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Contents

Foreword

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

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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".

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].

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 E-UTRAN.

The Global Procedures module contains procedures that are not related to a specific UE. The procedures in this module are in contrast to the above module involving two peer 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
Data Forwarding Address Indication	DATA FORWARDING 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

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

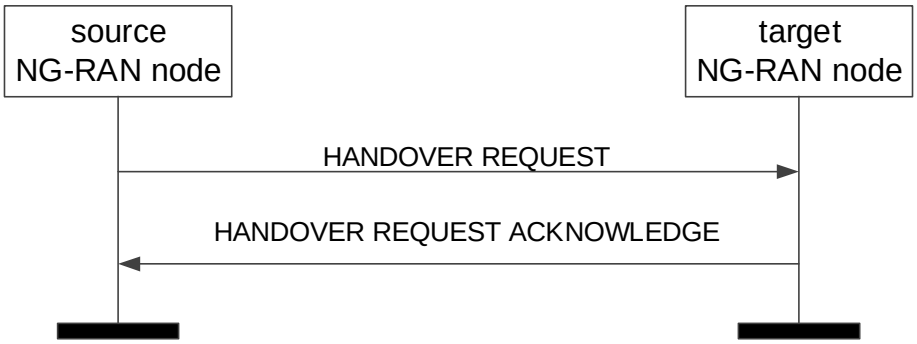

Figure 8.2.1.2-1: Handover Preparation, successful operation

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 $TXn_{RELOCprep}$.

If the *Signalling TNL association address at source NG-C side* IE is included in the HANDOVER REQUEST message the target NG-RAN node shall behave as specified in TS 23.502 [13].

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

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

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

Upon reception of the *PDU Session Resource Setup List* IE, contained in the HANDOVER REQUEST message, the target NG-RAN node shall behave the same as specified in TS 38.413 [5] for the PDU Session Resource Setup procedure. The target NG-RAN node shall report in the HANDOVER REQUEST ACKNOWLEDGE message the successful establishment of the result for all the requested PDU session resources. When the target NG-RAN node reports the unsuccessful establishment of a PDU session resource, the cause value should be precise enough to enable the source NG-RAN node to know the reason for the unsuccessful establishment.

For each PDU session if the *PDU Session Aggregate Maximum Bit Rate* IE is included in the *PDU Session Resources To Be Setup List* IE contained in the HANDOVER REQUEST message, the target NG-RAN node store the received PDU Session Aggregate Maximum Bit Rate in the UE context and use it for non-GBR QoS flows for the concerned PDU session and 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 *QoS Flows To Be Setup List* IE in the *PDU Session Resource 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 Admitted Response Transfer* IE contained in the *PDU Sessions Admitted List* IE in the HANDOVER REQUEST ACKNOWLEDGE message.

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. 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 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 *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 nor ciphering for the concerned PDU session

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.

8.2.1.3 Unsuccessful Operation

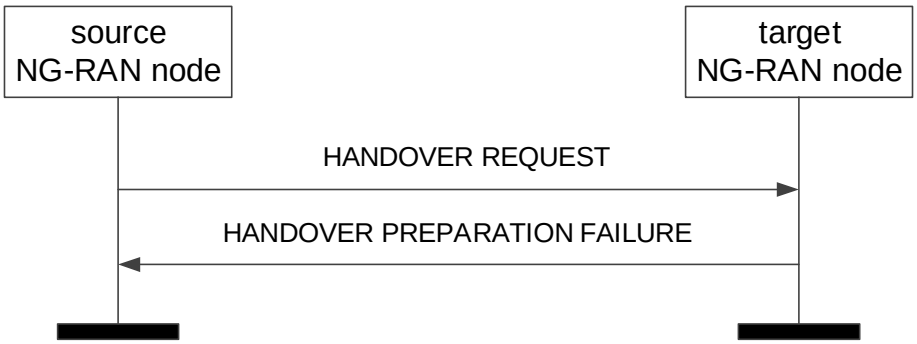

Figure 8.2.1.3-1: Handover Preparation, unsuccessful operation

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, for each respective DRB of the source DRB configuration for which PDCP SN and HFN status preservation applies.

The procedure uses UE-associated signalling.

8.2.2.2 Successful Operation

Figure 8.2.2.2-1: SN Status Transfer, successful operation

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

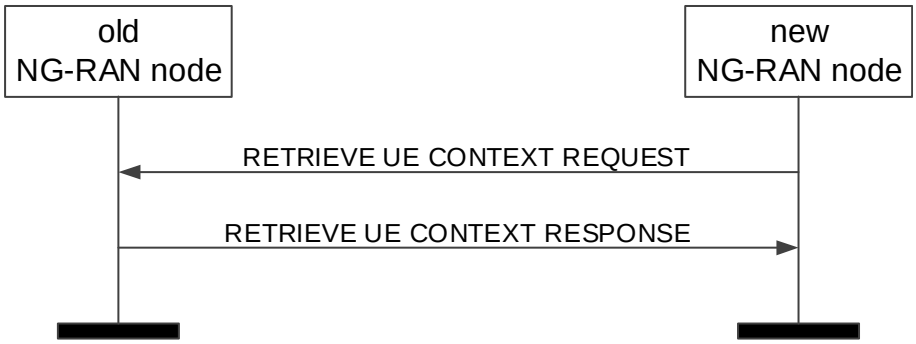

Figure 8.2.4.2-1: Retrieve UE Context, successful operation

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].

8.2.4.3 Unsuccessful Operation

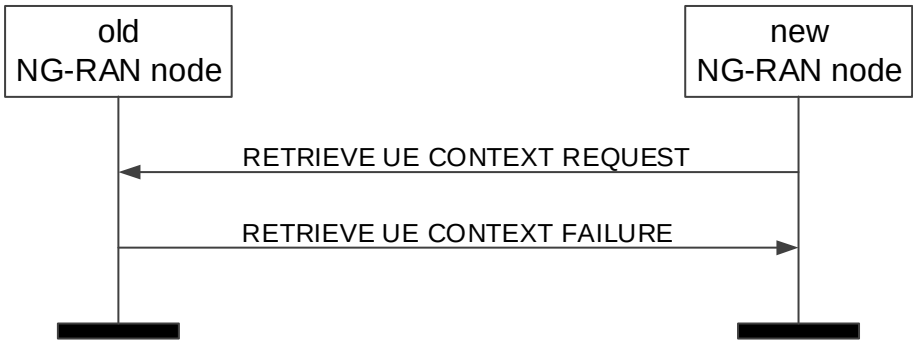

Figure 8.2.4.3-1: Retrieve UE Context, unsuccessful operation

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 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 Paging* IE is included in the RAN PAGING message, the NG-RAN $node_2$ may use it according to TS 38.300 [9].

8.2.5.3 Unsuccessful Operation

Not applicable.

8.2.5.4 Abnormal Condition

Void.

8.2.6 Data Forwarding Address Indication

8.2.6.1 General

For the retrieval of a UE context, the Data Forwarding 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.

The procedure uses UE-associated signalling.

8.2.6.2 Successful Operation

Figure 8.2.6.2-1: Data Forwarding Address Indication, successful operation

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

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

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.

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

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.

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

Editor's Note: Dual Connectivity is not complete and is targeted for completion in December 2018, all the text of section 8.3 is FFS.

8.3.1 S-NG-RAN node Addition Preparation

Editor's Note: Dual Connectivity is not complete and is targeted for completion in December 2018, all the text of section 8.3.1 is FFS.

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

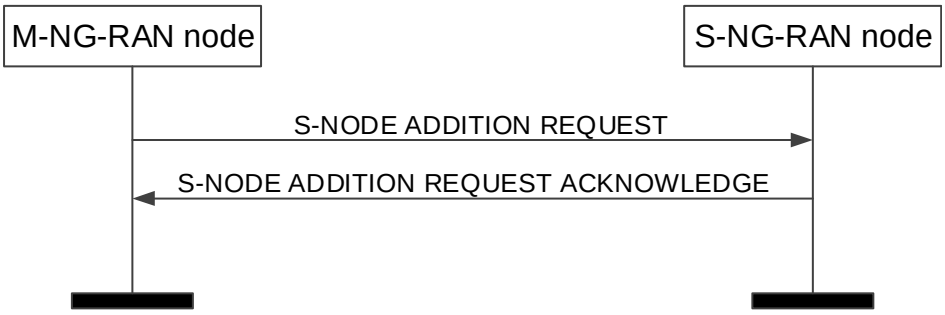

Figure 8.3.1.2-1: S-NG-RAN node Addition Preparation, successful operation

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 *PDU Session Level QoS Parameters* IE 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 in the S-NODE ADDITION REQUEST message, the S-NG-RAN node shall behave the same as the NG-RAN node in the PDU Session Resource Setup procedure, specified in TS 38.413 [5].

If the 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.

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}.

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 as specified in the TS 37.340 [8].

If the S-NODE ADDITION REQUEST ACKNOWLEDGE message contains the *RRC config indication* IE, the M-NG-RAN node shall consider that the appropriate configuration (full or delta) is applied by the S-NG-RAN node, 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 $TXn_{DCoverall}$.

8.3.1.3 Unsuccessful Operation

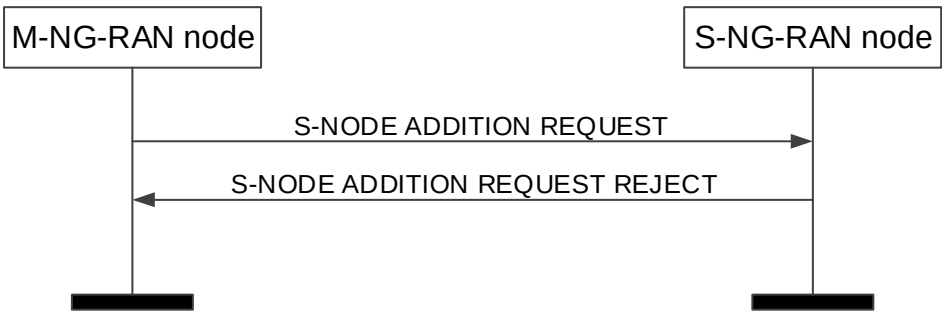

Figure 8.3.1.3-1: S-NG-RAN node Addition Preparation, unsuccessful operation

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

Void.

8.3.2 S-NG-RAN node Reconfiguration Completion

Editor's Note: Dual Connectivity is not complete and is targeted for completion in December 2018, all the text of section 8.3.2 is FFS.

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 M-NG-RAN node has not triggered configuration requested by the S-NG-RAN node. 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

Editor's Note: Dual Connectivity is not complete and is targeted for completion in December 2018, all the text of section 8.3.3 is FFS.

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

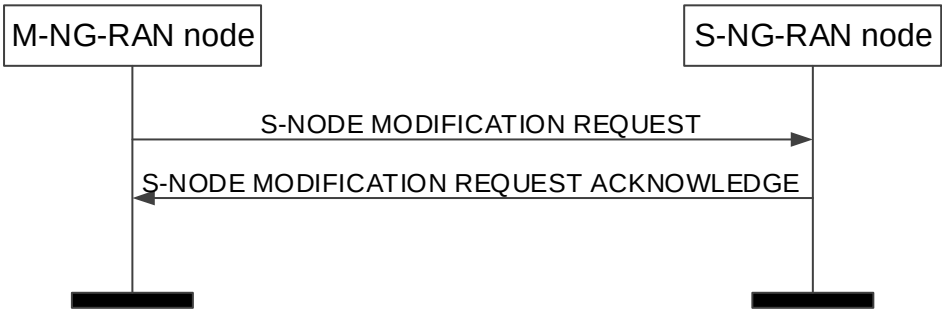

Figure 8.3.3.2-1: M-NG-RAN node initiated S-NG-RAN node Modification Preparation, successful operation

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 *SCG Change Indication* IE;
- the *SCG Configuration Query* IE;
- the *Requested split SRBs IE*;
- the *Requested split SRBs release* 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.

The allocation of resources according to the values of the *Allocation and Retention Priority* IE included in the *PDU Session Level QoS Parameters* IE 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 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].

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 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 *PDU Session level QoS parameter* IE is included in the S-NODE MODIFICATION REQUEST message for an PDU session resource to be modified the S-NG-RAN node shall allocate respective resources and provide corresponding radio configuration information within the *S-NG-RAN node to M-NG-RAN node Container* IE as specified in TS 37.340 [8].

If the S-NODE MODIFICATION REQUEST message contains for an PDU session resource to be modified which is configured with the SCG bearer option, the *NG UL UP Address* 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 an PDU session resource to be modified which is configured with the split bearer option, the *M-NG-RAN node UP Address* IE the S-NG-RAN node shall use it as the new UL Xn-U address.

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

For an PDU session resource to be modified which is configured with the split bearer option the S-NG-RAN node may include in the S-NODE MODIFICATION REQUEST ACKNOWLEDGE message the *S-NG-RAN node UP Address* IE.

If the *SCG 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 as specified in TS 37.340 [8].

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].

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 as specified in the TS 37.340 [8].

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

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 $TXn_{DCoverall}$.

8.3.3.3 Unsuccessful Operation

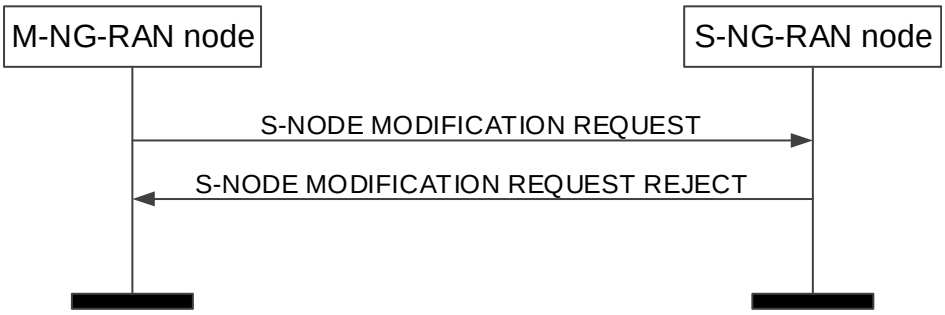

Figure 8.3.3.3-1: M-NG-RAN node initiated S-NG-RAN node Modification Preparation, unsuccessful operation

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 Modfication 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

Void.

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

Editor's Note: Dual Connectivity is not complete and is targeted for completion in December 2018, all the text of section 8.3.4 is FFS.

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

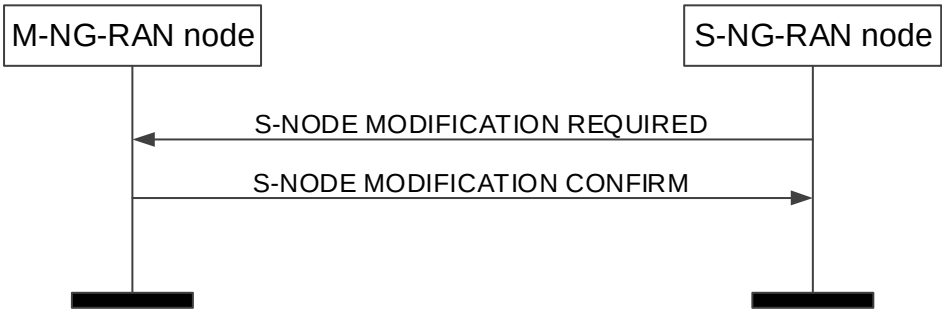

Figure 8.3.4.2-1: S-NG-RAN node initiated S-NG-RAN node Modification, successful operation.

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 released within the *PDU Session Resources To Be Released Item* IE;
- the *SCG Change Indication* IE.

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

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.

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

8.3.4.3 Unsuccessful Operation

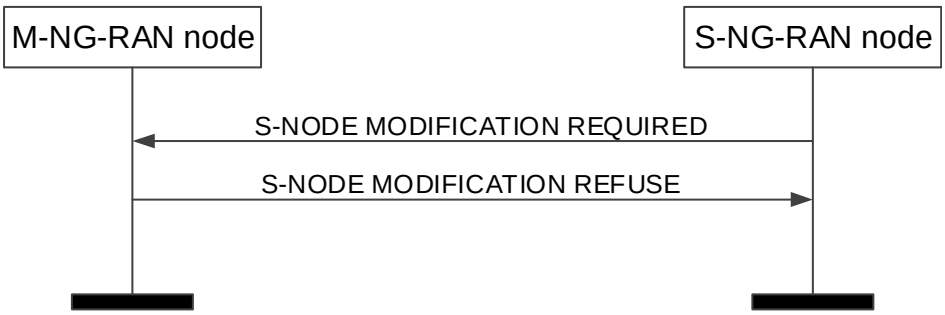

Figure 8.3.4.3-1: S-NG-RAN node initiated S-NG-RAN node Modification, unsuccessful operation.

In case the request 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.

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

Void.

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

Editor's Note: Dual Connectivity is not complete and is targeted for completion in December 2018, all the text of section 8.3.5 is FFS.

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

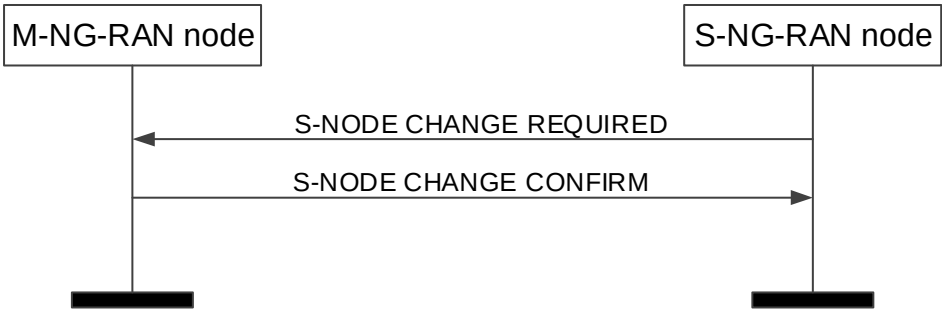

Figure 8.3.5.2-1: S-NG-RAN node initiated S-NG-RAN node Change, successful operation.

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.

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

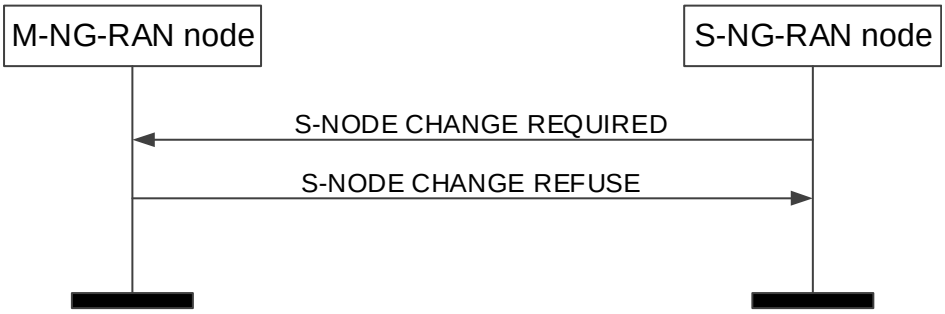

Figure 8.3.5.3-1: S-NG-RAN node initiated S-NG-RAN node Change, unsuccessful operation.

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.

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.

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

Editor's Note: Dual Connectivity is not complete and is targeted for completion in December 2018, all the text of section 8.3.6 is FFS.

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

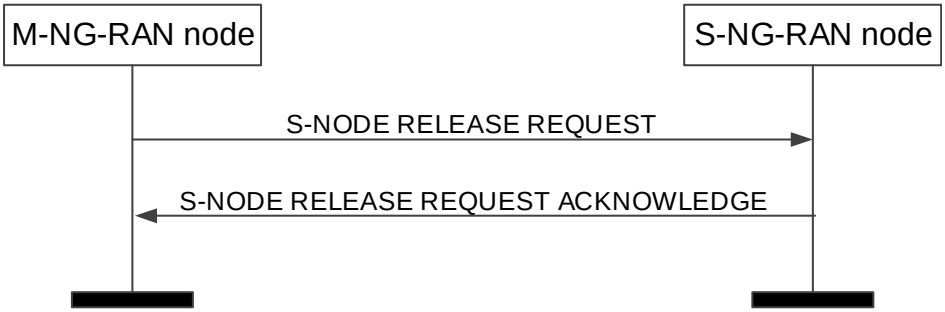

Figure 8.3.6.2-1: M-NG-RAN node initiated S-NG-RAN node Release, successful operation

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.

If the PDU session resource context in the S-NG-RAN node was configured with the SCG bearer option, for each SCG bearer for which the M-NG-RAN node requests forwarding of uplink/downlink data, the M-NG-RAN node includes the *UL Forwarding UP address*/ *DL Forwarding UP Address* IE within the *PDU Session Resources To Be Released Item* IE of the S-NODE RELEASE REQUEST message to indicate that the S-NG-RAN node should perform data forwarding of uplink/downlink packets for that SCG bearer.

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.

8.3.6.3 Unsuccessful Operation

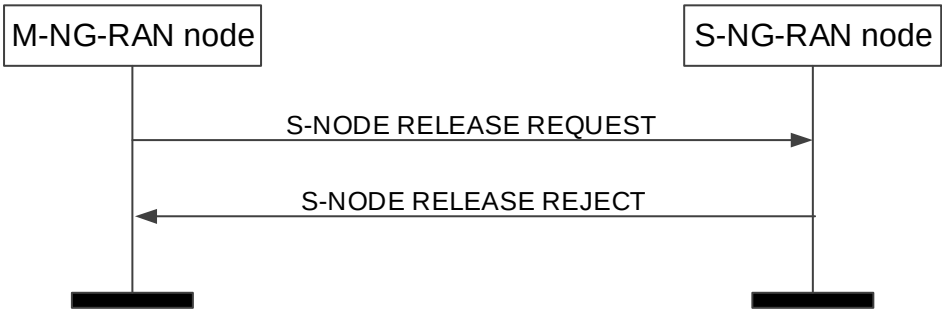

Figure 8.3.6.3-1: M-NG-RAN node initiated S-NG-RAN node Release, unsuccessful operation

If the S-NG-RAN node cannot confirms 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

Void.

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

Editor's Note: Dual Connectivity is not complete and is targeted for completion in December 2018, all the text of section 8.3.7 is FFS.

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

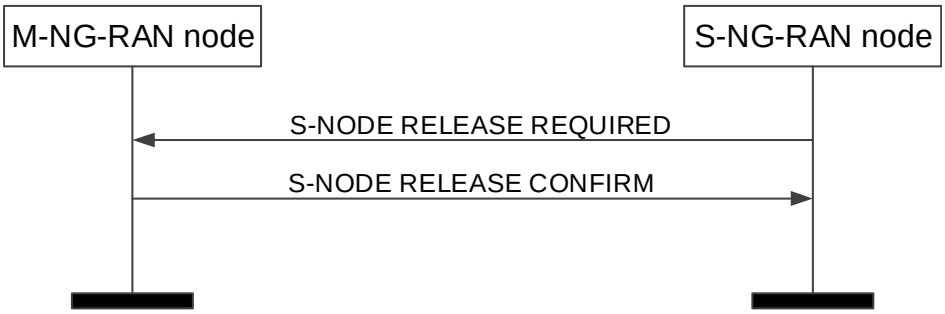

Figure 8.3.7.2-1: S-NG-RAN node initiated S-NG-RAN node Release, successful operation.

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 PDU session resource configured with the SCG bearer option, 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,

8.3.7.3 Unsuccessful Operation

Not applicable.

8.3.7.4 Abnormal Conditions

Void.

8.3.8 S-NG-RAN node Counter Check

Editor's Note: Dual Connectivity is not complete and is targeted for completion in December 2018, all the text of section 8.3.8 is FFS.

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 38.331 [10].

8.3.8.3 Unsuccessful Operation

Not applicable.

8.3.8.4 Abnormal Conditions

Void.

8.3.9 RRC Transfer

Editor's Note: Dual Connectivity is not complete and is targeted for completion in December 2018, all the text of section 8.3.9 is FFS.

8.3.9.1 General

The purpose of the RRC Transfer procedure is to deliver an LTE RRC message or NR RRC message encapsulated in a PDCP-C PDU 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 of either the NR RRC message container with the NR measurements or the E-UTRA RRC message container with the E-UTRA measurements from the M-NG-RAN-NODE to the S-NG-RAN-NODE, when received from the UE.

The procedure uses UE-associated signalling.

8.3.9.2 Successful Operation

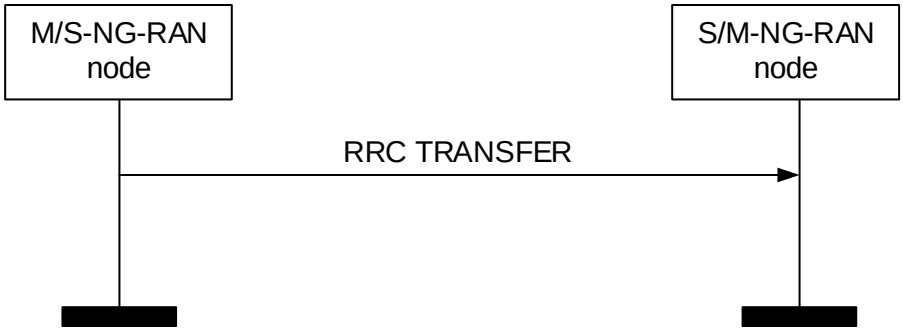

Figure 8.3.9.2-1: RRC Transfer procedure, successful operation.

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 a RRC TRANSFER message without the RRC Container IE in the *Split SRB* IE, or 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 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 Notificaton Control indication procedure is to provide information that for already established GBR QoS flow(s) for which notification control has been enabled, the NG-RAN node involved in Dual Connectivity cannot fulfill 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 of one or several already established QoS flows or PDU sessions. The procedure uses UE-associated signalling.

8.3.11.2 Successful Operation

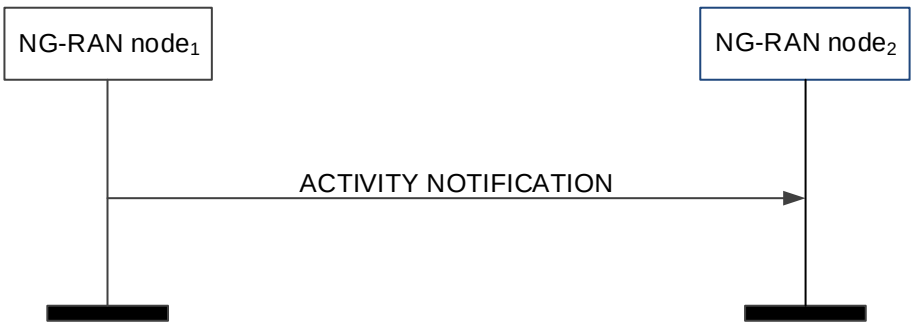

Figure 8.3.11.2-1: Activity Notification

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

The ACTIVITY NOTIFICATION message may contain

- 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 or QoS flows within the *PDU Session Resource Activity Notify List* IE.

NOTE: Specification text may need to be refined.

8.3.11.3 Abnormal Conditions

Void.

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

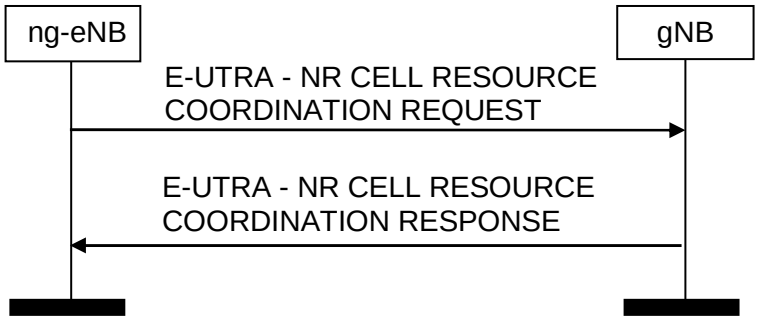

Figure 8.3.12.2-1: ng-eNB-initiated E-UTRA – NR Cell Resource Coordination request, successful operation

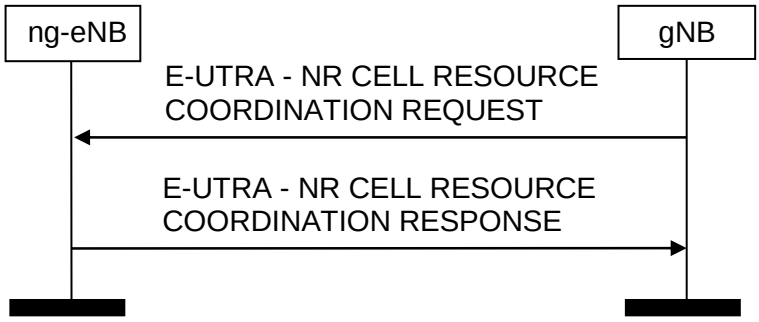

Figure 8.3.12.2-2: gNB-initiated E-UTRA – NR Cell Resource Coordination request, successful operation

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.

8.4 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.

The procedure uses non UE-associated signalling.

8.4.1.2 Successful Operation

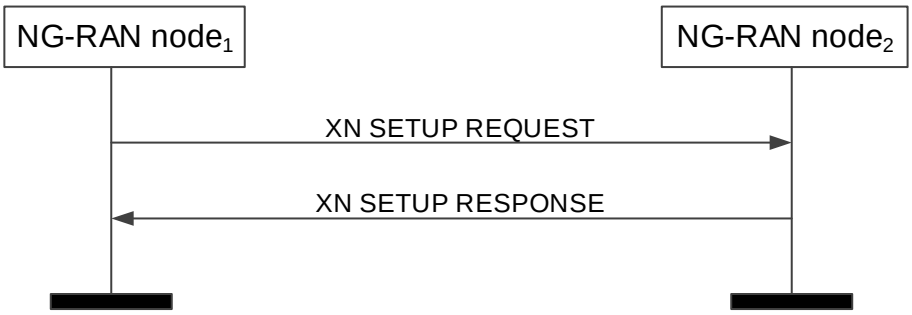

Figure 8.4.1.2: Xn Setup, successful operation

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.

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.

The NG-RAN node$_1$ may include the *TAI Slice Support List* IE in the XN SETUP REQUEST message. The candidate NG-RAN node$_2$ may also include *TAI Slice Support List* IE in the XN SETUP RESPONSE message. The NG-RAN node receiving the IE may use it accordingly.

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.

8.4.1.3 Unsuccessful Operation

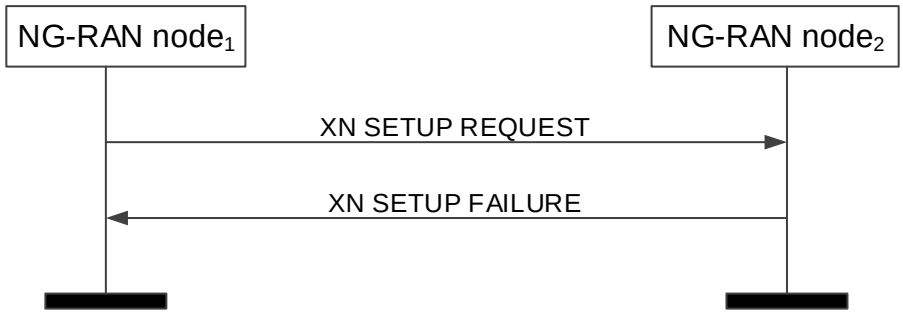

Figure 8.4.1.3-1: Xn Setup, unsuccessful operation

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$_2$.

8.4.1.4 Abnormal Conditions

Void.

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.

8.4.2.2 Successful Operation

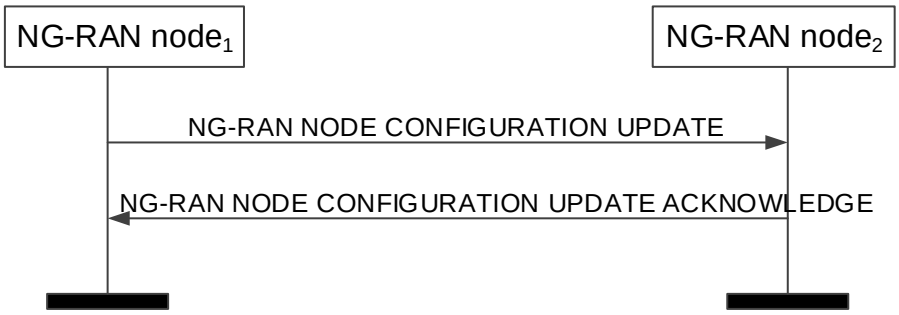

Figure 8.4.2.2-1: NG-RAN node Configuration Update, successful operation

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, if supported, replace any 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:

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.
- 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.
- 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.

8.4.2.3 Unsuccessful Operation

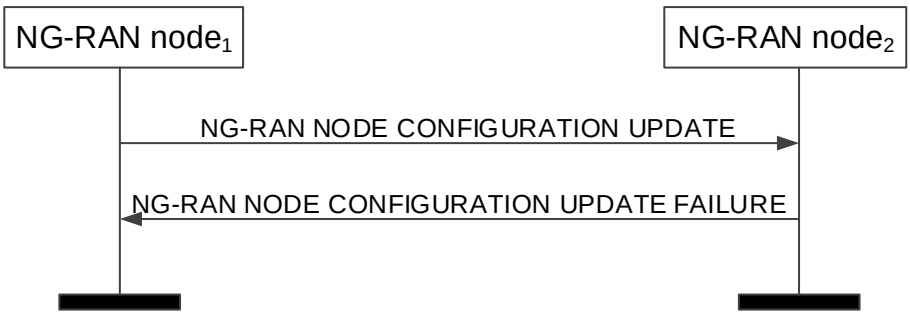

Figure 8.4.2.3-1: NG-RAN node Configuration Update, unsuccessful operation

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.

8.4.2.4 Abnormal Conditions

Void.

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

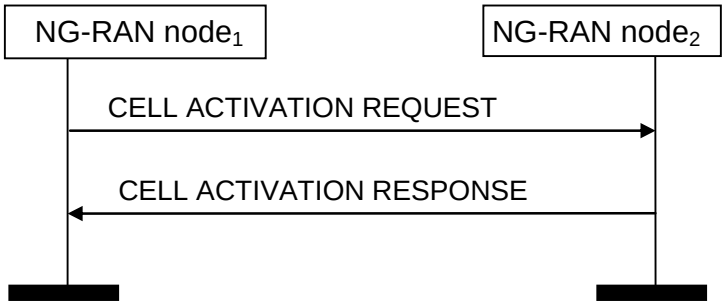

Figure 8.4.3.2-1: EN-DC Cell Activation, successful operation

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.

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

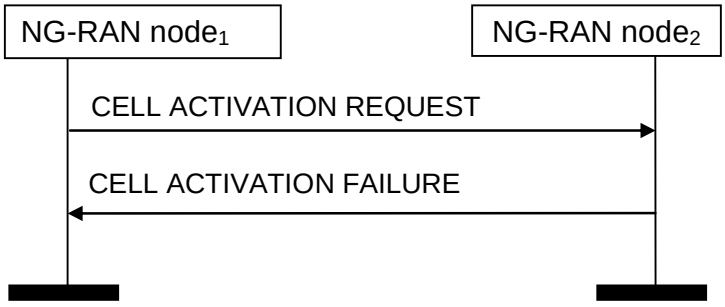

Figure 8.4.3.3-1: EN-DC Cell Activation, unsuccessful operation

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.

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

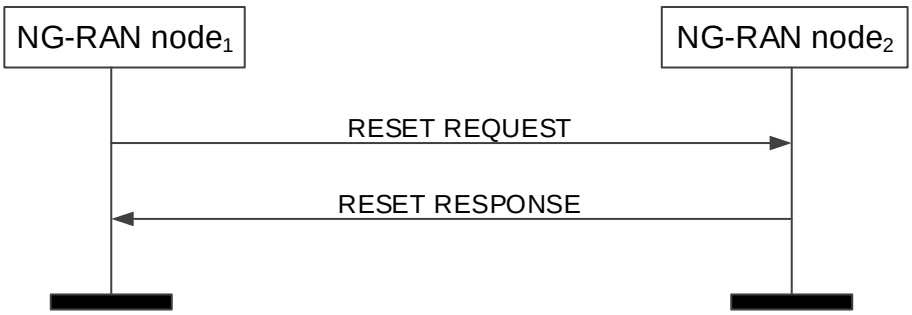

Figure 8.4.4.2-1: Reset, successful operation

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.

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 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

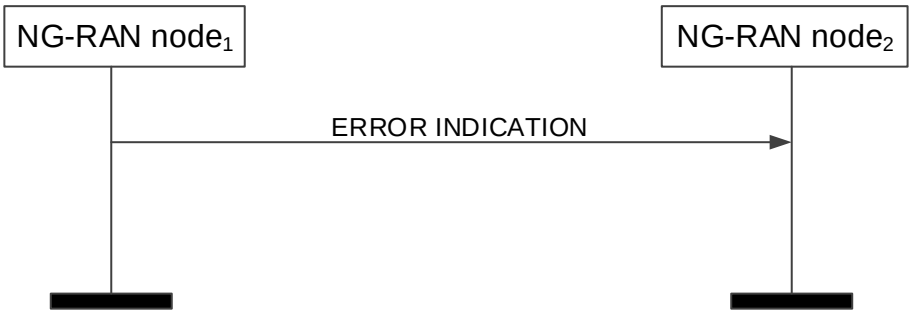

Figure 8.4.5.2-1: Error Indication, successful operation.

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.

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.

The procedure uses non UE-associated signaling.

8.4.6.2 Successful Operation

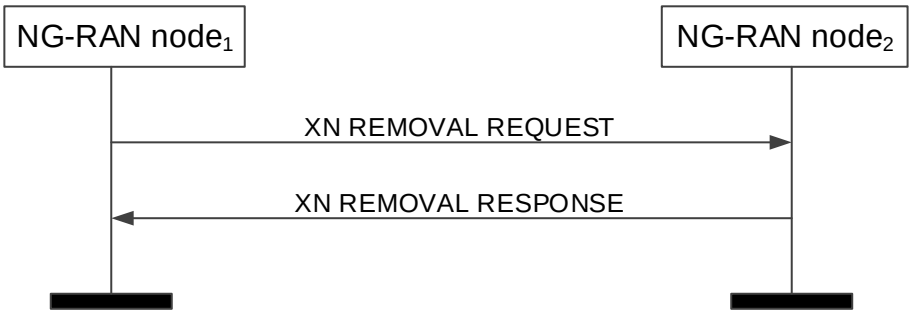

Figure 8.4.6.2-1: Xn Removal, successful operation

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.

8.4.6.3 Unsuccessful Operation

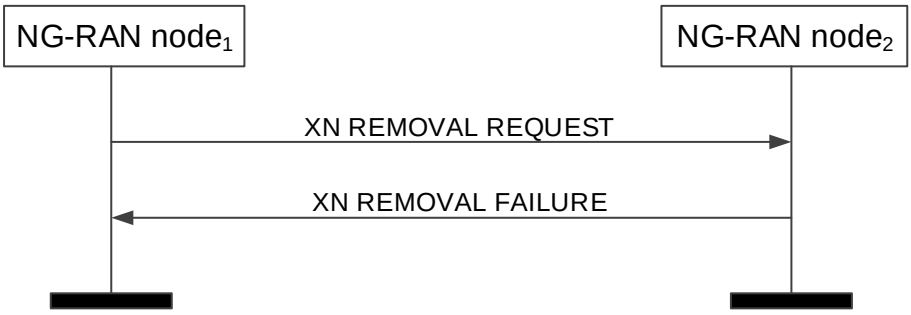

Figure 8.4.6.3-1: Xn Removal, unsuccessful operation

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.

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	M	*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.	–	
>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		–	
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

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.

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 for handover at the source NG-RAN node	YES	reject
Target NG-RAN node UE XnAP ID	M		NG-RAN node UE XnAP ID 9.2.3.16	Allocated for handover at the target NG-RAN node	YES	reject
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.

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

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].	–	
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 Paging	O		9.2.3.41		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	ignore
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))	*ShortMAC-I* either contained in the *RRCConnection ResumeRequest* message as defined in TS 38.331 [10]) or in the *RRCConnection ResumeRequest* message as defined in TS 36.331 [14])	YES	reject
New Cell Identifier	M		NG-RAN Cell Identity 9.2.2.9	The Cell Identifier of the cell where the RRC connection has been requested to be resumed or to be re-established.	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 *RRC ResumeRequest* 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	ignore
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	ignore
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 DATA FORWARDING ADDRESS INDICATION

This message is sent by the new NG-RAN node to transfer data forwarding information to the new NG-RAN node.

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	ignore
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
Data Forwarding Info per PDU Session Resources		*1*			YES	reject
>**Data Forwarding Info per PDU Session Resources Item**		*1..<maxnoofPDUSessions>*			–	
>>PDU Session ID	M		9.2.3.18		–	
>>DL Forwarding UP TNL Information	O		UP Transport Layer Information 9.2.3.30		–	

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

9.1.2 Messages for Dual Connectivity Procedures

Editor's Note: Dual Connectivity is not complete and is targeted for completion in December 2018, all the text of section 9.1.2 is FFS.

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	This IE may need to be refined.	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	This IE may need to be refined.	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>*			–	
>>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		9.2.3.69		–	
>>Bearer Configurations To Be Added		*1 .. <maxnoofBearerConfigs>*			–	
>>>CHOICE *Bearer Configuration*	M				–	
>>>>*SN terminated Bearer*					–	
>>>>>PDU Session Resource Setup Info – SN terminated	M		9.2.1.5		–	
>>>>*MN terminated Bearer*					–	
>>>>>PDU Session Resource Setup Info – MN terminated	M		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] or the *SCG-ConfigInfo* message as defined in subclause 10.2.2 of TS 36.331 [14].	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		OCTET STRING	This IE may need to be refined	YES	ignore
Requested Split SRBs	O		ENUMERATED (srb1, srb2, srb1&2, ...)	Indicates that resources for Split SRBs are requested.	YES	reject
PCell ID	O		Global NG-RAN Cell Identity 9.2.2.27		YES	reject

Range bound	Explanation
maxnoofPDUSessions	Maximum no. of PDU sessions. Value is 256
maxnoofBearerConfigs	Maximum no. of BearerConfigurations Value is 2. The value may need to be refined. So far, only MN- and SN-terminated bearer configurations are considered.

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>*			–	
>>PDU Session ID	M		9.2.3.18		–	
>>Bearer Configurations Admitted To Be Added		*1 .. <maxnoofBearerConfigs>*			–	
>>>CHOICE *Bearer Configuration*	M				–	
>>>>*SN terminated Bearer*					–	
>>>>>PDU Session Resource Setup Response Info – SN terminated	M		9.2.1.6		–	
>>>>*MN terminated Bearer*					–	
>>>>>PDU Session Resource Setup Response Info – MN terminated	M		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	A value for *PDU Session ID* shall only be present once in *PDU Session Resources Admitted List* IE and in *PDU Session Resources Not Admitted List* IE.	–	
>PDU Session Resources Not Admitted List – MN terminated	O		PDU Session Resources Not Admitted List 9.2.1.3	A value for *PDU Session ID* shall only be present once in *PDU Session Resources Admitted List* IE and in *PDU Session Resources Not Admitted List* IE.	–	
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] or the *SCG-Config* message as defined in subclause 10.2.2 of TS 36.331 [14].	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

Range bound	Explanation
maxnoofPDUSessions	Maximum no. of PDU sessions. Value is 256
maxnoofBearerConfigs	Maximum no. of BearerConfigurations Value is 2. This value may need to be refined. So far, only MN- and SN-terminated bearer configurations are considered.

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	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
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] or the *SCG-ConfigInfo* message as defined in subclause 10.2.2 of TS 36.331 [14].	–	

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	This IE may need to be refined.	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	This IE may need to be refined.	–	
>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>*			–	
>>>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		9.2.3.69			
>>>Bearer Configurations To Be Added		*1 .. <maxnoofBearerConfigs>*			–	
>>>>CHOICE *Bearer Configuration*	M				–	
>>>>>*SN terminated Bearer*					–	
>>>>>PDU Session Resource Setup Info – SN terminated	M		9.2.1.5		–	
>>>>>*MN terminated Bearer*					–	
>>>>>>PDU Session Resource Setup Info – MN terminated	M		9.2.1.7		–	
>PDU Session Resources To Be Modified List		*0..1*			–	
>>PDU Session Resources To Be Modified Item		*1 .. <maxnoofPDUSessions>*			–	
>>>PDU Session ID	M		9.2.3.18		–	

>>>S-NG-RAN node PDU Session Aggregate Maximum Bit Rate	O		9.2.3.69		–	
>>>Bearer Configurations To Be Modified		*1 .. <maxnoofBearerConfigs>*			–	
>>>>CHOICE *Bearer Configuration*	M				–	
>>>>>*SN terminated Bearer*					–	
>>>>>>PDU Session Resource Modification Info – SN terminated	M		9.2.1.9		–	
>>>>>*MN terminated Bearer*					–	
>>>>>>PDU Session Resource Modification Info – MN terminated	M		9.2.1.11		–	
> PDU Session Resources To Be Released List		*0..1*			–	
>>PDU Session Resources To Be Released List – SN terminated	O		OCTET STRING	A value for *PDU Session ID* shall only be present once in *PDU Session Resources Admitted List* IE and in *PDU Session Resources Not Admitted List* IE. This IE may need to be refined.	–	
>>PDU Session Resources to Be Released List – MN terminated	O		OCTET STRING	A value for *PDU Session ID* shall only be present once in *PDU Session Resources Admitted List* IE and in *PDU Session Resources Not Admitted List* IE. This IE may need to be refined.	–	
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] or the *SCG-ConfigInfo* message as defined in subclause 10.2.2 of TS 36.331 [14].	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

Range bound	Explanation
maxnoofPDUSessions	Maximum no. of PDU sessions. Value is 256
maxnoofBearerConfigs	Maximum no. of BearerConfigurations Value is 2. This value may need to be refined. So far, only MN- and SN-terminated bearer configurations are considered.

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		*1*			–	
>>PDU Session Resources Admitted To Be Added Item		*1 .. <maxnoofPDUSessions>*			–	
>>>PDU Session ID	M		9.2.3.18		–	
>>>Bearer Configurations Admitted To Be Added		*1 .. <maxnoofBearerConfigs>*			–	
>>>>CHOICE *Bearer Configuration*	M				–	
>>>>>*SN terminated Bearer*					–	
>>>>>> PDU Session Resource Setup Response Info – SN terminated	M		9.2.1.6		–	
>>>>>*MN terminated Bearer*					–	
>>>>>>PDU Session Resource Setup Response Info – MN terminated	M		9.2.1.8		–	
>PDU Session Resources Admitted To Be Modified List		*0..1*			–	
>>PDU Session Resources Admitted To Be Modified Item		*1 .. <maxnoofPDUSessions>*			–	
>>>PDU Session ID	M		9.2.3.18		–	
>>>Bearer Configurations Admitted To Be Modified		*1 .. <maxnoofBearerConfigs>*			–	
>>>>*CHOICE Bearer Configuration*	M				–	
>>>>>*SN terminated Bearer*					–	
>>>>>>PDU Session Resource Modification Response Info – SN terminated	M		9.2.1.10		–	
>>>>>*MN terminated Bearer*					–	
>>>>>>PDU Session Resource Modification Response Info – MN terminated	M		9.2.1.12		–	
>PDU Session Resources Admitted To Be Released List		*0..1*			–	

>>PDU Session Resources admitted to be released List – SN terminated	O		OCTET STRING	A value for *PDU Session ID* shall only be present once in *PDU Session Resources Admitted List* IE and in *PDU Session Resources Not Admitted List* IE. This IE may need to be refined.	–	
>>PDU Session Resources admitted to be released List – MN terminated	O		OCTET STRING	A value for *PDU Session ID* shall only be present once in *PDU Session Resources Admitted List* IE and in *PDU Session Resources Not Admitted List* IE. This IE may need to be refined.	–	
PDU Session Resources Not Admitted to be Added List	O				YES	ignore
>PDU Session Resources Not Admitted List – SN terminated	M		PDU Session Resources Not Admitted List 9.2.1.3	A value for *PDU Session ID* shall only be present once in *PDU Session Resources Admitted List* IE and in *PDU Session Resources Not Admitted List* IE.	–	

>PDU Session Resources Not Admitted List – MN terminated	M		PDU Session Resources Not Admitted List 9.2.1.3	A value for *PDU Session ID* shall only be present once in *PDU Session Resources Admitted List* IE and in *PDU Session Resources Not Admitted List* IE.	–	
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] or the *SCG-Config* message as defined in subclause 10.2.2 of TS 36.331 [14].	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

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>*			–	
>>PDU Session ID	M		9.2.3.18		–	
>>Bearer Configurations To Be Added		*1 .. <maxnoofBearerConfigs>*			–	
>>>CHOICE *Bearer Configuration*	M				–	
>>>>SN terminated Bearer						
>>>>> PDU Session Modification Required Info – SN terminated	M		9.2.1.20		–	
>>>>MN terminated Bearer						
>>>>>PDU Session Modification Required Info – MN terminated	M		9.2.1.22		–	
PDU Session Resources To Be Released List		*0..1*		Editor's Note: whether this IE is necessary needs further discussions.	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] or the *SCG-Config* message as defined in subclause 10.2.2 of TS 36.331 [14].	YES	ignore

Range bound	Explanation
maxnoofPDUSessions	Maximum no. of PDU sessions. Value is 256
maxnoofBearerConfigs	Maximum no. of BearerConfigurations Value is 2.

	The value may need to be refined. So far, only MN- and SN-terminated bearer configurations are considered.

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>*			–	
>>PDU session ID	M		9.2.3.18		–	
>>Bearer Configurations Admitted To Be Added		*1 .. <maxnoofBearerConfigs>*			–	
>>>CHOICE *Bearer Configuration*	M				–	
>>>>*SN terminated Bearer*						
>>>>>PDU Session Modificaton Confirm Info – SN terminated	M		9.2.1.21		–	
>>>>*MN terminated Bearer*						
>>>>> PDU Session Modificaton Confirm Info – MN terminated	M		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 *CG-ConfigInfo* message as defined in subclause 11.2.2 of TS 38.331 [10] or the *SCG-ConfigInfo* message as defined in subclause 10.2.2 of TS 36.331 [14].	YES	ignore
Criticality Diagnostics	O		9.2.3.3		YES	ignore

Range bound	Explanation
maxnoofPDUSessions	Maximum no. of PDU sessions. Value is 256
maxnoofBearerConfigs	Maximum no. of BearerConfigurations Value is 2. This value may need to be refined. So far, only MN- and SN-terminated bearer configurations are considered.

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] or the *SCG-ConfigInfo* message as defined in subclause 10.2.2 of TS 36.331 [14].	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 .. <maxnoof PDUsessions>*			–	
>>PDU Session ID	M		9.2.3.18		–	
>>Bearer Configurations To Be Added		*1 .. <maxnoofBearerConfigs>*			–	
>>>CHOICE *Bearer Configuration*	M				–	
>>>>SN terminated Bearer					–	
>>>>>PDU Session Resource Change Required Info – SN terminated	M		9.2.1.18		–	
>>>>MN terminated Bearer					–	
S-NG-RAN node to M-NG-RAN node Container	M		OCTET STRING	Includes the *CG-Config* message as defined in 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
maxnoofBearerConfigs	Maximum no. of BearerConfigurations Value is FFS. Editor's Note: So far, only MN- and SN-terminated bearer configurations are considered.

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>*			–	
>>PDU Session ID	M		9.2.3.18		–	
>>Bearer Configurations		*1 .. <maxnoofBearerConfigs>*			–	
>>>CHOICE *Bearer Configuration*	M				–	
>>>>*SN terminated Bearer*					–	
>>>>>PDU Session Resource Change Confirm Info – SN terminated	M		9.2.1.19		–	
>>>>*MN terminated Bearer*					–	
Criticality Diagnostics	O		9.2.3.3		YES	ignore

Range bound	Explanation
maxnoofPDUsessions	Maximum no. of PDU sessions. Value is 256
maxnoofBearerConfigs	Maximum no. of BearerConfigurations Value is FFS. Editor's Note: So far, only MN- and SN-terminated bearer configurations are considered.

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	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	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		*0..1*		Editor's Note: This IE needs to be refined	YES	ignore
>PDU Session Resources To Be Released Item		*1 .. <maxnoofPDUSessions>*			–	
>>CHOICE *Bearer Option*	M				–	
>>>*SCG Bearer*					–	
>>>>PDU Session ID	M		9.2.3.18		–	
>>>>UL Forwarding UP TNL Information	O		UP Transport Layer Information 9.2.3.30	Identifies the Xn transport bearer used for forwarding of UL PDUs	–	
>>>>DL Forwarding UP TNL Information	O		UP Transport Layer Information 9.2.3.30	Identifies the Xn transport bearer. used for forwarding of DL PDUs	–	
>>>*Split Bearer*					–	
>>>>PDU Session ID	M		9.2.3.18		–	
>>>>DL Forwarding UP TNL Information	O		UP Transport Layer Information 9.2.3.30	Identifies the Xn transport bearer. used for forwarding of DL PDUs	–	
UE Context Kept Indicator	O		9.2.3.68	This IE may need to be refined.	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] or the *SCG-ConfigInfo* message as defined in subclause 10.2.2 of TS 36.331 [14].	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	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	O		NG-RAN node UE XnAP ID 9.2.3.16	Allocated at the S-NG-RAN node	YES	reject
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	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	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 List		*0..1*			YES	ignore
>PDU sessions 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

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 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		–	
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.

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	RRC message encapsulated in a PDCP-C PDU 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	–	
NR UE Measurement Report		*0..1*			YES	reject
>RRC Container	M		OCTET STRING	Contains the *MeasurementReport* message as defined in subclause 6.2.2 of TS 38.331 [10] or the *MeasurementReport* message as defined in subclause 6.2.2 of TS 36.331 [14].	–	

9.1.2.21 NOTIFICATION CONTROL INDICATION

This message is sent to notify that the already established QoS flow(s) for a given UE are 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 Notificaton 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	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	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 List		*1..<maxnoofPDUSessions>*			–	
>>PDU Session ID	M		9.2.2.31		–	
>>PDU Session level user plane activity report	O		User plane traffic activity report 9.2.3.59		–	
>>**QoS Flows Activity Notify List**		*0..<maxnoofQoSflows>*			–	
>>>QoS Flow Indicator	M		9.2.3.10		–	
>>> User plane traffic activity report	M		9.2.3.59		–	

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		*0 .. < 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		*1 .. < 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		*0 .. < maxnoNRcellsSpectrumSharingwithE-UTRA >*		List of applicable NR cells	–	
>>>NR-Cell ID	M		NR-CGI 9.2.2.7		–	

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		*0 .. < 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		*0 .. < maxnoNRcellsSpectrumSharingwithE-UTRA >*		List of applicable NR cells	–	
>>>NR Cell ID	M		NR-CGI 9.2.2.7		–	

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.

9.1.3 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	O		9.2.3.20	List of supported TAs and associated characteristics.	YES	reject
AMF Pool information	M		OCTET STRING	List of all the AMF pools to which the NG-RAN node belongs. This IE may need to be refined.	YES	reject
List of Served Cells NR		*0 .. <maxnoofCellsinNG-RAN node>*		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>*		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		–	

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	O		9.2.3.20	List of supported TAs and associated characteristics.	YES	reject
List of Served Cells NR		*0 .. <maxnoofCellsinNG-RAN node>*		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>*		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

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

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

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-RAN node*>		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	–	
Criticality Diagnostics	O		9.2.3.3		YES	ignore

Range bound	Explanation
maxnoofCellsinNGRAN node	Maximum no. cells that can be served by an NG-RAN node. Value is 16384.

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

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

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

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

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 UE contexts>*			–	
>>>>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

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 $node_2$ → 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 UE contexts>*			–	
>>>>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

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

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

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

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

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	M		9.2.3.69	This IE shall be present when at least one non-GBR QoS Flows are 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	–	
>>Security Indication	O		9.2.3.52		–	
>>PDU Session Type	M		9.2.3.19		–	
>>QoS Flows To Be Setup List		*1*			–	
>>>QoS Flows To Be Setup Item		*1 .. <maxnoofQoSFlows>*			–	
>>>>QoS Flow Indicator	M		9.2.3.10		–	
>>>>DL data Forwarding	O		9.2.3.34		–	
>>>>QoS Flow Level QoS Parameters	M		9.2.3.5		–	
>>>>E-RAB ID	O		INTEGER (0..15, …)		–	
>>Source DRB to QoS Flow Mapping List	O		DRB to QoS Flow Mapping List 9.2.1.15		–	

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		–	
>>QoS Flows Admitted List		*1*			–	
>>>QoS Flows Admitted Item		*1..<maxnoofQoSFlows>*			–	
>>>>QoS Flow Indicator	M		9.2.3.10			
>>>>Data Forwarding Accepted	O		9.2.3.35		–	
>>QoS Flows not Admitted List		*0..1*			–	
>>>QoS Flows not Admitted Item	O	*1..<maxnoofQoSFlows>*			–	
>>>>QoS Flow Indicator	M		9.2.3.10		–	
>>>>Cause	M		9.2.3.2		–	
>>Data Forwarding Info from target NG-RAN node	O		9.2.1.16		–	

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	Criticality	Assigned Criticality
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	Criticality	Assigned Criticality
QoS Flow with Cause Item		*1..<maxnoofQoSFlows>*			–	
>QoS Flow Indicator	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.

9.2.1.5 PDU Session Resource Setup Info – SN terminated

Editor's Note: Dual Connectivity is not complete and is targeted for completion in December 2018, the content of this section is FFS.

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		–	
QoS Flows To Be Setup List		*1*			–	
>**QoS Flows To Be Setup Item**		*1 .. <maxnoofQoSFlows>*			–	
>>QoS Flow Indicator	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.	–	
DL Forwarding	O		9.2.3.34	This IE may need to be refined. Placeholder IE only.	–	
Security Indication	O		9.2.3.52		–	

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

9.2.1.6 PDU Session Resource Setup Response Info – SN terminated

Editor's Note: Dual Connectivity is not complete and is targeted for completion in December 2018, the content of this section is FFS.

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
NG-U DL 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		*1*			–	
>DRBS to Be Setup Item		*1 .. <maxnoofDRBs>*			–	
>>DRB ID	M		9.2.3.33		–	
>>SN UL PDCP UP TNL Information	M		UP Transport Layer Information 9.2.3.30	S-NG-RAN node endpoint 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	O		9.2.3.28		–	
>>secondary SN UL PDCP UP TNL Information	O		UP Transport Layer Information 9.2.3.30	S-NG-RAN node endpoint 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 To Mapped to DRB Item		*1 .. <maxnoofQoSFlows>*			–	
>>>>QoS Flow Indicator	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 Flows Not Admitted List	O		QoS Flow List with Cause 9.2.1.4		–	
DL Forwarding UP TNL Information	O		UP Transport Layer Information 9.2.3.30	Identifies the Xn transport bearer used for forwarding of DL PDUs This IE may need to be refined. Placeholder only.	–	
UL Forwarding UP TNL Information	O		UP Transport Layer Information 9.2.3.30	Identifies the Xn transport bearer used for forwarding of UL PDUs This IE may need to be refined. Placeholder only.	–	
Security Result	O		9.2.3.67		–	

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

Editor's Note: Dual Connectivity is not complete and is targeted for completion in December 2018, the content of this section is FFS.

This IE contains information for the addition of S-NG-RAN node resources related to a PDU session for DRBs configured with an MN terminated bearer option.

IE/Group Name	Presence	Range	IE type and reference	Semantics description	Criticality	Assigned Criticality
PDU Session Type	M		9.2.3.19		–	
DRBs To Be Setup List		*1*			–	
>DRBS to Be Setup Item		*1 .. <maxnoofDRBs>*			–	
>>DRB ID	M		9.2.3.33		–	
>>MN UL PDCP UP TNL Information	M		UP Transport Layer Information 9.2.3.30	M-NG-RAN node endpoint of a DRB's Xn-U transport bearer at its PDCP resource. For delivery of UL PDUs.	–	
>>RLC Mode	O		9.2.3.28		–	
>>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 Layer Information 9.2.3.30	M-NG-RAN node endpoint 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 Indicator	M		9.2.3.10		–	
>>>>QoS Flow Level QoS Parameters	M		9.2.3.5		–	

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

Editor's Note: Dual Connectivity is not complete and is targeted for completion in December 2018, the content of this section is FFS.

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 .. <maxnoofDRBs>*			–	
>>DRB ID	M		9.2.3.33		–	
>>S-Node DL SCG UP TNL Information	M		UP Transport Layer Information 9.2.3.30	S-NG-RAN node GTP-U tunnel endpoint of the DRB's Xn transport at its Lower Layer SCG resource. For delivery of DL PDUs.	–	
>>secondary S-Node DL SCG UP TNL Information	O		UP Transport Layer Information 9.2.3.30	S-NG-RAN node GTP-U tunnel endpoint 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	–	

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

Editor's Note: Dual Connectivity is not complete and is targeted for completion in December 2018, the content of this section is FFS.

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	–	
QoS Flows To Be Setup List		*0..1*			–	
>QoS Flows To Be Setup Item		*1 .. <maxnoofQoSFlows>*			–	
>>QoS Flow Indicator	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.	–	
DL Forwarding	O		9.2.3.34	This IE may need to be refined. Placeholder only.	–	
QoS Flows To Be Modified List		*0..1*			–	
>QoS Flows To Be Modified Item		*1 .. <maxnoofQoSFlows>*			–	
>>QoS Flow Indicator	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				–	
>>MN DL PDCP UP TNL Information	O		UP Transport Layer Information 9.2.3.30	M-NG-RAN node endpoint of a DRB's Xn transport bearer at its PDCP resource. For delivery of DL PDUs.	–	
>>secondary MN DL PDCP UP TNL Information	O		UP Transport Layer Information 9.2.3.30	M-NG-RAN node endpoint of a DRB's Xn transport bearer at its PDCP 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	–	

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

9.2.1.10 PDU Session Resource Modification Response Info – SN terminated

Editor's Note: Dual Connectivity is not complete and is targeted for completion in December 2018, the content of this section is FFS.

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
PDU Sessions Level QoS Parameters			OCTET STRING	Includes QoS parameters to be modified. This IE may need to be refined.	–	
NG-U DL 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 Layer Information 9.2.3.30	S-NG-RAN node endpoint 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	O		9.2.3.28		–	
>>secondary SN UL PDCP UP TNL Information	O		UP Transport Layer Information 9.2.3.30	S-NG-RAN node endpoint 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 List		1			–	
>>>QoS Flows Mapped To DRB Item		*1 .. <maxnoofQoSFlows>*			–	
>>>>QoS Flow Indicator	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.	–	
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 Layer Information 9.2.3.30	S-NG-RAN node endpoint 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		–	
>>PDCP SN Length	O		9.2.3.63	Indicates the PDCP SN length of the DRB.	–	
>>QoS Flows Mapped to DRB List		*0..1*		Overwriting the existing QoS Flow List	–	

>>>QoS Flows Mapped to DRB Item		*1 .. <maxnoofQoSFlows>*			–	
>>>>QoS Flow Indicator	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.	–	
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		–	
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		–	
DL Forwarding UP TNL Information	O		UP Transport Layer Information 9.2.3.30	Identifies the Xn transport bearer used for forwarding of DL PDUs. This IE may need to be refined. Placeholder only.	–	
UL Forwarding UP TNL Information	O		UP Transport Layer Information 9.2.3.30	Identifies the Xn transport bearer used for forwarding of UL PDUs. This IE may need to be refined. Placeholder only.	–	

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

Editor's Note: Dual Connectivity is not complete and is targeted for completion in December 2018, the content of this section is FFS.

This IE contains information related to PDU session resource for an M-NG-RAN node initiated request to modify DRBs configured with an MN terminated bearer option.

IE/Group Name	Presence	Range	IE type and reference	Semantics description	Criticality	Assigned Criticality
PDU Session Type	M		9.2.3.19		–	
DRBs To Be Setup List		*0..1*			–	
>DRBS to Be Setup Item		*1 .. <maxno of DRBs>*			–	
>>DRB-ID	M		9.2.3.33		–	
>>MN UL PDCP UP TNL Information	M		UP Transport Layer Information 9.2.3.30	M-NG-RAN node endpoint of a DRB's Xn transport bearer at its PDCP resource. For delivery of UL PDUs.	–	
>>RLC Mode			9.2.3.28		–	
>>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 Layer Information 9.2.3.30	M-NG-RAN node endpoint 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 Item		*1 .. <maxno ofQoSFl ows>*			–	
>>>>QoS Flow Indicator	M		9.2.3.10		–	
>>>>QoS Flow Level QoS Parameters	M		9.2.3.5		–	
DRBs To Be Modified List		*0..1*			–	
>DRBS to Be Modified Item		*1 .. <maxno ofDRBs >*			–	
>>DRB ID	M		9.2.3.33		–	
>>MN UL PDCP UP TNL Information	O		UP Transport Layer Information 9.2.3.30	M-NG-RAN node endpoint 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		–	
>>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 Layer Information 9.2.3.30	M-NG-RAN node endpoint of a DRB's Xn transport bearer at its PDCP resource. For delivery of UL PDUs in case of PDCP duplication.	–	
>>QoS Flows Mapped To DRB List		*0..1*		Overwriting the existing QoS Flow List	–	
>>>QoS Flows Mapped To DRB Item		*1 .. <maxno of QoS Flows>*			–	

>>>>QoS Flow Indicator	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.	–	
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

Editor's Note: Dual Connectivity is not complete and is targeted for completion in December 2018, the content of this section is FFS.

This IE contains the PDU session resource related result of an M-NG-RAN node initiated modification of DRBs configured with an MN terminated bearer option.

IE/Group Name	Presence	Range	IE type and reference	Semantics description	Criticality	Assigned Criticality
DRBs Admitted to be Setup or Modified List		*1*			–	
>DRBS Admitted to be Setup or Modified Item		*1 .. <maxnoofDRBs>*			–	
>>DRB ID	M		9.2.3.33		–	
>>S-Node DL SCG UP TNL Information	O		UP Transport Layer Information 9.2.3.30	S-NG-RAN node GTP-U tunnel endpoint of the DRB's Xn transport at its Lower Layer SCG resource. For delivery of DL PDUs.	–	
>>secondary S-Node DL SCG UP TNL Information	O		UP Transport Layer Information 9.2.3.30	S-NG-RAN node GTP-U tunnel endpoint 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
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.
UE Security Capabilities	M		9.2.3.49	
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	

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 .. <maxnoofDRBs>*			–	
>DRB ID	M		9.2.3.33		–	
>CHOICE PDCP SN	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	–	
>>>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 should assign for the next DL SDU not having an SN yet 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	–	
>>>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 should assign for the next DL SDU not having an SN yet in case of 18-bit long PDCP-SN	–	

Range bound	Explanation

maxnoofDRBs	Maximum no. of DRBs allowed towards one UE. Value is 32.

9.2.1.15 DRB to QoS Flow Mapping List

This IE contains a list of DRBs containing information about the mapped QoS flows.

IE/Group Name	Presence	Range	IE type and reference	Semantics description	Criticality	Assigned Criticality
DRBS to QoS Flow Mapping Item		*1 .. <maxnoofDRBs>*			–	
>DRB ID	M		9.2.3.33		–	
>QoS Flows List		*1*			–	
>>QoS Flow Item		*1..<maxnoofQoSFlows>*			–	
>>>QoS Flow Indicator	M		9.2.3.10		–	

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	Criticality	Assigned Criticality
PDU Session level DL data forwarding UP TNL Information	O		UP Transport Layer Information 9.2.3.30	To forward NG-U DL data to the target node for which no PDCP SN has been assigned yet.	–	
Data Forwarding Response DRB List		*0..1*			–	
>Data Forwarding Response DRB Item		*1..<maxnoofDRBs>*			–	
>>DRB ID	M		9.2.3.33		–	
>>DL Forwarding UP TNL Information	O		UP Transport Layer Information 9.2.3.30		–	
>>UL Forwarding UP TNL Information	O		UP Transport Layer Information 9.2.3.30		–	

Range bound	Explanation
maxnoofDRBs	Maximum no. of DRBs. Value is 32.

9.2.1.17 Data Forwarding Request List

This IE contains information from a source NG-RAN node regarding per QoS flow proposed data forwarding.

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 Indicator	M		9.2.3.10		–	
>>DL Data Forwarding	M		9.2.3.34		–	
Source DRB to QoS Flow Mapping List	O		DRB to QoS Flow Mapping List 9.2.1.15		–	

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

Editor's Note: Dual Connectivity is not complete and is targeted for completion in December 2018, the content of this section is FFS.

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	Criticality	Assigned Criticality
Data Forwarding Request List	O		9.2.1.17		–	

9.2.1.19 PDU Session Resource Change Confirm Info – SN terminated

Editor's Note: Dual Connectivity is not complete and is targeted for completion in December 2018, the content of this section is FFS.

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		–	

9.2.1.20 PDU Session Modification Required Info – SN terminated

Editor's Note: Dual Connectivity is not complete and is targeted for completion in December 2018, the content of this section is FFS.

This IE contains PDU session resource information of an S-NG-RAN node initiated modification request of DRBs configured with an SN terminated bearer option.

IE/Group Name	Presence	Range	IE type and reference	Semantics description	Criticality	Assigned Criticality
DL NG-U UP TNL Information at NG-RAN	O		UP Transport Layer Information 9.2.3.30	S-NG-RAN node endpoint of the NG-U transport bearer. For delivery of DL PDUs.	–	
QoS Flows To Be Released List	O		QoS Flow List with Cause 9.2.1.4		–	
Data Forwarding Request List	O		9.2.1.17		–	
DRBs To Be Setup List		*0..1*			–	
>DRBS to Be Setup Item		*1 .. <maxnoofDRBs>*			–	
>>DRB ID	M		9.2.3.33		–	
>>UL Xn-U UP TNL Information at SN	M		UP Transport Layer Information 9.2.3.30	S-NG-RAN node endpoint 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		–	
>>QoS Flows Mapped To DRB List		*1*			–	
>>>QoS Flows Mapped To DRB Item		*1 .. <maxnoofQoSFlows>*			–	
>>>>QoS Flow Indicator	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.	–	
DRBs To Be Modified List		*0..1*			–	
>DRBS to Be Modified Item		*1 .. <maxnoofDRBs>*			–	
>>DRB ID	M		9.2.3.33		–	
>>UL Xn-U UP TNL Information at SN	O		UP Transport Layer Information 9.2.3.30	S-NG-RAN node endpoint 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 Indicator	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.	–	
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		–	

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 Modification Confirm Info – SN terminated

Editor's Note: Dual Connectivity is not complete and is targeted for completion in December 2018, the content of this section is FFS.

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		–	
>>DL Xn-U UP TNL Information at MN	O		UP Transport Layer Information 9.2.3.30	M-NG-RAN node endpoint of the DRB's Xn transport at its Lower Layer MCG resource. For delivery of DL PDUs.	–	
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		–	
QoS Flows Released List	O		QoS Flow List with Cause 9.2.1.4		–	
Data Forwarding Info from target NG-RAN node	O		9.2.1.16	Forwarding Addresses for both, QoS flow and DRB level offloading.	–	

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 Modification Required Info – MN terminated

Editor's Note: Dual Connectivity is not complete and is targeted for completion in December 2018, the content of this section is FFS.

This IE contains PDU session resource information of an S-NG-RAN node initiated modification request of DRBs configured with an MN terminated bearer option.

IE/Group Name	Presence	Range	IE type and reference	Semantics description	Criticality	Assigned Criticality
DRBs To Be Released List	O		DRB List with Cause 9.2.1.28		–	

9.2.1.23 PDU Session Modification Confirm Info – MN terminated

Editor's Note: Dual Connectivity is not complete and is targeted for completion in December 2018, the content of this section is FFS.

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.

IE/Group Name	Presence	Range	IE type and reference	Semantics description	Criticality	Assigned Criticality
DRBs Released List	O		DRB List 9.2.1.29		–	

9.2.1.24 PDU Session List with data forwarding request info

Editor's Note: Dual Connectivity is not complete and is targeted for completion in December 2018, the content of this section is FFS.

This IE contains a list of PDU session related data forwarding request information.

IE/Group Name	Presence	Range	IE type and reference	Semantics description	Criticality	Assigned Criticality
PDU Session Release Request with SDAP Change Item		*1 .. <maxnoofPDUsessions>*			–	
>PDU session ID	M		9.2.3.18		–	
>Data Forwarding Request List	O		9.2.1.17		–	

Range bound	Explanation
maxnoof*PDUsessions*	Maximum no. of PDU sessions. Value is 256.

9.2.1.25 PDU Session List with data forwarding info from the target node

Editor's Note: Dual Connectivity is not complete and is targeted for completion in December 2018, the content of this section is FFS.

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	O		9.2.1.16		–	

Range bound	Explanation
maxnoof*PDUsessions*	Maximum no. of PDU sessions. Value is 256.

9.2.1.26 PDU Session List with Cause

Editor's Note: Dual Connectivity is not complete and is targeted for completion in December 2018, the content of this section is FFS.

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	Criticality	Assigned Criticality
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

Editor's Note: Dual Connectivity is not complete and is targeted for completion in December 2018, the content of this section is FFS.

This IE contains a list of PDU sessions.

IE/Group Name	Presence	Range	IE type and reference	Semantics description	Criticality	Assigned Criticality
PDU Session Release Request with SDAP Change Item		*1 .. <maxnoofPDUSessions>*			–	
>PDU session ID	M		9.2.3.18		–	

Range bound	Explanation
maxnoof*PDUsessions*	Maximum no. of PDU sessions. Value is 256.

9.2.1.28 DRB List with Cause

Editor's Note: Dual Connectivity is not complete and is targeted for completion in December 2018, the content of this section is FFS.

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	Criticality	Assigned Criticality
DRB List with Cause		*1 .. <maxnoofDRBs>*			–	
>DRB ID	M		9.2.3.18		–	
>Cause	O		9.2.3.2		–	

Range bound	Explanation
maxnoofDRBs	Maximum no. of PDU sessions. Value is 32.

9.2.1.29 DRB List

Editor's Note: Dual Connectivity is not complete and is targeted for completion in December 2018, the content of this section is FFS.

This IE contains a list of DRBs.

IE/Group Name	Presence	Range	IE type and reference	Semantics description	Criticality	Assigned Criticality
DRB List		*1 .. <maxnoofDRBs>*			–	
>DRB ID	M		9.2.3.33		–	

Range bound	Explanation
maxnoofDRBs	Maximum no. of DRBs. Value is 32.

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
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
>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 *MeasurementTimingConfiguration* inter-node message for the served cell, as defined in TS 38.331 [10].
SSB SCS	M		ENUMERATED (scs15, scs30, scs120, scs240, …)	The values scs15, scs30, scs120, scs240 correspond to the sub-carrier spacing as specified in TS 38.104 [24].
Connectivity Support	M		9.2.2.28	

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
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 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 *FreqBandIndicationPriority*, 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.

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.

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	

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>*			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>*			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 >*			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>*			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>*			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		–	
Served Cells To Delete E-UTRA		*0 .. < maxnoofCellsinNG-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 .. < maxnoofCellsin NG-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 TS38.104 [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 TS38.104 [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 IE contains the additional frequency band indicators that an E-UTRA cell belongs to listed in decreasing order of preference and corresponds to the *MultiBandInfoList* specified in TS 36.331 [14].

IE/Group Name	Presence	Range	IE type and reference	Semantics description
BandInfo		*1..<maxnoofEutraBands>*		
>Frequency Band Indicator	M		INTEGER (1.. 256, ...)	E-UTRA operating band as defined in TS 36.101 [27, table 5.5-1]

Range bound	Explanation
maxnoofEUTRABands	Maximum number of frequency bands that an E-UTRA cell belongs to. The value is 16.

9.2.2.25 E-UTRA PRACH Configuration

This IE indicates the E-UTRA PRACH resources used in an E-UTRA neighbour cell.

IE/Group Name	Presence	Range	IE type and reference	Semantics description
RootSequenceIndex	M		INTEGER (0..837)	See section 5.7.2. in TS 36.211 [26]
ZeroCorrelationZoneConfiguration	M		INTEGER (0..15)	See section 5.7.2. in TS 36.211 [26]
HighSpeedFlag	M		ENUMERATED (true, false, ...)	"true" corresponds to Restricted set and "false" to Unrestricted set. See section 5.7.2 in TS 36.211 [26]
PRACH-FrequencyOffset	M		INTEGER (0..94)	See section 5.7.1 of TS 36.211 [26]
PRACH-ConfigurationIndex	O		INTEGER (0..63)	Mandatory for TDD, shall not be present for FDD. See section 5.7.1. in TS 36.211 [26]

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 Start Time	M		INTEGER(1..20, ...)	The time-position of the PRB inside the frame in which the periodic Intra-PRB Protected Resource Footprint appears for the first time. The value “1” corresponds to the receiving node’s slot 0 in subframe 0 in the receiving node’s radio frame where SFN = Activation SFN.
MBSFN Control Region Length	O		INTEGER(0..3)	Length of control region in MBSFN subframes. Expressed in REs, in the time dimension.
PDCCH Region Length	M		INTEGER(1..3)	Length of PDCCH region in regular subframes. Expressed in REs, in the time dimension.

Range bound	Explanation
maxnoofProtectedResourcePatterns	Maximum no. protected resource patterns. Value is 16.

9.2.2.30 Data Traffic Resource Indication

This IE indicates the intended data traffic resource allocation for E-UTRA - NR Cell Resource Coordination.

IE/Group Name	Presence	Range	IE type and reference	Semantics description
Activation SFN	M		INTEGER (0..1023)	Indicates from which SFN of the receiving node the agreement is valid.
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.

9.2.3 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 NGAP 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 Region 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, UE Maximum integrity protected data rate reason, Unspecified, …)	
>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 Region ID	The target NG-RAN node doesn't belong to the same pool area 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 Region of the source NG-RAN node and recognizes the AMF Region 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, e.g., 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. In the current version of this specification applicable for Dual Connectivity only. The semantics of this value may need to be refined. Cause Values for RRC_INACTIVITY should be discussed first.
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	The requested resources are not available for the slice.
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.
Unspecified	Sent for radio network layer cause when none of the specified cause values applies.

Transport Layer cause	Meaning
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" shall not be used.
>IE ID	M		INTEGER (0..65535)	The IE ID of the not understood or missing IE
>Type Of Error	M		ENUMERATED(not understood, missing, …)	

Range bound	Explanation
maxNrOfErrors	Maximum no. of IE errors allowed to be reported with a single message. The Value 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 Desciptor	M		9.2.3.8	
>Dynamic 5QI				
>>Dynamic 5QI Desciptor	M		9.2.3.9	
Allocation and Retention Priority	M		9.2.3.7	Note: presence needs to be checked with latest SA2 status, hence this IE definition may need to be refined.
GBR QoS Flow Information	O		9.2.3.6	This IE shall be present for GBR QoS Flows only.
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 shall be 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 shall be 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 **Usage:** The QoS flow shall not pre-empt other QoS flow or, the QoS flow may pre-empt other QoS flows 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. **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. 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	This IE applies to GBR QoS Flows only. 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. If the 5QI refers to a non delay critical QoS flow the IE shall be ignored.

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 shall 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 Indicator

This IE identifies a QoS Flow within a PDU Session. Definition and use of the QoS Flow Indicator is specified in TS 23.501 [7].

IE/Group Name	Presence	Range	IE type and reference	Semantics description
QoS Flow Indicator	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.

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.

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].

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)	The value range of this IE may need to be refined.

9.2.3.19 PDU Session Type

This IE defines the PDU Session Type as specified in TS 23.501 [7].

IE/Group Name	Presence	Range	IE type and reference	Semantics description
PDU Session Type	M		ENUMERATED (IPv4, IPv6, IPv4v6, Ethernet, Unstructured, ...)	

9.2.3.20 TAI Support List

This IE indicates the list of TAIs supported by NG-RAN node and associated characteristics e.g. supported slices.

IE/Group Name	Presence	Range	IE type and reference	Semantics description	Criticality	Assigned Criticality
TAI Support Item		*1..<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	O		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 1024. This IE may need to be refined.
maxnoofsupportedPLMNs	Maximum no. of PLMNs supported by an NG-RAN node. Value is 16. This IE may need to be refined.

9.2.3.21 S-NSSAI

This IE indicates the S-NSSAI.

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 ID	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 refer to the UE Context in the serving AMF.

IE/Group Name	Presence	Range	IE type and reference	Semantics description
AMF UE NGAP ID	M		INTEGER (0 .. 2^{32}-1)	As defined in TS 38.413 [5].

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
CHOICE *CP Transport Layer Information*				
>Endpoint IP address				
>>Endpoint IP Address Address	M		Transport Layer Address 9.2.3.29	The Transport Layer Address is specified in TS 38.424 [19] and TS 38.414 [20].The Transport Layer Address is specified in TS 38.422 [4] and TS 38.412 [21].

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 bit 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 bit 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	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.
>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				
>>I-RNTI	M		9.2.3.46	

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.

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))	
>I-RNTI short				
>>I-RNTI short	M		BIT STRING (SIZE (24))	

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 Area	M		ENUMERATED (Cell, …)	
Area Of Interest	O		9.2.3.48	

9.2.3.48 Area of Interest

This IE indicates the area of interest.

IE/Group Name	Presence	Range	IE type and reference	Semantics description
List of Area Of Interest		*1.. <maxnoofAoIs>*		
>List of TAIs		*0..1*		
>>TAI List Item		*1..< maxnoofTAIsinAoI >*		
>>>PLMN	M		9.2.2.4	
>>>TAC	M		9.2.2.5	
>List of Cells		*0..1*		This IE may need to be refined with SA2.
>>Cell List Item		*1..<maxnoofcellsinAoI>*		
>>>PLMN	M		9.2.2.4	
>>>NG-RAN Cell Identity	M		9.2.2.9	
>List of Global NG-RAN Nodes		*0..1*		
>>Global NG-RAN Node List Item		*1..<maxnoofRANNodesinAoI>*		
>>>Global NG-RAN Node ID	M		9.2.2.3	
>Location 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. This value may need to be refined.
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 indicates whether the UP integrity is configured for corresponding PDU sessions, respectively.

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	

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
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.

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 enabled with notification control.

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 Indicator	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 Location Reporting Reference ID

This IE contains the Location Reporting Reference ID.

IE/Group Name	Presence	Range	IE Type and Reference	Semantics Description
Location 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.

NOTE: This IE may need to be refined.

IE/Group Name	Presence	Range	IE type and reference	Semantics description
User plane traffic activity report	M		ENUMERATED (inactive, re-activated, …)	"re-activated" shall be only set after "inactive" has been reported for the concerned reporting object

9.2.3.60 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.

NOTE: This IE may need to be refined.

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" shall be 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
PDCP SN Length	M		ENUMERATED (12bits, 18bits, …)	This IE indicates the PDCP sequence number size.

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].

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 by the SMF to the NG-RAN node.

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 logicall 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 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
Maximum IP Rate	M		ENUMERATED (64kbps, max-UErate, …)	Defines the upper bound of the aggregated data rate of user plane integrity protected data. This limit applies to both UL and DL independently.

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.

9.3 Message and Information Element Abstract Syntax (with ASN.1)

Editor's Note: Dual Connectivity is not complete and is targeted for completion in December 2018, the content of section 9.3 related to Dual Connectivity is FFS.

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

```
-- **************************************************************
--
-- 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,
    DataForwardingAddressIndication,
    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-dataForwardingAddressIndication,
    id-uEContextRelease,
    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                               |
    dataForwardingAddressIndication         |
    uEContextRelease                        |
    sNGRANnodeReconfigurationCompletion     |
    sNGRANnodeCounterCheck                  |
    rRCTransfer                             |
    errorIndication                         |
    privateMessage                          |
    notificationControl                     |
    activityNotification                   ,
    ...

}

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


dataForwardingAddressIndication XNAP-ELEMENTARY-PROCEDURE ::= {
    INITIATING MESSAGE      DataForwardingAddressIndication
    PROCEDURE CODE          id-dataForwardingAddressIndication
    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             ignore
}


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
}

END
```

9.3.4 PDU Definitions

```
-- **************************************************************
--
-- 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,
    ActivationIDforCellActivation,
    AMF-Pool-Information,
    AMF-UE-NGAP-ID,
    AS-SecurityInformation,
    AssistanceDataForRANPaging,
    Cause,
    CellAssistanceInfo-NR,
    CPTransportLayerInformation,
    CriticalityDiagnostics,
    DataforwardingInfoperPDUSession,
    DataTrafficResourceIndication,
    DeliveryStatus,
    DRB-ID,
    DRBsSubjectToStatusTransfer-List,
    DRBToQoSFlowMapping-List,
    E-UTRA-CGI,
    ExpectedUEBehaviour,
    GlobalNG-RANNode-ID,
    GlobalNG-RANCell-ID,
    GUAMI,
    I-RNTI,
    LocationReportingInformation,
    LowerLayerPresenceStatusChange,
    ServedCells-E-UTRA,
    ServedCells-NR,
    ServedCellsToUpdate-E-UTRA,
    ServedCellsToUpdate-NR,
    MAC-I,
    MaskedIMEISV,
    MobilityRestrictionList,
    NG-RAN-Cell-Identity,
    NG-RANnodeUEXnAPID,
    NR-CGI,
    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,
    PDUSessionResourceSetupInfo-SNterminated,
    PDUSessionResourceSetupInfo-MNterminated,
    PDUSessionResourceSetupResponseInfo-SNterminated,
    PDUSessionResourceSetupResponseInfo-MNterminated,
    PDUSessionResourceModificationInfo-SNterminated,
    PDUSessionResourceModificationInfo-MNterminated,
    PDUSessionResourceModificationResponseInfo-SNterminated,
    PDUSessionResourceModificationResponseInfo-MNterminated,
    PDUSessionResourceModConfirmInfo-SNterminated,
    PDUSessionResourceModConfirmInfo-MNterminated,
    PDUSessionResourceModRqdInfo-SNterminated,
    PDUSessionType,
    QoSFlowIndicator,
    QoSFlowNotificationControlIndicationInfo,
    QoSFlows-List,
    RANPagingArea,
    ResetRequestTypeInfo,
    ResetResponseTypeInfo,
    RFSP-Index,
    RRCConfigIndication,
    RRCResumeCause,
    SCGConfigurationQuery,
    SecurityIndication,
    ServedCells-NR,
    S-NG-RANnode-SecurityKey,
    SpectrumSharingGroupID,
    SplitSRBsTypes,
    S-NSSAI,
    TAISupport-List,
    Target-CGI,
    TimeToWait,
    TraceActivation,
    TraceActivation,
    UEAggregateMaximumBitRate,
    UEContextID,
    UEContextInfoRetrUECtxtResp,
    UEContextKeptIndicator,
    UEHistoryInformation,
    UEIdentityIndexValue,
    UERANPagingIdentity,
```

```
    UESecurityCapabilities,
    UPTransportLayerInformation,
    UserPlaneTrafficActivityReport,
    XnBenefitValue


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-AMF-Pool-Information,
    id-AssistanceDataForRANPaging,
    id-Cause,
    id-cellAssistanceInfo-NR,
    id-ConfigurationUpdateInitiatingNodeChoice,
    id-UEContextID,
    id-CriticalityDiagnostics,
    id-dataforwardingInfoperPDUSession,
    id-DRBsSubjectToStatusTransfer-List,
    id-ExpectedUEBehaviour,
    id-GlobalNG-RAN-node-ID,
    id-GUAMI,
    id-indexToRatFrequSelectionPriority,
    id-List-of-served-cells-E-UTRA,
    id-List-of-served-cells-NR,
    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-PDUSessionResourcesActivityNotifyList,
    id-PDUSessionResourcesAdmitted-List,
```

```
    id-PDUSessionResourcesNotAdmitted-List,
    id-PDUSessionResourcesNotifyList,
    id-PDUSessionToBeAddedAddReq,
    id-RANPagingArea,
    id-requestedSplitSRB,
    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-S-NG-RANnodeUEXnAPID,
    id-TAISupport-list,
    id-Target2SourceNG-RANnodeTranspContainer,
    id-targetCellGlobalID,
    id-targetNG-RANnodeUEXnAPID,
    id-TimeToWait,
    id-TraceActivation,
    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-admittedSplitSRB,
    id-RRCConfigIndication,
    id-SplitSRB-RRCTransfer,
    id-NRUEMeasurementReportRRCTransfer,
    id-PDUSessionReleasedList-RelConf,
    id-BearersSubjectToCounterCheck,
    id-PDUSessionReleasedList-RelConf,
    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,

    maxnoofBearerConfigs,
    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 ::={
    ...
}

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 },
    ...
}

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

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

-- **************************************************************
--
-- DATA FORWARDING ADDRESS INDICATION
--
-- **************************************************************

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

DataForwardingAddressIndication-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-dataforwardingInfoperPDUSession        CRITICALITY reject      TYPE DataforwardingInfoperPDUSession     PRESENCE mandatory},
    ...
}

-- **************************************************************
--
-- S-NODE ADDITION REQUEST
```

```
--
-- **************************************************************
-- Editor’s Note: Dual Connectivity is not complete and is targeted for completion in December 2018.

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 },


    ...
}

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

PDUSessionToBeAddedAddReq-Item ::= SEQUENCE {
    pduSessionId                PDUSession-ID,
    s-NSSAI                     S-NSSAI,
    sN-PDUSessionAMBR           PDUSessionAggregateMaximumBitRate   OPTIONAL,
    bearerConfigToBeAdded       BearerConfigToBeAdded-AddReq,
    iE-Extension            ProtocolExtensionContainer { {PDUSessionToBeAddedAddReq-Item-ExtIEs} }   OPTIONAL,
    ...
}

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

BearerConfigToBeAdded-AddReq ::= SEQUENCE (SIZE(1..maxnoofBearerConfigs)) OF BearerConfigToBeAdded-AddReq-Item

BearerConfigToBeAdded-AddReq-Item ::= CHOICE {
    sn-terminated           PDUSessionResourceSetupInfo-SNterminated,
    mn-terminated           PDUSessionResourceSetupInfo-MNterminated,
    choice-extension        ProtocolIE-Single-Container { {BearerConfigToBeAdded-AddReq-Item-ExtIEs} }
}

BearerConfigToBeAdded-AddReq-Item-ExtIEs XNAP-PROTOCOL-IES ::= {
    ...
}
```

```
-- **************************************************************
--
-- S-NODE ADDITION REQUEST ACKNOWLEDGE
--
-- **************************************************************
-- Editor’s Note: Dual Connectivity is not complete and is targeted for completion in December 2018.

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 },
    ...
}

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

PDUSessionAdmittedAddedAddReqAck-Item ::= SEQUENCE {
    pduSessionId                            PDUSession-ID,
    bearerConfigAdmittedToBeAdded       BearerConfigAdmittedToBeAdded-AddReqAck,
    iE-Extension            ProtocolExtensionContainer { {PDUSessionAdmittedAddedAddReqAck-Item-ExtIEs} }  OPTIONAL,
    ...
}

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

BearerConfigAdmittedToBeAdded-AddReqAck ::= SEQUENCE (SIZE(1..maxnoofBearerConfigs)) OF BearerConfigAdmittedToBeAdded-AddReqAck-Item

BearerConfigAdmittedToBeAdded-AddReqAck-Item ::= CHOICE {
    sn-terminated           PDUSessionResourceSetupResponseInfo-SNterminated,
    mn-terminated           PDUSessionResourceSetupResponseInfo-MNterminated,
    choice-extension        ProtocolIE-Single-Container { {BearerConfigAdmittedToBeAdded-AddReqAck-Item-ExtIEs} }
}

BearerConfigAdmittedToBeAdded-AddReqAck-Item-ExtIEs XNAP-PROTOCOL-IES ::= {
    ...
}

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
--
-- **************************************************************
-- Editor’s Note: Dual Connectivity is not complete and is targeted for completion in December 2018.

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
--
-- **************************************************************
-- Editor’s Note: Dual Connectivity is not complete and is targeted for completion in December 2018.

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
--
-- **************************************************************
-- Editor’s Note: Dual Connectivity is not complete and is targeted for completion in December 2018.

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 },
    ...
}

UEContextInfo-SNModRequest ::= SEQUENCE {
    ueSecurityCapabilities                 UESecurityCapabilities                              OPTIONAL,
    s-ng-RANnode-SecurityKey                   S-NG-RANnode-SecurityKey                            OPTIONAL,
    indexToRatFrequencySelectionPriority       RFSP-Index                                          OPTIONAL,
    lowerLayerPresenceStatusChange         LowerLayerPresenceStatusChange                      OPTIONAL,
    bearerConfigToBeAdded                      PDUSessionsToBeAdded-SNModRequest-List            OPTIONAL,
    bearerConfigToBeModified                   PDUSessionsToBeModified-SNModRequest-List         OPTIONAL,
    bearerConfigToBeReleased                   PDUSessionsToBeReleased-SNModRequest-List         OPTIONAL,
    iE-Extension           ProtocolExtensionContainer { {UEContextInfo-SNModRequest-ExtIEs} }  OPTIONAL,
    ...
}

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

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

PDUSessionsToBeAdded-SNModRequest-Item ::= SEQUENCE {
    pduSessionId               PDUSession-ID,
    s-NSSAI                    S-NSSAI,
    sN-PDUSessionAMBR          PDUSessionAggregateMaximumBitRate   OPTIONAL,
    bearerConfigToBeAdded      BearerConfigToBeAdded-SNModRequest,
    iE-Extension           ProtocolExtensionContainer { {PDUSessionsToBeAdded-SNModRequest-Item-ExtIEs} } OPTIONAL,
    ...
}

PDUSessionsToBeAdded-SNModRequest-Item-ExtIEs XNAP-PROTOCOL-EXTENSION ::= {
    ...
}

BearerConfigToBeAdded-SNModRequest ::= SEQUENCE (SIZE(1..maxnoofBearerConfigs)) OF BearerConfigToBeAdded-SNModRequest-Item

BearerConfigToBeAdded-SNModRequest-Item ::= CHOICE {
    sn-terminated          PDUSessionResourceSetupInfo-SNterminated,
    mn-terminated          PDUSessionResourceSetupInfo-MNterminated,
    choice-extension       ProtocolIE-Single-Container { {BearerConfigToBeAdded-SNModRequest-Item-ExtIEs} }
}

BearerConfigToBeAdded-SNModRequest-Item-ExtIEs XNAP-PROTOCOL-IES ::= {
    ...
}

PDUSessionsToBeModified-SNModRequest-List ::= SEQUENCE (SIZE(maxnoofPDUSessions)) OF PDUSessionsToBeModified-SNModRequest-Item

PDUSessionsToBeModified-SNModRequest-Item ::= SEQUENCE {
```

```
    pduSessionId                    PDUSession-ID,
    sN-PDUSessionAMBR               PDUSessionAggregateMaximumBitRate   OPTIONAL,
    bearerConfigToBeModified        BearerConfigToBeModified-SNModRequest,
    iE-Extension            ProtocolExtensionContainer { {PDUSessionsToBeModified-SNModRequest-Item-ExtIEs} } OPTIONAL,
    ...
}

PDUSessionsToBeModified-SNModRequest-Item-ExtIEs XNAP-PROTOCOL-EXTENSION ::= {
    ...
}

BearerConfigToBeModified-SNModRequest ::= SEQUENCE (SIZE(1..maxnoofBearerConfigs)) OF BearerConfigToBeModified-SNModRequest-Item

BearerConfigToBeModified-SNModRequest-Item ::= CHOICE {
    sn-terminated           PDUSessionResourceModificationInfo-SNterminated,
    mn-terminated           PDUSessionResourceModificationInfo-MNterminated,
    choice-extension        ProtocolIE-Single-Container { {BearerConfigToBeModified-SNModRequest-Item-ExtIEs} }
}

BearerConfigToBeModified-SNModRequest-Item-ExtIEs XNAP-PROTOCOL-IES ::= {
    ...
}

PDUSessionsToBeReleased-SNModRequest-List ::= SEQUENCE {
    sn-terminated               OCTET STRING OPTIONAL, -- This IE needs to be refined
    mn-terminated               OCTET STRING OPTIONAL, -- This IE needs to be refined
    iE-Extension            ProtocolExtensionContainer { {PDUSessionsToBeReleased-SNModRequest-List-ExtIEs} } OPTIONAL,
    ...
}

PDUSessionsToBeReleased-SNModRequest-List-ExtIEs XNAP-PROTOCOL-EXTENSION ::= {
    ...
}

-- **************************************************************
--
-- S-NODE MODIFICATION REQUEST ACKNOWLEDGE
--
-- **************************************************************
-- Editor’s Note: Dual Connectivity is not complete and is targeted for completion in December 2018.

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 },
    ...
}
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,
    bearerConfigs               BearerConfigToBeAdded-SNModResponse-List,
    iE-Extension            ProtocolExtensionContainer { {PDUSessionAdmittedToBeAddedSNModResponse-Item-ExtIEs} }   OPTIONAL,
    ...
}

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

BearerConfigToBeAdded-SNModResponse-List ::= SEQUENCE (SIZE(1..maxnoofBearerConfigs)) OF BearerConfigToBeAdded-SNModResponse-Item

BearerConfigToBeAdded-SNModResponse-Item ::= CHOICE {
    sn-terminated           PDUSessionResourceSetupResponseInfo-SNterminated,
    mn-terminated           PDUSessionResourceSetupResponseInfo-MNterminated,
    choice-extension        ProtocolIE-Single-Container { {BearerConfigToBeAdded-SNModResponse-Item-ExtIEs} }
}

BearerConfigToBeAdded-SNModResponse-Item-ExtIEs XNAP-PROTOCOL-IES ::= {
    ...
}

PDUSessionAdmittedToBeModifiedSNModResponse::= SEQUENCE (SIZE(1..maxnoofPDUSessions)) OF PDUSessionAdmittedToBeModifiedSNModResponse-Item
PDUSessionAdmittedToBeModifiedSNModResponse-Item ::= SEQUENCE {
    pduSessionId                PDUSession-ID,
    bearerConfigs               BearerConfigToBeModified-SNModResponse-List,
    iE-Extension            ProtocolExtensionContainer { {PDUSessionAdmittedToBeModifiedSNModResponse-Item-ExtIEs} }   OPTIONAL,
    ...
}

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

BearerConfigToBeModified-SNModResponse-List ::= SEQUENCE (SIZE(1..maxnoofBearerConfigs)) OF
                                                        BearerConfigToBeModified-SNModResponse-Item
```

```
BearerConfigToBeModified-SNModResponse-Item ::= CHOICE {
    sn-terminated           PDUSessionResourceModificationResponseInfo-SNterminated,
    mn-terminated           PDUSessionResourceModificationResponseInfo-MNterminated,
    choice-extension        ProtocolIE-Single-Container { {BearerConfigToBeModified-SNModResponse-Item-ExtIEs} }
}

BearerConfigToBeModified-SNModResponse-Item-ExtIEs XNAP-PROTOCOL-IES ::= {
    ...
}

PDUSessionAdmittedToBeReleasedSNModResponse ::= SEQUENCE {
    sn-terminated           OCTET STRING        OPTIONAL,-- This IE may need to be refined
    mn-terminated           OCTET STRING        OPTIONAL,-- This IE may need to be refined
    iE-Extension            ProtocolExtensionContainer { {PDUSessionAdmittedToBeReleasedSNModResponse-ExtIEs} }  OPTIONAL,
    ...
}

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

PDUSessionNotAdmitted-SNModResponse ::= SEQUENCE {
    pduSessionResourcesNotAdmitted-SNterminated     PDUSessionResourcesNotAdmitted-List OPTIONAL,
    pduSessionResourcesNotAdmitted-MNterminated     PDUSessionResourcesNotAdmitted-List OPTIONAL,
    iE-Extension            ProtocolExtensionContainer { {PDUSessionNotAdmitted-SNModResponse-ExtIEs} } OPTIONAL,
    ...
}

PDUSessionNotAdmitted-SNModResponse-ExtIEs XNAP-PROTOCOL-EXTENSION ::= {
    ...
}



-- **************************************************************
--
-- S-NODE MODIFICATION REQUEST REJECT
--
-- **************************************************************
-- Editor’s Note: Dual Connectivity is not complete and is targeted for completion in December 2018.

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
--
-- **************************************************************
-- Editor’s Note: Dual Connectivity is not complete and is targeted for completion in December 2018.

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 },
    ...
}
PDUSessionToBeModifiedSNModRequired::= SEQUENCE (SIZE (1.. maxnoofPDUSessions)) OF  PDUSessionToBeModifiedSNModRequired-Item

PDUSessionToBeModifiedSNModRequired-Item ::= SEQUENCE {
    pduSessionId                    PDUSession-ID,
    bearerConfigurations            BearerConfigToBeModifiedSNModRequired-List,
    iE-Extension        ProtocolExtensionContainer { {PDUSessionToBeModifiedSNModRequired-Item-ExtIEs} }   OPTIONAL,
    ...
}

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

BearerConfigToBeModifiedSNModRequired-List::= SEQUENCE (SIZE(1..maxnoofBearerConfigs)) OF
                                                        BearerConfigToBeModifiedSNModRequired-Item

BearerConfigToBeModifiedSNModRequired-Item ::= CHOICE {
    sn-terminated           PDUSessionResourceModRqdInfo-SNterminated,
    mn-terminated           PDUSessionResourceModRqdInfo-SNterminated,
    choice-extension        ProtocolIE-Single-Container { {BearerConfigToBeModifiedSNModRequired-Item-ExtIEs} }
}

BearerConfigToBeModifiedSNModRequired-Item-ExtIEs XNAP-PROTOCOL-IES ::= {
    ...
}

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
--
-- **************************************************************
-- Editor’s Note: Dual Connectivity is not complete and is targeted for completion in December 2018.

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-CriticalityDiagnostics              CRITICALITY ignore      TYPE CriticalityDiagnostics                PRESENCE optional },
    ...
}

PDUSessionAdmittedModSNModConfirm ::= SEQUENCE (SIZE(maxnoofPDUSessions)) OF PDUSessionAdmittedModSNModConfirm-Item

PDUSessionAdmittedModSNModConfirm-Item ::= SEQUENCE {
    pduSessionId                PDUSession-ID,
    bearerConfigurations        BearerConfigAdmittedModSNModConfirm,
    iE-Extension            ProtocolExtensionContainer { {PDUSessionAdmittedModSNModConfirm-Item-ExtIEs} } OPTIONAL,
    ...
}

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

BearerConfigAdmittedModSNModConfirm ::= SEQUENCE (SIZE(1..maxnoofBearerConfigs)) OF BearerConfigAdmittedModSNModConfirm-Item

BearerConfigAdmittedModSNModConfirm-Item ::= CHOICE {
    sn-terminated           PDUSessionResourceModConfirmInfo-SNterminated,
    mn-terminated           PDUSessionResourceModConfirmInfo-MNterminated,
    choice-extension        ProtocolIE-Single-Container { {BearerConfigAdmittedModSNModConfirm-Item-Item-ExtIEs} }
}

BearerConfigAdmittedModSNModConfirm-Item-Item-ExtIEs XNAP-PROTOCOL-IES ::= {
    ...
}
```

```
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
--
-- **************************************************************
-- Editor’s Note: Dual Connectivity is not complete and is targeted for completion in December 2018.

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
--
-- **************************************************************
-- Editor’s Note: Dual Connectivity is not complete and is targeted for completion in December 2018.

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 OCTET STRING                       PRESENCE mandatory}|
-- Editor's Note: This IE needs to be refined --
    { ID id-UEContextKeptIndicator              CRITICALITY ignore      TYPE UEContextKeptIndicator             PRESENCE optional }|
    { ID id-MN-to-SN-Container                  CRITICALITY ignore      TYPE OCTET STRING                       PRESENCE optional },
    ...
```

```
}

-- **************************************************************
--
-- S-NODE RELEASE REQUEST ACKNOWLEDGE
--
-- **************************************************************
-- Editor’s Note: Dual Connectivity is not complete and is targeted for completion in December 2018.

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-CriticalityDiagnostics              CRITICALITY ignore      TYPE CriticalityDiagnostics             PRESENCE optional },
    ...
}

-- **************************************************************
--
-- S-NODE RELEASE REJECT
--
-- **************************************************************
-- Editor’s Note: Dual Connectivity is not complete and is targeted for completion in December 2018.

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
--
-- **************************************************************
-- Editor’s Note: Dual Connectivity is not complete and is targeted for completion in December 2018.

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},
    ...
}

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
--
-- **************************************************************
-- Editor’s Note: Dual Connectivity is not complete and is targeted for completion in December 2018.

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
--
-- **************************************************************
```

```
-- Editor's Note: Dual Connectivity is not complete and is targeted for completion in December 2018.

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
--
-- ************************************************************
-- Editor's Note: Dual Connectivity is not complete and is targeted for completion in December 2018.

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,
    bearerConfigToBeAdded       BearerConfigToBeAdded-ChangeRqd,
    iE-Extension            ProtocolExtensionContainer { {PDUSession-SNChangeRequired-Item-ExtIEs} } OPTIONAL,
    ...
}

PDUSession-SNChangeRequired-Item-ExtIEs XNAP-PROTOCOL-EXTENSION ::= {
    ...
}

BearerConfigToBeAdded-ChangeRqd ::= SEQUENCE (SIZE(1..maxnoofBearerConfigs)) OF BearerConfigToBeAdded-ChangeRqd-Item

BearerConfigToBeAdded-ChangeRqd-Item ::= CHOICE {
    sn-terminated           PDUSessionResourceChangeRequiredInfo-SNterminated,
    mn-terminated           PDUSessionResourceChangeRequiredInfo-MNterminated,
    choice-extension        ProtocolIE-Single-Container { { BearerConfigToBeAdded-ChangeRqd-Item-ExtIEs} }
}

BearerConfigToBeAdded-ChangeRqd-Item-ExtIEs XNAP-PROTOCOL-IES ::= {
    ...
}


-- **************************************************************
--
-- S-NODE CHANGE CONFIRM
--
-- **************************************************************
-- Editor’s Note: Dual Connectivity is not complete and is targeted for completion in December 2018.

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,
    bearerConfigToBeAdded       BearerConfig-ChangeConfirm,
    iE-Extension            ProtocolExtensionContainer { {PDUSession-SNChangeConfirm-Item-ExtIEs} }  OPTIONAL,
    ...
}

PDUSession-SNChangeConfirm-Item-ExtIEs XNAP-PROTOCOL-EXTENSION ::= {
    ...
```

```
}

BearerConfig-ChangeConfirm ::= SEQUENCE (SIZE(1..maxnoofBearerConfigs)) OF BearerConfig-ChangeConfirm-Item

BearerConfig-ChangeConfirm-Item ::= CHOICE {
    sn-terminated           PDUSessionResourceChangeConfirmInfo-SNterminated,
    mn-terminated           PDUSessionResourceChangeConfirmInfo-MNterminated,
    choice-extension        ProtocolIE-Single-Container { { BearerConfig-ChangeConfirm-Item-ExtIEs} }
}

BearerConfig-ChangeConfirm-Item-ExtIEs XNAP-PROTOCOL-IES ::= {
    ...
}


-- **************************************************************
--
-- S-NODE CHANGE REFUSE
--
-- **************************************************************
-- Editor’s Note: Dual Connectivity is not complete and is targeted for completion in December 2018.
-- ASN.1 for this message is FFS.

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
--
-- **************************************************************
-- Editor’s Note: Dual Connectivity is not complete and is targeted for completion in December 2018.

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-NRUEMeasurementReportRRCTransfer    CRITICALITY reject      TYPE NRUEMeasurementReportRRCTransfer   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 ::= {
    ...
}

NRUEMeasurementReportRRCTransfer::= SEQUENCE {
    rrcContainer                    OCTET STRING,
    iE-Extensions                   ProtocolExtensionContainer { {NRUEMeasurementReportRRCTransfer-ExtIEs} } OPTIONAL,
    ...
}

NRUEMeasurementReportRRCTransfer-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 },
    ...
}

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 {
    qosFlowIndicator                QoSFlowIndicator,
    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 optional }|
    { ID id-AMF-Pool-Information        CRITICALITY reject  TYPE AMF-Pool-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 },
    ...
}

-- **************************************************************
--
-- 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 optional }|
    { 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 },
    ...
}

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

-- **************************************************************
--
```

```
-- 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},
    ...
}

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-CriticalityDiagnostics              CRITICALITY ignore  TYPE CriticalityDiagnostics             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 },
    ...
}


-- **************************************************************
--
```

```
-- 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},
    ...
}

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},
    ...
}

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 ::= {
    ...
}


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

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

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

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

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 },
    ...
}

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 },
    ...
}

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

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

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

-- **************************************************************
--
-- PRIVATE MESSAGE
--
-- **************************************************************

PrivateMessage ::= SEQUENCE {
    privateIEs      PrivateIE-Container {{PrivateMessage-IEs}},
    ...
}

PrivateMessage-IEs XNAP-PRIVATE-IES ::= {
    ...
}


END
```

9.3.5 Information Element definitions

```
-- **************************************************************
--
-- 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



    maxEARFCN,
    maxnoofAllowedAreas,
    maxnoofAoIs,
    maxnoofBPLMNs,
```

```
    maxnoofCellsinAoI,
    maxnoofCellsinNG-RANnode,
    maxnoofCellsinRNA,
    maxnoofCellsinUEHistoryInfo,
    maxnoofDRBs,
    maxnoofEPLMNs,
    maxnoofEUTRABands,
    maxnoofForbiddenTACs,
    maxnoofMBSFNEUTRA,
    maxnoofNeighbours,
    maxnoofNRCellBands,
    maxnoofPDUSessions,
    maxnoofPLMNs,
    maxnoofProtectedResourcePatterns,
    maxnoofQoSFlows,
    maxnoofRANAreaCodes,
    maxnoofRANAreasinRNA,
    maxnoofSliceItems,
    maxnoofsupportedTACs,
    maxnoofsupportedPLMNs,
    maxnoofTAI,
    maxnoofTAIsinAoI,
    maxnoofUEContexts,
    maxNRARFCN,
    maxNrOfErrors,
    maxnoofRANNodesinAoI

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


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-Pool-Information ::= OCTET STRING -- This IE may need to be refined.


AMF-UE-NGAP-ID ::= INTEGER (0..4294967295)


AreaOfInterest ::= SEQUENCE (SIZE(1..maxnoofAoIs)) OF AreaOfInterest-Item

AreaOfInterest-Item ::= SEQUENCE {
    listOfTAIs                      ListOfTAIsinAoI                                         OPTIONAL,
    listOfCells                     ListOfCells                                             OPTIONAL,
    listOfRANNodes                  ListOfRANNodesinAoI                                     OPTIONAL,
    locationReportingReferenceID    LocationReportingReferenceID,
    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


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


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


BroadcastPLMNinTAISupport-Item ::= SEQUENCE {
    plmn-id                         PLMN-Identity,
    tAISliceSupport-List            SliceSupport-List           OPTIONAL,
    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-Region-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,
    ue-max-IP-data-rate-reason,
    unspecified,
    ...
}

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 ::= {
    ...
}


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 ::= {
    ...
}


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
```

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

DataforwardingInfoperPDUSession-Item ::= SEQUENCE {
    pduSession-ID           PDUSession-ID,
    dlForwardingUPTNL       UPTransportLayerInformation                                         OPTIONAL,
    iE-Extension            ProtocolExtensionContainer { { DataforwardingInfoperPDUSession-Item-ExtIEs} } OPTIONAL,
    ...
}

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

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


DataForwardingInfoFromTargetNGRANnode ::= SEQUENCE {
    pduSessionLevelDLDataForwardingInfo             UPTransportLayerInformation                     OPTIONAL,
    dataForwardingResponseDRBItemList               DataForwardingResponseDRBItemList               OPTIONAL,
    iE-Extension        ProtocolExtensionContainer { {DataForwardingInfoFromTargetNGRANnode-ExtIEs} }  OPTIONAL,
    ...
}

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


DataforwardingRequest-List ::= SEQUENCE {
    qosFlowsToBeForwarded           QoSFLowsToBeForwarded-List,
    sourceDRBtoQoSFlowMapping       DRBToQoSFlowMapping-List        OPTIONAL,
    iE-Extension        ProtocolExtensionContainer { {DataforwardingRequest-List-ExtIEs} }  OPTIONAL,
    ...
}

DataforwardingRequest-List-ExtIEs XNAP-PROTOCOL-EXTENSION ::= {
    ...
}

QoSFLowsToBeForwarded-List ::= SEQUENCE (SIZE(1.. maxnoofQoSFlows)) OF QoSFLowsToBeForwarded-Item

QoSFLowsToBeForwarded-Item ::= SEQUENCE {
    qosFlowIndicator            QoSFlowIndicator,
    dl-dataforwarding           DLForwarding,
    iE-Extension        ProtocolExtensionContainer { {QoSFLowsToBeForwarded-Item-ExtIEs} }  OPTIONAL,
    ...
}

QoSFLowsToBeForwarded-Item-ExtIEs XNAP-PROTOCOL-EXTENSION ::= {
    ...
}
```

```
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, ...)


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   OPTIONAL,
    iE-Extension        ProtocolExtensionContainer { {DRB-List-withCause-Item-ExtIEs} } OPTIONAL,
    ...
}
```

```
DRB-List-withCause-Item-ExtIEs XNAP-PROTOCOL-EXTENSION ::= {
    ...
}



DRBsSubjectToStatusTransfer-List ::= SEQUENCE (SIZE (1..maxnoofDRBs)) OF DRBsSubjectToStatusTransfer-Item

DRBsSubjectToStatusTransfer-Item ::= SEQUENCE {
    drbID               DRB-ID,
    statusTransfer      DRBBStatusTransferChoice,
    iE-Extension        ProtocolExtensionContainer { {DRBsSubjectToStatusTransfer-Item-ExtIEs} }  OPTIONAL,
    ...
}

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


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,
    ulCOUNTValue            COUNT-PDCP-SN12,
    dlCOUNTValue            COUNT-PDCP-SN12,
    iE-Extension            ProtocolExtensionContainer { {DRBBStatusTransfer12bitsSN-ExtIEs} }  OPTIONAL,
    ...
}

DRBBStatusTransfer12bitsSN-ExtIEs XNAP-PROTOCOL-EXTENSION ::= {
    ...
}


DRBBStatusTransfer18bitsSN ::= SEQUENCE {
    receiveStatusofPDCPSDU  BIT STRING (SIZE(1..131072))                                    OPTIONAL,
    ulCOUNTValue            COUNT-PDCP-SN18,
    dlCOUNTValue            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,
    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, -- present for TDD --
    iE-Extensions                       ProtocolExtensionContainer { {E-UTRAPRACHConfiguration-ExtIEs} }  OPTIONAL,
    ...
}

E-UTRAPRACHConfiguration-ExtIEs XNAP-PROTOCOL-EXTENSION ::= {
    ...
}


E-UTRATransmissionBandwidth ::= ENUMERATED {bw6, bw15, bw25, bw50, bw75, bw100, ..., bw1}

EventType ::= ENUMERATED {
    report-upon-change-of-serving-cell,
    report-UE-moving-presence-into-or-out-of-the-Area-of-Interest,
    ...
}

ExpectedUEBehaviour ::= OCTET STRING -- This IE may need to be refined


-- F

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-if       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


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 ::= {
    ...
}


LocationReportingInformation ::= SEQUENCE {
    eventType           EventType,
    reportArea          ReportArea,
    areaOfInterest      AreaOfInterest          OPTIONAL,
    iE-Extensions       ProtocolExtensionContainer { {LocationReportingInformation-ExtIEs} } OPTIONAL,
    ...
}

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


LocationReportingReferenceID ::= INTEGER (1..64, ...)
```

```
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           MaxIPrate,
    iE-Extensions       ProtocolExtensionContainer { {MaximumIPdatarate-ExtIEs} }   OPTIONAL,
    ...
}

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

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 ::={
    ...
}


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,
    not-allowed-TACs-ServiceArea        SEQUENCE (SIZE(1..maxnoofAllowedAreas)) OF TAC,
    iE-Extensions       ProtocolExtensionContainer { {ServiceAreaItem-ExtIEs} } OPTIONAL,
    ...
}

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


-- N


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,
    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, ...}

NRSCS-SSB ::= ENUMERATED { scs15, scs30, scs120, scs240, ...}


NRTransmissionBandwidth ::= SEQUENCE {
    nRSCS   NRSCS,
    nRNRB   NRNRB,
    iE-Extensions               ProtocolExtensionContainer { {NRTransmissionBandwidth-ExtIEs} } OPTIONAL,
    ...
}

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


NumberOfAntennaPorts-E-UTRA ::= ENUMERATED {an1, an2, an4, ...}


-- O


-- P


PacketDelayBudget ::= INTEGER (0..1023, ...)


PacketErrorRate ::= SEQUENCE {
    pER-Scalar          PER-Scalar,
    pER-Exponent        PER-Exponent,
    iE-Extensions       ProtocolExtensionContainer { {PacketErrorRate-ExtIEs} } OPTIONAL,
    ...
}

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

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 ::= {
    ...
}


PDCPSNLength ::= ENUMERATED {v12bits, v18bits, ...}


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 ::= {
    ...
}


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

PDUSession-List-withDataForwardingRequest-Item ::= SEQUENCE {
    pduSessionId                    PDUSession-ID,
    dataforwardingRequest-List      DataforwardingRequest-List,
    iE-Extension        ProtocolExtensionContainer { {PDUSession-List-withDataForwardingRequest-Item-ExtIEs} }   OPTIONAL,
    ...
}

PDUSession-List-withDataForwardingRequest-Item-ExtIEs XNAP-PROTOCOL-EXTENSION ::= {
    ...
}


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

-- ************************************************************
--
-- PDU Session related message level IEs BEGIN
--
-- ************************************************************
```

```
-- **************************************************************
--
-- PDU Session Resources Admitted List
--
-- **************************************************************


PDUSessionResourcesAdmitted-Item ::= SEQUENCE {
    pduSessionId                        PDUSession-ID,
    pduSessionResourceAdmittedInfo      PDUSessionResourceAdmittedInfo,
    iE-Extensions                       ProtocolExtensionContainer { {PDUSessionResourcesAdmitted-Item-ExtIEs} }   OPTIONAL,
    ...
}

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


PDUSessionResourceAdmittedInfo ::= SEQUENCE {
    qosFlowsAdmitted-List           QoSFlowsAdmitted-List,
    qosFlowsNotAdmitted-List        QoSFlowsNotAdmitted-List,
    dataForwardingInfoFromTarget    DataForwardingInfoFromTargetNGRANnode           OPTIONAL,
    iE-Extensions                   ProtocolExtensionContainer { {PDUSessionResourceAdmittedInfo-ExtIEs} } OPTIONAL,
    ...
}

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


-- **************************************************************
--
-- 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,
    uL-NG-U-TNLatUPF                UPTransportLayerInformation,
    securityIndication              SecurityIndication                                                  OPTIONAL,
    pduSessionType                  PDUSessionType,
    qosFlowsToBeSetup-List          QoSFlowsToBeSetup-List,
    sourceDRBtoQoSFlowMapping       DRBToQoSFlowMapping-List                                            OPTIONAL,
    iE-Extensions                   ProtocolExtensionContainer { {PDUSessionResourcesToBeSetup-Item-ExtIEs} }   OPTIONAL,
    ...
}

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


-- **************************************************************
--
-- PDU Session Resource Setup Info - SN terminated
--
-- **************************************************************


PDUSessionResourceSetupInfo-SNterminated ::= SEQUENCE {
    uL-NG-U-TNLatUPF                UPTransportLayerInformation,
    pduSessionType                  PDUSessionType,
    qosFlowsToBeSetup-List      QoSFlowsToBeSetup-List-Setup-SNterminated,
    dlForwarding                    DLForwarding            OPTIONAL, -- this IE needs to be refined and is only a placeholder
    securityIndication              SecurityIndication                                                  OPTIONAL,
    iE-Extensions                   ProtocolExtensionContainer { {PDUSessionResourceSetupInfo-SNterminated-ExtIEs} }  OPTIONAL,
    ...
}

PDUSessionResourceSetupInfo-SNterminated-ExtIEs XNAP-PROTOCOL-EXTENSION ::= {
    ...
}

QoSFlowsToBeSetup-List-Setup-SNterminated ::= SEQUENCE (SIZE(1..maxnoofQoSFlows)) OF QoSFlowsToBeSetup-List-Setup-SNterminated-Item

QoSFlowsToBeSetup-List-Setup-SNterminated-Item ::= SEQUENCE {
    qfi                             QoSFlowIndicator,
    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,
    qosFlowsNotAdmittedList     QoSFlows-List-withCause             OPTIONAL,
    dLForwardingUPTNLInfo           UPTransportLayerInformation         OPTIONAL, -- this IE needs to be refined, placeholder only
    uLForwardingUPTNLInfo           UPTransportLayerInformation         OPTIONAL, -- this IE needs to be refined, placeholder only
    securityResult                  SecurityResult                          OPTIONAL,
    iE-Extensions                   ProtocolExtensionContainer { {PDUSessionResourceSetupResponseInfo-SNterminated-ExtIEs} }   OPTIONAL,
    ...
}

PDUSessionResourceSetupResponseInfo-SNterminated-ExtIEs XNAP-PROTOCOL-EXTENSION ::= {
    ...
}

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                           UPTransportLayerInformation,
    dRB-QoS                                         QoSFlowLevelQoSParameters,
    pDCP-SNLength                                   PDCPSNLength                        OPTIONAL,
    rLC-Mode                                        RLCMode                             OPTIONAL,
    secondary-SN-UL-PDCP-UP-TNLInfo                 UPTransportLayerInformation     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 {
```

```
    qoSFlowIndicator               QoSFlowIndicator,
    mCGRequestedGBRQoSFlowInfo  GBRQoSFlowInfo                                          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                           UPTransportLayerInformation,
    rLC-Mode                                        RLCMode                         OPTIONAL,
    dRB-QoS                                         QoSFlowLevelQoSParameters,
    pDCP-SNLength                                   PDCPSNLength                    OPTIONAL,
    secondary-MN-UL-PDCP-UP-TNLInfo                 UPTransportLayerInformation     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 {
    qoSFlowIndicator               QoSFlowIndicator,
    qoSFlowLevelQoSParameters      QoSFlowLevelQoSParameters,
    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 ::= {
    ...
}

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                    UPTransportLayerInformation,
    secondary-SN-DL-SCG-UP-TNLInfo      UPTransportLayerInformation     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,
    qosFlowsToBeSetup-List      QoSFlowsToBeSetup-List-Setup-SNterminated       OPTIONAL,
    qosFlowsToBeModified-List       QoSFlowsToBeSetup-List-Modified-SNterminated    OPTIONAL,
    qoSFlowsToBeReleased-List       QoSFlows-List-withCause                         OPTIONAL,
    drbsToBeModifiedList            DRBsToBeModified-List-Modified-SNterminated     OPTIONAL,
```

```
    dlForwarding                    DLForwarding            OPTIONAL, -- this IE needs to be refined and is only a placeholder
    securityIndication              SecurityIndication                                                  OPTIONAL,
    iE-Extensions                   ProtocolExtensionContainer { {PDUSessionResourceModificationInfo-SNterminated-ExtIEs} } OPTIONAL,
    ...
}

PDUSessionResourceModificationInfo-SNterminated-ExtIEs XNAP-PROTOCOL-EXTENSION ::= {
    ...
}

QoSFlowsToBeSetup-List-Modified-SNterminated ::= SEQUENCE (SIZE(1..maxnoofQoSFlows)) OF QoSFlowsToBeSetup-List-Modified-SNterminated-Item

QoSFlowsToBeSetup-List-Modified-SNterminated-Item ::= SEQUENCE {
    qfi                             QoSFlowIndicator,
    qosFlowLevelQoSParameters       QoSFlowLevelQoSParameters                       OPTIONAL,
    offeredGBRQoSFlowInfo           GBRQoSFlowInfo                                  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-PDCP-UP-TNLInfo               UPTransportLayerInformation     OPTIONAL,
    secondary-MN-DL-PDCP-UP-TNLInfo     UPTransportLayerInformation     OPTIONAL,
    lCID                                LCID                                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,
    dRBsToBeSetup                   DRBsToBeSetupList-SetupResponse-SNterminated            OPTIONAL,
    dRBsToBeModified                DRBsToBeModifiedList-ModificationResponse-SNterminated  OPTIONAL,
    dRBsToBeReleased                DRB-List-withCause                                          OPTIONAL,
    qosFlowsReleased                QoSFlows-List-withCause                                 OPTIONAL,
    dLForwardingUPTNLInfo           UPTransportLayerInformation         OPTIONAL, -- this IE needs to be refined, placeholder only
    uLForwardingUPTNLInfo           UPTransportLayerInformation         OPTIONAL, -- this IE needs to be refined, placeholder only
```

```
    iE-Extensions                   ProtocolExtensionContainer { {PDUSessionResourceModificationResponseInfo-SNterminated-ExtIEs} }  OPTIONAL,
    ...
}

PDUSessionResourceModificationResponseInfo-SNterminated-ExtIEs XNAP-PROTOCOL-EXTENSION ::= {
    ...
}

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                               UPTransportLayerInformation     OPTIONAL,
    dRB-QoS                                             QoSFlowLevelQoSParameters           OPTIONAL,
    pDCP-SNLength                                       PDCPSNLength                        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 ::= {
    ...
}


-- **************************************************************
--
-- 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                               UPTransportLayerInformation     OPTIONAL,
    dRB-QoS                                             QoSFlowLevelQoSParameters           OPTIONAL,
    pDCP-SNLength                                       PDCPSNLength                        OPTIONAL,
```

```
    secondary-MN-UL-PDCP-UP-TNLInfo                    UPTransportLayerInformation     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                    UPTransportLayerInformation     OPTIONAL,
    secondary-SN-DL-SCG-UP-TNLInfo      UPTransportLayerInformation     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 {
```

```
    dataforwardingRequest-List  DataforwardingRequest-List              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 ::= {
    ...
}


-- **************************************************************
--
-- 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,
    dataforwardingRequest-List  DataforwardingRequest-List                      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,
    uL-Xn-U-TNLinfoatSN                     UPTransportLayerInformation,
    dRB-QoS                                     QoSFlowLevelQoSParameters,
    qoSFlowsMappedtoDRB-ModRqd-SNterminated     QoSFlowsSetupMappedtoDRB-ModRqd-SNterminated,
    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 {
    qoSFlowIndicator                QoSFlowIndicator,
    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,
    uL-Xn-U-TNLinfoatSN                         UPTransportLayerInformation                     OPTIONAL,
    dRB-QoS                                     QoSFlowLevelQoSParameters                           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 {
    qoSFlowIndicator                QoSFlowIndicator,
    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,
    dRBsReleasedList                        DRB-List                                               OPTIONAL,
    dRBsNotAdmittedSetupModifyList      DRB-List-withCause                                  OPTIONAL,
    qosFlowsReleased                        QoSFlows-List-withCause                             OPTIONAL,
    dataforwardinginfoTarget                DataForwardingInfoFromTargetNGRANnode               OPTIONAL,
    iE-Extensions                   ProtocolExtensionContainer { {PDUSessionResourceModConfirmInfo-SNterminated-ExtIEs} }   OPTIONAL,
    ...
}

PDUSessionResourceModConfirmInfo-SNterminated-ExtIEs XNAP-PROTOCOL-EXTENSION ::= {
```

```
    ...
}

DRBsAdmittedList-ModConfirm-SNterminated ::= SEQUENCE (SIZE(1..maxnoofDRBs)) OF
                                                                    DRBsAdmittedList-ModConfirm-SNterminated-Item

DRBsAdmittedList-ModConfirm-SNterminated-Item ::= SEQUENCE {
    drb-ID                      DRB-ID,
    sN-Xn-U-TNLInfoatMN     UPTransportLayerInformation     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 {
    dRBsToBeReleased                DRB-List-withCause                                      OPTIONAL,
    iE-Extensions                   ProtocolExtensionContainer { {PDUSessionResourceModRqdInfo-MNterminated-ExtIEs} } OPTIONAL,
    ...
}

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


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


PDUSessionResourceModConfirmInfo-MNterminated ::= SEQUENCE {
    dRBsReleasedList                DRB-List                    OPTIONAL,
    iE-Extensions                   ProtocolExtensionContainer { {PDUSessionResourceModConfirmInfo-MNterminated-ExtIEs} }   OPTIONAL,
    ...
}

PDUSessionResourceModConfirmInfo-MNterminated-ExtIEs XNAP-PROTOCOL-EXTENSION ::= {
    ...
}
```

```
-- **************************************************************
--
-- PDU Session related message level IEs END
--
-- **************************************************************


PDUSessionType ::= ENUMERATED {ipv4, ipv6, ipv4v6, ethernet, unstructured, ...}

PDUSession-ID   ::= INTEGER (0..255)


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


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 ::= {
    ...
}


QoSFlowIndicator    ::= 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 ::= {
    ...
}


QoSFlowNotificationControlIndicationInfo ::= SEQUENCE (SIZE (1..maxnoofQoSFlows)) OF QoSFlowNotify-Item

QoSFlowNotify-Item ::= SEQUENCE {
    qosFlowIndicator            QoSFlowIndicator,
    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                 QoSFlowIndicator,
    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                 QoSFlowIndicator,
    cause               Cause                   OPTIONAL,
    iE-Extension        ProtocolExtensionContainer { {QoSFlowwithCause-Item-ExtIEs} }   OPTIONAL,
    ...
}

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


QoSFlowsAdmitted-List ::= SEQUENCE (SIZE (1..maxnoofQoSFlows)) OF QoSFlowAdmitted-Item

QoSFlowAdmitted-Item ::= SEQUENCE {
    qfi                             QoSFlowIndicator,
    dataForwardingAccepted          DataForwardingAccepted  OPTIONAL,
    iE-Extension        ProtocolExtensionContainer { {QoSFlowAdmitted-Item-ExtIEs} }    OPTIONAL,
    ...
}

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


QoSFlowsNotAdmitted-List ::= SEQUENCE (SIZE (1..maxnoofQoSFlows)) OF QoSFlowNotAdmitted-Item

QoSFlowNotAdmitted-Item ::= SEQUENCE {
    qfi                         QoSFlowIndicator,
    cause                       Cause,
    iE-Extension        ProtocolExtensionContainer { {QoSFlowNotAdmitted-Item-ExtIEs} } OPTIONAL,
    ...
}

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


QoSFlowsToBeSetup-List ::= SEQUENCE (SIZE (1..maxnoofQoSFlows)) OF QoSFlowsToBeSetup-Item
```

```
QoSFlowsToBeSetup-Item ::= SEQUENCE {
    qfi                             QoSFlowIndicator,
    dlDataForwarding                DLForwarding                                        OPTIONAL,
    qosFlowLevelQoSParameters       QoSFlowLevelQoSParameters,
    e-RAB-ID                        E-RAB-ID                                            OPTIONAL,
    iE-Extension        ProtocolExtensionContainer { {QoSFlowsToBeSetup-Item-ExtIEs} }  OPTIONAL,
    ...
}

QoSFlowsToBeSetup-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 ::= {
    ...
}


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


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


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


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,
    ng-ran-node2UEXnAPID                        NG-RANnodeUEXnAPID,
    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,
    ng-ran-node2UEXnAPID                        NG-RANnodeUEXnAPID,
    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,
    ...
    }


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


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


RRCResumeCause ::= ENUMERATED {
    rna-Update,
    ...
}


-- S


SCGConfigurationQuery   ::= ENUMERATED {true, ...}


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,
    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 ::= {
    ...
}


ServedCellInformation-E-UTRA-perBPLMN ::= SEQUENCE {
    plmn-id                 PLMN-Identity,
    e-utra-mode-info        ServedCellInformation-E-UTRA-perBPLMN-ModeInfo,
    iE-Extensions           ProtocolExtensionContainer { {ServedCellInformation-E-UTRA-perBPLMN-ExtIEs} } OPTIONAL,
    ...
}
```

```
ServedCellInformation-E-UTRA-perBPLMN-ExtIEs XNAP-PROTOCOL-EXTENSION ::= {
    ...
}


ServedCellInformation-E-UTRA-perBPLMN-ModeInfo ::= CHOICE {
    fdd                 ServedCellInformation-E-UTRA-perBPLMN-FDDInfo,
    tdd                 ServedCellInformation-E-UTRA-perBPLMN-TDDInfo,
    choice-extension    ProtocolIE-Single-Container{ {ServedCellInformation-E-UTRA-perBPLMN-ModeInfo-ExtIEs} }
}

ServedCellInformation-E-UTRA-perBPLMN-ModeInfo-ExtIEs XNAP-PROTOCOL-IES ::= {
    ...
}


ServedCellInformation-E-UTRA-perBPLMN-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-perBPLMN-FDDInfo-ExtIEs} } OPTIONAL,
    ...
}

ServedCellInformation-E-UTRA-perBPLMN-FDDInfo-ExtIEs XNAP-PROTOCOL-EXTENSION ::= {
    ...
}


ServedCellInformation-E-UTRA-perBPLMN-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-perBPLMN-TDDInfo-ExtIEs} } OPTIONAL,
    ...
}

ServedCellInformation-E-UTRA-perBPLMN-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,
    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,
    nrscs-ssb                       NRSCS-SSB,
    connectivitySupport             Connectivity-Support,   iE-Extensions                   ProtocolExtensionContainer
{ {ServedCellInformation-NR-ExtIEs} } OPTIONAL,
    ...
}

ServedCellInformation-NR-ExtIEs XNAP-PROTOCOL-EXTENSION ::= {
    ...
```

```
}


ServedCells-NR ::= SEQUENCE (SIZE (1..maxnoofCellsinNG-RANnode)) OF ServedCells-NR-Item

ServedCells-NR-Item ::= SEQUENCE {
    served-cell-info-NR         ServedCellInformation-NR,
    neighbour-info-NR           NeighbourInformation-NR             OPTIONAL,
    neighbour-info-E-UTRA       NeighbourInformation-E-UTRA         OPTIONAL,
    iE-Extensions       ProtocolExtensionContainer { {ServedCells-NR-Item-ExtIEs} } OPTIONAL,
    ...
}

ServedCells-NR-Item-ExtIEs XNAP-PROTOCOL-EXTENSION ::= {
    ...
}


ServedCells-ToModify-NR ::= SEQUENCE (SIZE (1..maxnoofCellsinNG-RANnode)) OF ServedCells-ToModify-NR-Item

ServedCells-ToModify-NR-Item ::= SEQUENCE {
    old-NR-CGI                  NR-CGI,
    served-cell-info-NR         ServedCellInformation-NR,
    neighbour-info-NR           NeighbourInformation-NR                                         OPTIONAL,
    neighbour-info-E-UTRA       NeighbourInformation-E-UTRA                                     OPTIONAL,
    deactivation-indication     ENUMERATED {deactivated, ...}                                   OPTIONAL,
    iE-Extensions       ProtocolExtensionContainer { {Served-cells-ToModify-NR-Item-ExtIEs} }   OPTIONAL,
    ...
}

Served-cells-ToModify-NR-Item-ExtIEs XNAP-PROTOCOL-EXTENSION ::= {
    ...
}


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-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)


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,
    ...
}

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,
    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 ::= {
    ...
}


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 ::= {
    ...
}


UERANPagingIdentity ::= CHOICE {
    i-RNTI              I-RNTI,
    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 ::= {
    ...
}


UPTransportLayerInformation ::= CHOICE {
    gtpTunnel                   GTPtunnelTransportLayerInformation,
    choice-extension            ProtocolIE-Single-Container { {UPTransportLayerInformation-ExtIEs} }
}

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

UserPlaneTrafficActivityReport ::= ENUMERATED {inactive, re-activated, ...}


-- V


-- W


-- X

XnBenefitValue ::= INTEGER (1..8, ...)


-- Y


-- Z


END
```

9.3.6 Common definitions

```
-- **************************************************************
--
-- 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
```

9.3.7 Constant definitions

```
-- **************************************************************
--
-- 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-dataForwardingAddressIndication                              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



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

maxEARFCN                               INTEGER ::= 262143
maxnoofAllowedAreas                     INTEGER ::= 16
maxnoofAoIs                             INTEGER ::= 64
```

```
maxnoofBPLMNs                           INTEGER ::= 12
maxnoofBearerConfigs                    INTEGER ::= 2  -- This IE may need to be refined
maxnoofCellsinAoI                       INTEGER ::= 256
maxnoofCellsinUEHistoryInfo             INTEGER ::= 16
maxnoofCellsinNG-RANnode                    INTEGER ::= 16384
maxnoofCellsinRNA                       INTEGER ::= 32
maxnoofDRBs                             INTEGER ::= 32
maxnoofEUTRABands                       INTEGER ::= 16
maxnoofEPLMNs                           INTEGER ::= 15
maxnoofForbiddenTACs                        INTEGER ::= 4096
maxnoofMBSFNEUTRA                       INTEGER ::= 8
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
maxnoofSliceItems                       INTEGER ::= 1024
maxnoofsupportedPLMNs                   INTEGER ::= 16  -- This IE may need to be refined.
maxnoofsupportedTACs                    INTEGER ::= 1024 -- This IE may need to be refined.
maxnoofTAI                              INTEGER ::= 16
maxnoofTAIsinAoI                        INTEGER ::= 16
maxnoofUEContexts                       INTEGER ::= 8292
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-Pool-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-dataforwardingInfoperPDUSession                                      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
id-LocationReportingInformation
id-MAC-I
id-MaskedIMEISV
id-M-NG-RANnodeUEXnAPID
id-MN-to-SN-Container
id-MobilityRestrictionList
id-new-NG-RAN-Cell-Identity
id-newNG-RANnodeUEXnAPID
id-NRUEMeasurementReportRRCTransfer
id-oldNG-RANnodeUEXnAPID
id-OldtoNewNG-RANnodeResumeContainer
id-PagingDRX
id-PCellID
id-PDCPChangeIndication
id-PDUSessionAdmittedAddedAddReqAck
id-PDUSessionAdmittedModSNModConfirm
id-PDUSessionAdmitted-SNModResponse
id-PDUSessionNotAdmittedAddReqAck
id-PDUSessionNotAdmitted-SNModResponse
id-PDUSessionReleasedList-RelConf
id-PDUSessionReleasedSNModConfirm
id-PDUSessionResourcesActivityNotifyList
id-PDUSessionResourcesAdmitted-List
id-PDUSessionResourcesNotAdmitted-List
id-PDUSessionResourcesNotifyList
id-PDUSession-SNChangeConfirm-List
id-PDUSession-SNChangeRequired-List
id-PDUSessionToBeAddedAddReq
id-PDUSessionToBeModifiedSNModRequired
id-PDUSessionToBeReleasedList-RelRqd
id-PDUSessionToBeReleased-RelReq
id-PDUSessionToBeReleasedSNModRequired
id-RANPagingArea
id-PagingPriority
id-requestedSplitSRB
id-requestedSplitSRBrelease
id-ResetRequestTypeInfo
id-ResetResponseTypeInfo
id-RespondingNodeTypeConfigUpdateAck
id-respondingNodeType-ResourceCoordResponse
id-ResponseInfo-ReconfCompl
id-RRCConfigIndication
id-RRCResumeCause
id-SCGConfigurationQuery
id-selectedPLMN
id-ServedCellsToActivate
id-servedCellsToUpdate-E-UTRA
id-ServedCellsToUpdateInitiatingNodeChoice
id-servedCellsToUpdate-NR
id-s-ng-RANnode-SecurityKey
id-S-NG-RANnodeUE-AMBR
id-S-NG-RANnodeUEXnAPID
id-SN-to-MN-Container
  ProtocolIE-ID ::= 19
  ProtocolIE-ID ::= 20
  ProtocolIE-ID ::= 21
  ProtocolIE-ID ::= 22
  ProtocolIE-ID ::= 23
     ProtocolIE-ID ::= 24
  ProtocolIE-ID ::= 25
  ProtocolIE-ID ::= 26
  ProtocolIE-ID ::= 27
  ProtocolIE-ID ::= 28
  ProtocolIE-ID ::= 29
  ProtocolIE-ID ::= 30
  ProtocolIE-ID ::= 31
     ProtocolIE-ID ::= 32
  ProtocolIE-ID ::= 33
  ProtocolIE-ID ::= 34
     ProtocolIE-ID ::= 35
  ProtocolIE-ID ::= 36
  ProtocolIE-ID ::= 37
  ProtocolIE-ID ::= 38
  ProtocolIE-ID ::= 39
  ProtocolIE-ID ::= 40
  ProtocolIE-ID ::= 41
  ProtocolIE-ID ::= 42
  ProtocolIE-ID ::= 43
  ProtocolIE-ID ::= 44
  ProtocolIE-ID ::= 45
  ProtocolIE-ID ::= 46
     ProtocolIE-ID ::= 47
  ProtocolIE-ID ::= 48
     ProtocolIE-ID ::= 49
     ProtocolIE-ID ::= 50
  ProtocolIE-ID ::= 51
  ProtocolIE-ID ::= 52
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  ProtocolIE-ID ::= 58
  ProtocolIE-ID ::= 59
  ProtocolIE-ID ::= 60
  ProtocolIE-ID ::= 61
  ProtocolIE-ID ::= 62
     ProtocolIE-ID ::= 63
  ProtocolIE-ID ::= 64
  ProtocolIE-ID ::= 65
  ProtocolIE-ID ::= 66
  ProtocolIE-ID ::= 67
  ProtocolIE-ID ::= 68
ProtocolIE-ID ::= 69
  ProtocolIE-ID ::= 70
  ProtocolIE-ID ::= 71
     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

END
```

9.3.8 Container definitions

```
-- **************************************************************
--
-- 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
```

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

History

Document history		
V15.0.0	July 2018	Publication
V15.1.0	September 2018	Publication