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Foreword

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1 Scope

The present document specifies the 5G radio network layer signalling protocol for the E1 interface. The E1 interface provides means for interconnecting a gNB-CU-CP and a gNB-CU-UP of a gNB within an NG-RAN, or for interconnecting a gNB-CU-CP and a gNB-CU-UP of an en-gNB within an E-UTRAN. The E1 Application Protocol (E1AP) supports the functions of E1 interface by signalling procedures defined in the present document. E1AP is developed in accordance to the general principles stated in TS 38.401 [2] and TS 38.460 [3].

2 References

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- [1] 3GPP TR 21.905: "Vocabulary for 3GPP Specifications".
- [2] 3GPP TS 38.401: "NG-RAN; Architecture Description".
- [3] 3GPP TS 38.460: "NG-RAN; E1 general aspects and principles".
- [4] 3GPP TS 38.300: "NR; Overall description; Stage-2".
- [5] 3GPP TR 25.921 (version.7.0.0): "Guidelines and principles for protocol description and error".
- [6] 3GPP TS 38.413: "NG-RAN; NG Application Protocol (NGAP)".
- [7] ITU-T Recommendation X.691 (2002-07): "Information technology - ASN.1 encoding rules - Specification of Packed Encoding Rules (PER)".
- [8] ITU-T Recommendation X.680 (07/2002): "Information technology – Abstract Syntax Notation One (ASN.1): Specification of basic notation".
- [9] ITU-T Recommendation X.681 (07/2002): "Information technology – Abstract Syntax Notation One (ASN.1): Information object specification".
- [10] 3GPP TS 38.331: "NR; Radio Resource Control (RRC); Protocol Specification".
- [11] 3GPP TS 23.401: "General Packet Radio Service (GPRS) Enhancements for Evolved Universal Terrestrial Radio Access Network (E-UTRAN) access".
- [12] 3GPP TS 23.203: "Policy and Charging Control Architecture".
- [13] 3GPP TS 33.501: "Security Architecture and Procedures for 5G System".
- [14] IETF RFC 5905: "Network Time Protocol Version 4: Protocol and Algorithms Specification".
- [15] 3GPP TS 29.281: "General Packet Radio System (GPRS) Tunneling Protocol User Plane (GTPv1-U)".
- [16] 3GPP TS 38.414: "NG-RAN; NG Data Transport".
- [17] 3GPP TS 38.323: "NR; Packet Data Convergence Protocol (PDCP) specification".
- [18] 3GPP TS 38.462: "NG-RAN; E1 Signalling Transport".
- [19] 3GPP TS 37.340: "NR; Multi-connectivity; Overall description; Stage-2".

- [20] 3GPP TS 23.501: "System Architecture for the 5G System".
- [21] 3GPP TS 36.331: "Evolved Universal Terrestrial Radio Access (E-UTRA); Radio Resource Control (RRC) protocol specification".
- [22] 3GPP TS 28.552: "Management and orchestration; 5G performance measurements".
- [23] 3GPP TS 23.003: "Numbering, addressing and identification".
- [24] 3GPP TS 32.422: "Trace control and configuration management".
- [25] 3GPP TS 36.300: "Evolved Universal Terrestrial Radio Access (E-UTRA) and Evolved Universal Terrestrial Radio Access Network (E-UTRAN); Overall description; Stage 2".
- [26] 3GPP TS 32.425: "Performance measurements; Evolved Universal Terrestrial Radio Access Network (E-UTRAN)".
- [27] 3GPP TS 37.320: "Universal Terrestrial Radio Access (UTRA) and Evolved Universal Terrestrial Radio Access (E-UTRA); Radio measurement collection for Minimization of Drive Tests (MDT); Overall description; Stage 2".
- [28] 3GPP TS 38.474: "NG-RAN; F1 data transport".
- [29] 3GPP TS 29.244: "Interface between the Control Plane and the User Plane Nodes; Stage 3".

3 Definitions 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: E1AP consists of Elementary Procedures (EPs). An Elementary Procedure is a unit of interaction between gNB-CU-CP and gNB-CU-UP. These Elementary Procedures are defined separately and are intended to be used to build up complete sequences in a flexible manner. If the independence between some EPs is restricted, it is described under the relevant EP description. Unless otherwise stated by the restrictions, the EPs may be invoked independently of each other as standalone procedures, which can be active in parallel. The usage of several E1AP EPs together is specified in stage 2 specifications (e.g., TS 38.460 [3]).

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 and/or failure).
- **Class 2:** Elementary Procedures without response.

For Class 1 EPs, the types of responses can be as follows:

Successful:

- A signalling message explicitly indicates that the elementary procedure successfully completed with the receipt of the response.

Unsuccessful:

- A signalling message explicitly indicates that the EP failed.
- On time supervision expiry (i.e., absence of expected response).

Successful and Unsuccessful:

- One signalling message reports both successful and unsuccessful outcome for the different included requests. The response message used is the one defined for successful outcome.

Class 2 EPs are considered always successful.

Conditional handover: as defined in TS 38.300 [4].

Conditional PSCell Change: as defined in TS 37.340 [19].

DAPS Handover: as defined in TS 38.300 [4].

gNB: as defined in TS 38.300 [4].

gNB-CU: as defined in TS 38.401 [2].

gNB-DU: as defined in TS 38.401 [2].

gNB-CU-CP: as defined in TS 38.401 [2].

gNB-CU-UP: as defined in TS 38.401 [2].

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

UE-associated signalling: When E1AP messages associated to one UE uses the UE-associated logical E1-connection for association of the message to the UE in gNB-CU-UP and gNB-CU-CP.

UE-associated logical E1-connection: The UE-associated logical E1-connection uses the identities *GNB-CU-CP UE E1AP ID* and *GNB-CU-UP UE E1AP ID* according to the definition in TS 38.401 [2]. For a received UE associated E1AP message the gNB-CU-CP identifies the associated UE based on the *GNB-CU-CP UE E1AP ID IE* and the gNB-CU-UP identifies the associated UE based on the *GNB-CU-UP UE E1AP ID IE*.

Public Network Integrated NPN: as defined in TS 23.501 [20].

Stand-alone Non-Public Network: as defined in TS 23.501 [20].

3.2 Abbreviations

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

5GC	5G Core Network
5QI	5G QoS Identifier
CAG	Closed Access Group
CGI	Cell Global Identifier
CHO	Conditional Handover
CN	Core Network
CP	Control Plane
CPC	Conditional PSCell Change
DAPS	Dual Active Protocol Stack
DL	Downlink
EHC	Ethernet Header Compression
EN-DC	E-UTRA-NR Dual Connectivity
EPC	Evolved Packet Core
IAB	Integrated Access and Backhaul
MCG	Master Cell Group
NID	Network Identifier
NPN	Non-Public Network
PNI-NPN	Public Network Integrated Non-Public Network
NSSAI	Network Slice Selection Assistance Information
RANAC	RAN Area Code
SCG	Secondary Cell Group
SDAP	Service Data Adaptation Protocol
SNPN	Stand-alone Non-Public Network
S-NSSAI	Single Network Slice Selection Assistance Information
TNLA	Transport Network Layer Association

4 General

4.1 Procedure specification principles

The principle for specifying the procedure logic is to specify the functional behaviour of the terminating node exactly and completely. Any rule that specifies the behaviour of the originating 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 REQUEST 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 clause 10.

4.2 Forwards and backwards compatibility

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

4.3 Specification notations

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

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

5 E1AP services

E1AP provides the signalling service between the gNB-CU-CP and the gNB-CU-UP that is required to fulfil the E1AP functions described in clause 7. E1AP services are divided into two groups:

Non UE-associated services: They are related to the whole E1 interface instance between the gNB-CU-CP and gNB-CU-UP utilising a non UE-associated signalling connection.

UE-associated services: They are related to one UE. E1AP functions that provide these services are associated with a UE-associated signalling connection that is maintained for the UE in question.

Unless explicitly indicated in the procedure specification, at any instance in time one protocol endpoint shall have a maximum of one ongoing E1AP procedure related to a certain UE.

6 Services expected from signalling transport

The signalling connection shall provide in sequence delivery of E1AP messages. E1AP shall be notified if the signalling connection breaks.

7 Functions of E1AP

The functions of E1AP are described in TS 38.460 [3].

8 E1AP procedures

8.1 List of E1AP Elementary Procedures

In the following tables, all EPs are divided into Class 1 and Class 2 EPs (see subclause 3.1 for explanation of the different classes):

Table 1: Class 1 procedures

Elementary Procedure	Initiating Message	Successful Outcome	Unsuccessful Outcome
		Response message	Response message
Reset	RESET	RESET ACKNOWLEDGE	
gNB-CU-UP E1 Setup	GNB-CU-UP E1 SETUP REQUEST	GNB-CU-UP E1 SETUP RESPONSE	GNB-CU-UP E1 SETUP FAILURE
gNB-CU-CP E1 Setup	GNB-CU-CP E1 SETUP REQUEST	GNB-CU-CP E1 SETUP RESPONSE	GNB-CU-CP E1 SETUP FAILURE
gNB-CU-UP Configuration Update	GNB-CU-UP CONFIGURATION UPDATE	GNB-CU-UP CONFIGURATION UPDATE ACKNOWLEDGE	GNB-CU-UP CONFIGURATION UPDATE FAILURE
gNB-CU-CP Configuration Update	GNB-CU-CP CONFIGURATION UPDATE	GNB-CU-CP CONFIGURATION UPDATE ACKNOWLEDGE	GNB-CU-CP CONFIGURATION UPDATE FAILURE
E1 Release	E1 RELEASE REQUEST	E1 RELEASE RESPONSE	
Bearer Context Setup	BEARER CONTEXT SETUP REQUEST	BEARER CONTEXT SETUP RESPONSE	BEARER CONTEXT SETUP FAILURE
Bearer Context Modification (gNB-CU-CP initiated)	BEARER CONTEXT MODIFICATION REQUEST	BEARER CONTEXT MODIFICATION RESPONSE	BEARER CONTEXT MODIFICATION FAILURE
Bearer Context Modification Required (gNB-CU-UP initiated)	BEARER CONTEXT MODIFICATION REQUIRED	BEARER CONTEXT MODIFICATION CONFIRM	
Bearer Context Release (gNB-CU-CP initiated)	BEARER CONTEXT RELEASE COMMAND	BEARER CONTEXT RELEASE COMPLETE	
Resource Status Reporting Initiation	RESOURCE STATUS REQUEST	RESOURCE STATUS RESPONSE	RESOURCE STATUS FAILURE
IAB UP TNL Address Update	IAB UP TNL ADDRESS UPDATE	IAB UP TNL ADDRESS UPDATE ACKNOWLEDGE	IAB UP TNL ADDRESS UPDATE FAILURE

Table 2: Class 2 procedures

Elementary Procedure	Message
Error Indication	ERROR INDICATION
Bearer Context Release Request (gNB-CU-UP initiated)	BEARER CONTEXT RELEASE REQUEST
Bearer Context Inactivity Notification	BEARER CONTEXT INACTIVITY NOTIFICATION
DL Data Notification	DL DATA NOTIFICATION
UL Data Notification	UL DATA NOTIFICATION
Data Usage Report	DATA USAGE REPORT
gNB-CU-UP Counter Check	GNB-CU-UP COUNTER CHECK
gNB-CU-UP Status Indication	GNB-CU-UP STATUS INDICATION
MR-DC Data Usage Report	MR-DC DATA USAGE REPORT
Trace Start	TRACE START
Deactivate Trace	DEACTIVATE TRACE
Resource Status Reporting	RESOURCE STATUS UPDATE
Early Forwarding SN Transfer	EARLY FORWARDING SN TRANSFER
GNB-CU-CP Measurement Results Information	GNB-CU-CP MEASUREMENT RESULTS INFORMATION
IAB PSK Notification	IAB PSK NOTIFICATION

8.2 Interface Management procedures

8.2.1 Reset

8.2.1.1 General

The purpose of the Reset procedure is to initialise or re-initialise the E1AP UE-related contexts, in the event of a failure in the gNB-CU-CP or gNB-CU-UP. This procedure does not affect the application level configuration data exchanged during, e.g., the E1 Setup procedure.

The procedure uses non-UE associated signalling.

8.2.1.2 Successful Operation

8.2.1.2.1 Reset Procedure Initiated from the gNB-CU-CP

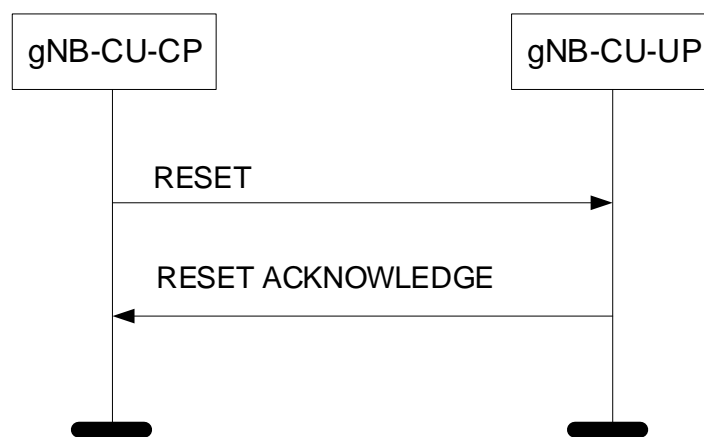


Figure 8.2.1.2.1-1: Reset procedure initiated from the gNB-CU-CP. Successful operation.

In the event of a failure at the gNB-CU-CP, which has resulted in the loss of some or all transaction reference information, a RESET message shall be sent to the gNB-CU-UP.

At reception of the RESET message the gNB-CU-UP shall release all allocated resources on E1 related to the UE association(s) indicated explicitly or implicitly in the RESET message and remove the indicated bearer contexts including E1AP ID.

After the gNB-CU-UP has released all assigned E1 resources and the UE E1AP IDs for all indicated UE associations which can be used for new UE-associated logical E1-connections over the E1 interface, the gNB-CU-UP shall respond with the RESET ACKNOWLEDGE message. The gNB-CU-UP does not need to wait for the release of bearer resources to be completed before returning the RESET ACKNOWLEDGE message.

If the RESET message contains the *UE-associated logical E1-connection list* IE, then:

- The gNB-CU-UP shall use the *gNB-CU-CP UE E1AP ID* IE and/or the *gNB-CU-UP UE E1AP ID* IE to explicitly identify the UE association(s) to be reset.
- The gNB-CU-UP shall include in the RESET ACKNOWLEDGE message, for each UE association to be reset, the *UE-associated logical E1-connection Item* IE in the *UE-associated logical E1-connection list* IE. The *UE-associated logical E1-connection Item* IEs shall be in the same order as received in the RESET message and shall include also unknown UE-associated logical E1-connections. Empty *UE-associated logical E1-connection Item* IEs, received in the RESET message, may be omitted in the RESET ACKNOWLEDGE message.
- If the *gNB-CU-CP UE E1AP ID* IE is included in the *UE-associated logical E1-connection Item* IE for a UE association, the gNB-CU-UP shall include the *gNB-CU-CP UE E1AP ID* IE in the corresponding *UE-associated logical E1-connection Item* IE in the RESET ACKNOWLEDGE message.

- If the *gNB-CU-UP UE E1AP ID IE* is included in the *UE-associated logical E1-connection Item IE* for a UE association, the gNB-CU-UP shall include the *gNB-CU-UP UE E1AP ID IE* in the corresponding *UE-associated logical E1-connection Item IE* in the RESET ACKNOWLEDGE message.

Interactions with other procedures:

If the RESET message is received, any other ongoing procedure (except for another Reset procedure) on the same E1 interface related to a UE association, indicated explicitly or implicitly in the RESET message, shall be aborted.

8.2.1.2.2 Reset Procedure Initiated from the gNB-CU-UP

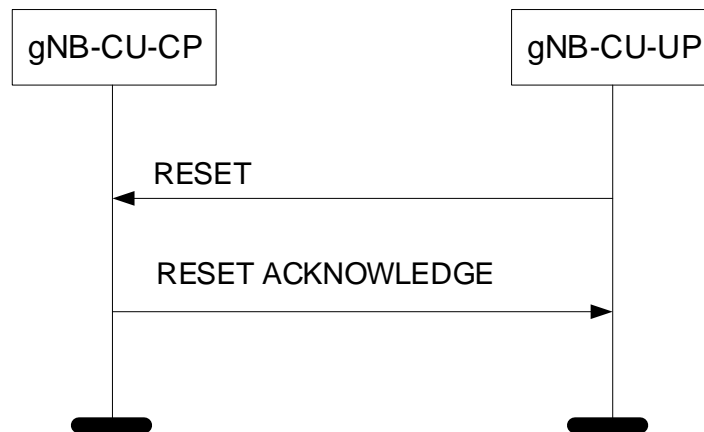


Figure 8.2.1.2.2-1: Reset procedure initiated from the gNB-CU-UP. Successful operation.

In the event of a failure at the gNB-CU-UP, which has resulted in the loss of some or all transaction reference information, a RESET message shall be sent to the gNB-CU-CP.

At reception of the RESET message the gNB-CU-CP shall release all allocated resources on E1 related to the UE association(s) indicated explicitly or implicitly in the RESET message and remove the E1AP ID for the indicated UE associations.

After the gNB-CU-CP has released all assigned E1 resources and the UE E1AP IDs for all indicated UE associations which can be used for new UE-associated logical E1-connections over the E1 interface, the gNB-CU-CP shall respond with the RESET ACKNOWLEDGE message. The gNB-CU-CP does not need to wait for the release of bearer resources to be completed before returning the RESET ACKNOWLEDGE message.

If the RESET message contains the *UE-associated logical E1-connection list IE*, then:

- The gNB-CU-CP shall use the *gNB-CU-CP UE E1AP ID IE* and/or the *gNB-CU-UP UE E1AP ID IE* to explicitly identify the UE association(s) to be reset.
- The gNB-CU-CP shall in the RESET ACKNOWLEDGE message include, for each UE association to be reset, the *UE-associated logical E1-connection Item IE* in the *UE-associated logical E1-connection list IE*. The *UE-associated logical E1-connection Item IEs* shall be in the same order as received in the RESET message and shall include also unknown UE-associated logical E1-connections. Empty *UE-associated logical E1-connection Item IEs*, received in the RESET message, may be omitted in the RESET ACKNOWLEDGE message.
- If the *gNB-CU-CP UE E1AP ID IE* is included in the *UE-associated logical E1-connection Item IE* for a UE association, the gNB-CU-CP shall include the *gNB-CU-CP UE E1AP ID IE* in the corresponding *UE-associated logical E1-connection Item IE* in the RESET ACKNOWLEDGE message.
- If the *gNB-CU-UP UE E1AP ID IE* is included in a *UE-associated logical E1-connection Item IE* for a UE association, the gNB-CU-CP shall include the *gNB-CU-UP UE E1AP ID IE* in the corresponding *UE-associated logical E1-connection Item IE* in the RESET ACKNOWLEDGE message.

Interactions with other procedures:

If the RESET message is received, any other ongoing procedure (except for another Reset procedure) on the same E1 interface related to a UE association, indicated explicitly or implicitly in the RESET message, shall be aborted.

8.2.1.3 Abnormal Conditions

Not applicable.

8.2.2 Error Indication

8.2.2.1 General

The Error Indication procedure is initiated by a node in order 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.

8.2.2.2 Successful Operation

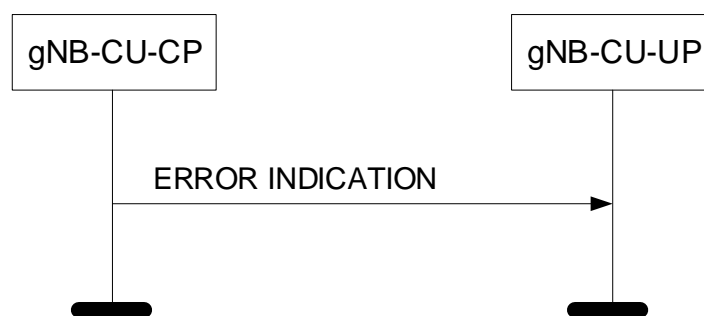


Figure 8.2.2.2-1: Error Indication procedure, gNB-CU-CP originated. Successful operation.

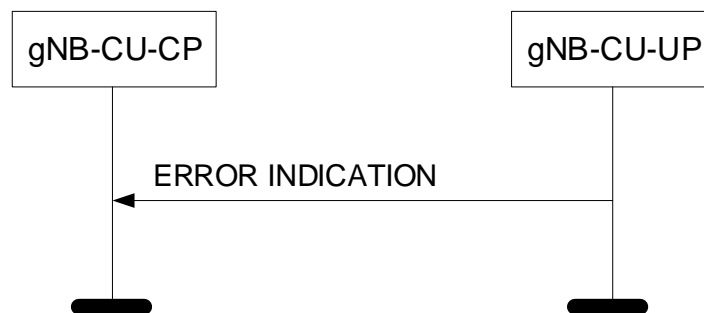


Figure 8.2.2.2-2: Error Indication procedure, gNB-CU-UP originated. Successful operation.

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

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 utilising UE associated signalling the *gNB-CU-CP UE E1AP ID* IE and *gNB-CU-UP UE E1AP ID* IE shall be included in the ERROR INDICATION message. If one or both of the *gNB-CU-CP UE E1AP ID* IE and the *gNB-CU-UP UE E1AP ID* IE are not correct, the cause shall be set to appropriate value, e.g., "Unknown or already allocated gNB-CU-CP UE E1AP ID", "Unknown or already allocated gNB-CU-UP UE E1AP ID" or "Unknown or inconsistent pair of UE E1AP ID".

8.2.2.3 Abnormal Conditions

Not applicable.

8.2.3 gNB-CU-UP E1 Setup

8.2.3.1 General

The purpose of the gNB-CU-UP E1 Setup procedure is to exchange application level data needed for the gNB-CU-UP and the gNB-CU-CP to correctly interoperate on the E1 interface. If the gNB-CU-UP initiates the first TNL association, it shall also initiate the gNB-CU-UP E1 Setup procedure. The procedure uses non-UE associated signalling.

This procedure erases any existing application level configuration data in the two nodes and replaces it by the one received. This procedure also re-initialises the E1AP UE-related contexts (if any) and erases all related signalling connections in the two nodes like a Reset procedure would do.

8.2.3.2 Successful Operation

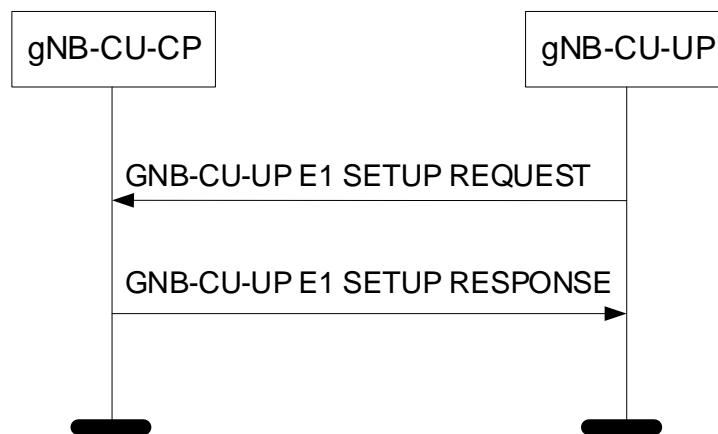


Figure 8.2.3.2-1: gNB-CU-UP E1 Setup procedure: Successful Operation.

The gNB-CU-UP initiates the procedure by sending a GNB-CU-UP E1 SETUP REQUEST message including the appropriate data to the gNB-CU-CP. The gNB-CU-CP responds with a GNB-CU-UP E1 SETUP RESPONSE message including the appropriate data.

If the GNB-CU-UP E1 SETUP REQUEST message contains the *gNB-CU-UP Name* IE the gNB-CU-CP may use this IE as a human readable name of the gNB-CU-UP. If the GNB-CU-UP E1 SETUP REQUEST message contains the *Extended gNB-CU-UP Name* IE, the gNB-CU-CP may use this IE as a human readable name of the gNB-CU-UP and shall ignore the *gNB-CU-UP Name* IE if included.

If the GNB-CU-UP E1 SETUP RESPONSE message contains the *gNB-CU-CP Name* IE, the gNB-CU-UP may use this IE as a human readable name of the gNB-CU-CP. If the GNB-CU-UP E1 SETUP RESPONSE message contains the *Extended gNB-CU-CP Name* IE, the GNB-CU-UP may use this IE as a human readable name of the gNB-CU-CP and shall ignore the *gNB-CU-CP Name* IE if included.

If the *Slice Support List* IE is contained in the GNB-CU-UP E1 SETUP REQUEST message, the gNB-CU-CP shall store the corresponding information and it may take it into account for bearer context establishment.

If the *NR CGI Support List* or the *Extended NR CGI Support List* IE is contained in the GNB-CU-UP E1 SETUP REQUEST message, the gNB-CU-CP shall store the corresponding information and it may take it into account for bearer context establishment.

If the *QoS Parameters Support List* IE is contained in the GNB-CU-UP E1 SETUP REQUEST message, the gNB-CU-CP shall store the corresponding information and it may take it into account for bearer context establishment.

If the *NPN Support Information* IE is contained in the GNB-CU-UP E1 SETUP REQUEST message, the gNB-CU-CP shall store the corresponding information and it may take it into account for bearer context establishment.

The exchanged data shall be stored in respective node and used as long as there is an operational TNL association. When this procedure is finished, the E1 interface is operational and other E1 messages can be exchanged.

If the *gNB-CU-UP Capacity* IE is contained in the GNB-CU-UP E1 SETUP REQUEST message, the gNB-CU-CP shall take this IE into account.

If the GNB-CU-UP E1 SETUP REQUEST message includes the *Transport Network Layer Address Info* IE, the gNB-CU-CP shall, if supported, take this IE into account for IPsec tunnel establishment.

If the GNB-CU-UP E1 SETUP RESPONSE message includes the *Transport Network Layer Address Info* IE, the gNB-CU-UP shall, if supported, take this IE into account for IPsec tunnel establishment.

8.2.3.3 Unsuccessful Operation

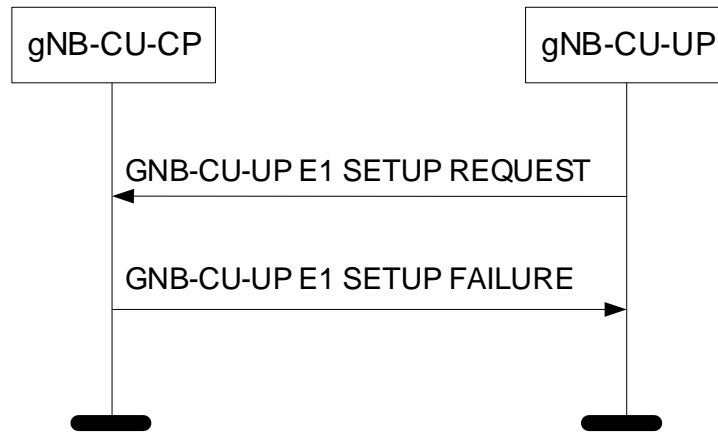


Figure 8.2.3.3-1: gNB-CU-UP E1 Setup procedure: Unsuccessful Operation.

If the gNB-CU-CP cannot accept the setup, it shall respond with a GNB-CU-UP E1 SETUP FAILURE and appropriate cause value.

If the GNB-CU-UP E1 SETUP FAILURE message includes the *Time To Wait* IE, the gNB-CU-UP shall wait at least for the indicated time before reinitiating the E1 setup towards the same gNB-CU-CP.

8.2.3.4 Abnormal Conditions

If the first message received for a specific TNL association is not a GNB-CU-CP E1 SETUP REQUEST, GNB-CU-UP E1 SETUP RESPONSE, or GNB-CU-UP E1 SETUP FAILURE message then this shall be treated as a logical error.

If the gNB-CU-UP does not receive either GNB-CU-UP E1 SETUP RESPONSE message or GNB-CU-UP E1 SETUP FAILURE message, the gNB-CU-UP may reinitiate the gNB-CU-UP E1 Setup procedure towards the same gNB-CU-CP, provided that the content of the new GNB-CU-UP E1 SETUP REQUEST message is identical to the content of the previously unacknowledged GNB-CU-UP E1 SETUP REQUEST message.

If the gNB-CU-UP receives a GNB-CU-CP E1 SETUP REQUEST message from the peer entity on the same E1 interface:

- In case the gNB-CU-UP answers with a GNB-CU-CP E1 SETUP RESPONSE message and receives a subsequent GNB-CU-UP E1 SETUP FAILURE message, the gNB-CU-UP shall consider the E1 interface as non operational and the procedure as unsuccessfully terminated according to sub clause 8.2.3.3.
- In case the gNB-CU-UP answers with a GNB-CU-CP E1 SETUP FAILURE message and receives a subsequent GNB-CU-UP E1 SETUP RESPONSE message, the gNB-CU-UP shall ignore the GNB-CU-UP E1 SETUP RESPONSE message and consider the E1 interface as non operational.

8.2.4 gNB-CU-CP E1 Setup

8.2.4.1 General

The purpose of the gNB-CU-CP E1 Setup procedure is to exchange application level data needed for the gNB-CU-CP and the gNB-CU-UP to correctly interoperate on the E1 interface. If the gNB-CU-CP initiates the first TNL association, it shall also initiate the gNB-CU-CP E1 Setup procedure. The procedure uses non-UE associated signalling.

This procedure erases any existing application level configuration data in the two nodes and replaces it by the one received. This procedure also re-initialises the E1AP UE-related contexts (if any) and erases all related signalling connections in the two nodes like a Reset procedure would do.

8.2.4.2 Successful Operation

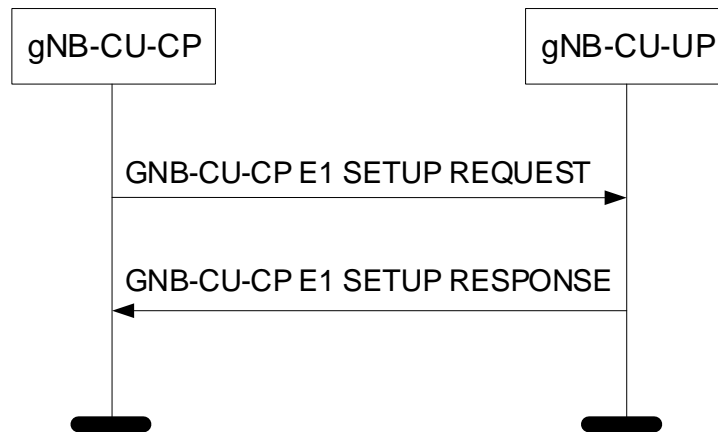


Figure 8.2.4.2-1: gNB-CU-CP E1 Setup procedure: Successful Operation.

The gNB-CU-CP initiates the procedure by sending a GNB-CU-CP E1 SETUP REQUEST message including the appropriate data to the gNB-CU-UP. The gNB-CU-UP responds with a GNB-CU-CP E1 SETUP RESPONSE message including the appropriate data.

If the GNB-CU-CP E1 SETUP REQUEST message contains the *gNB-CU-CP Name* IE the gNB-CU-UP may use this IE as a human readable name of the gNB-CU-CP. If the GNB-CU-CP E1 SETUP REQUEST message contains the *Extended gNB-CU-CP Name* IE, the gNB-CU-UP may use this IE as a human readable name of the gNB-CU-CP and shall ignore the *gNB-CU-CP Name* IE if included.

If the GNB-CU-CP E1 SETUP RESPONSE message contains the *gNB-CU-UP Name* IE, the gNB-CU-CP may use this IE as a human readable name of the gNB-CU-UP. If the GNB-CU-CP E1 SETUP RESPONSE message contains the *Extended gNB-CU-UP Name* IE, the gNB-CU-CP may use this IE as a human readable name of the gNB-CU-UP and shall ignore the *gNB-CU-UP Name* IE if included.

The exchanged data shall be stored in respective node and used as long as there is an operational TNL association. When this procedure is finished, the E1 interface is operational and other E1 messages can be exchanged.

If the *gNB-CU-UP Capacity* IE is contained in the GNB-CU-CP E1 SETUP RESPONSE message, the gNB-CU-CP shall take this IE into account.

If the GNB-CU-CP E1 SETUP REQUEST message includes the *Transport Network Layer Address Info* IE, the gNB-CU-UP shall, if supported, take this IE into account for IPsec tunnel establishment.

If the GNB-CU-CP E1 SETUP RESPONSE message includes the *Transport Network Layer Address Info* IE, the gNB-CU-CP shall, if supported, take this IE into account for IPsec tunnel establishment.

If the *NPN Support Information* IE is contained in the GNB-CU-CP E1 SETUP RESPONSE message, the gNB-CU-CP shall store the corresponding information and it may take it into account for bearer context establishment.

If the *NR CGI Support List* or the *Extended NR CGI Support List* IE is contained in the GNB-CU-CP E1 SETUP RESPONSE message, the gNB-CU-CP shall store the corresponding information and it may take it into account for bearer context establishment.

8.2.4.3 Unsuccessful Operation

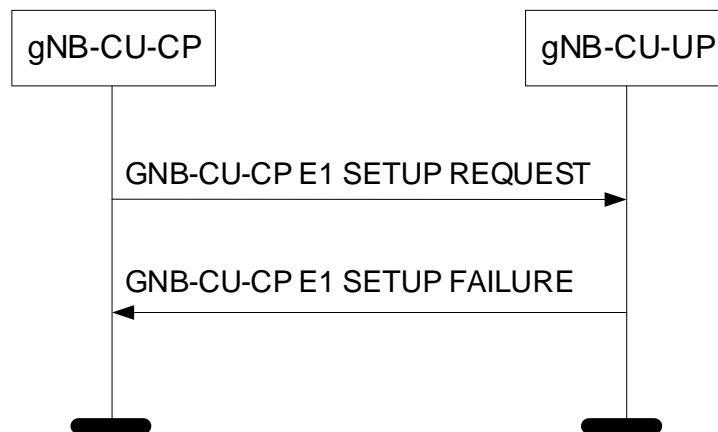


Figure 8.2.4.3-1: gNB-CU-CP E1 Setup procedure: Unsuccessful Operation.

If the gNB-CU-UP cannot accept the setup, it shall respond with a GNB-CU-CP E1 SETUP FAILURE and appropriate cause value.

If the GNB-CU-CP E1 SETUP FAILURE message includes the *Time To Wait* IE, the gNB-CU-CP shall wait at least for the indicated time before reinitiating the E1 setup towards the same gNB-CU-UP.

8.2.4.4 Abnormal Conditions

If the first message received for a specific TNL association is not a GNB-CU-UP E1 SETUP REQUEST, GNB-CU-CP E1 SETUP RESPONSE, or GNB-CU-CP E1 SETUP FAILURE message then this shall be treated as a logical error.

If the gNB-CU-CP does not receive either GNB-CU-CP E1 SETUP RESPONSE message or GNB-CU-CP E1 SETUP FAILURE message, the gNB-CU-CP may reinitiate the gNB-CU-CP E1 Setup procedure towards the same gNB-CU-UP, provided that the content of the new GNB-CU-CP E1 SETUP REQUEST message is identical to the content of the previously unacknowledged GNB-CU-CP E1 SETUP REQUEST message.

If the gNB-CU-CP receives a GNB-CU-UP E1 SETUP REQUEST message from the peer entity on the same E1 interface:

- In case the gNB-CU-CP answers with a GNB-CU-UP E1 SETUP RESPONSE message and receives a subsequent GNB-CU-CP E1 SETUP FAILURE message, the gNB-CU-CP shall consider the E1 interface as non operational and the procedure as unsuccessfully terminated according to sub clause 8.2.4.3.
- In case the gNB-CU-CP answers with a GNB-CU-UP E1 SETUP FAILURE message and receives a subsequent GNB-CU-CP E1 SETUP RESPONSE message, the gNB-CU-CP shall ignore the GNB-CU-CP E1 SETUP RESPONSE message and consider the E1 interface as non operational.

8.2.5 gNB-CU-UP Configuration Update

8.2.5.1 General

The purpose of the gNB-CU-UP Configuration Update procedure is to update application level configuration data needed for the gNB-CU-UP and the gNB-CU-CP to interoperate correctly on the E1 interface. This procedure does not affect existing UE-related contexts, if any. The procedure uses non-UE associated signalling.

8.2.5.2 Successful Operation

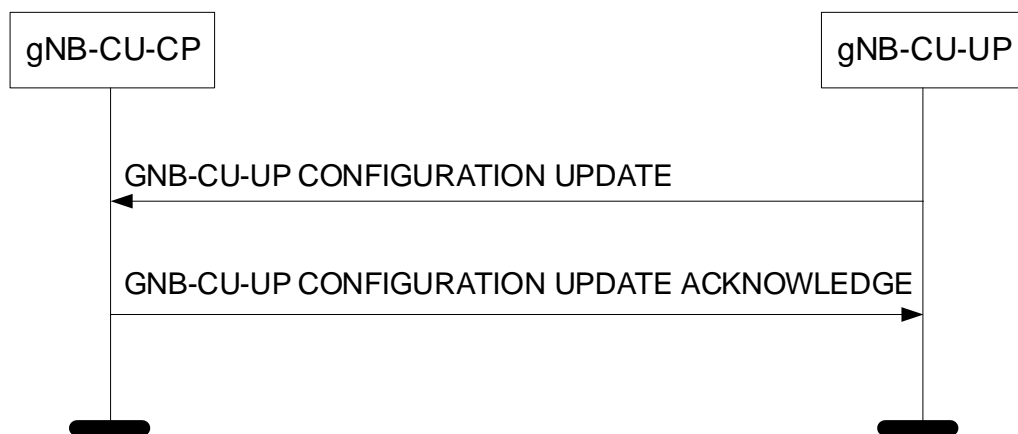


Figure 8.2.5.2-1: gNB-CU-UP Configuration Update procedure: Successful Operation.

The gNB-CU-UP initiates the procedure by sending a GNB-CU-UP CONFIGURATION UPDATE message to the gNB-CU-CP including an appropriate set of updated configuration data that it has just taken into operational use. The gNB-CU-CP responds with GNB-CU-UP CONFIGURATION UPDATE ACKNOWLEDGE message to acknowledge that it successfully updated the configuration data. If an information element is not included in the GNB-CU-UP CONFIGURATION UPDATE message, the gNB-CU-CP shall interpret that the corresponding configuration data is not changed and shall continue to operate with the existing related configuration data.

If the *Supported PLMNs* IE is included in the GNB-CU-UP CONFIGURATION UPDATE message, the gNB-CU-CP shall overwrite the whole list of information and store the corresponding information.

- If the *Slice Support List* IE is contained in the GNB-CU-UP CONFIGURATION UPDATE message, the gNB-CU-CP shall store the corresponding information and replace any existing information.
- If the *NR CGI Support List* or the *Extended NR CGI Extended Support List* IE is contained in the GNB-CU-UP CONFIGURATION UPDATE message, the gNB-CU-CP shall store the corresponding information and replace any existing information.
- If the *QoS Parameters Support List* IE is contained in the GNB-CU-UP CONFIGURATION UPDATE message, the gNB-CU-CP shall store the corresponding information and replace any existing information.
- If the *NPN Support Information* IE is contained in the GNB-CU-UP CONFIGURATION UPDATE message, the gNB-CU-CP shall store the corresponding information and replace any existing information.

The updated configuration data shall be stored in both nodes and used as long as there is an operational TNL association or until any further update is performed.

If the *gNB-CU-UP Capacity* IE is contained in the GNB-CU-UP CONFIGURATION UPDATE message, the gNB-CU-CP shall take this IE into account.

If the *gNB-CU-UP ID* IE is included in the GNB-CU-UP CONFIGURATION UPDATE message, the gNB-CU-CP shall associate the TNLA to the E1 interface instance using the gNB-CU-UP ID.

If the *gNB-CU-UP Name* IE is included in the GNB-CU-UP CONFIGURATION UPDATE message, the gNB-CU-CP may store it or update this IE value if already stored, and use it as a human readable name of the gNB-CU-UP. If the *Extended gNB-CU-UP Name* IE is included in the GNB-CU-UP CONFIGURATION UPDATE message, the gNB-CU-CP may store it or update this IE value if already stored, and use it as a human readable name of the gNB-CU-UP and shall ignore the *gNB-CU-UP Name* IE if also included.

If the GNB-CU-UP CONFIGURATION UPDATE message includes *gNB-CU-UP TNLA To Remove List* IE, and the *Endpoint IP address* IE and the *Port Number* IE for both TNL endpoints of the TNL association(s) are included in the *gNB-CU-UP TNLA To Remove List* IE, the gNB-CU-CP shall, if supported, consider that the TNL association(s) indicated by both received TNL endpoints will be removed by the gNB-CU-UP. If the *Endpoint IP address* IE, or the *Endpoint IP address* IE and the *Port Number* IE for one or both of the TNL endpoints is included in the *gNB-CU-UP TNLA To Remove List* IE in GNB-CU-UP CONFIGURATION UPDATE message, the gNB-CU-CP shall, if supported,

consider that the TNL association(s) indicated by the received endpoint IP address(es) will be removed by the gNB-CU-UP.

If the GNB-CU-UP CONFIGURATION UPDATE message includes the *Transport Network Layer Address Info* IE, the gNB-CU-CP shall, if supported, take this IE into account for IPsec tunnel establishment.

If the GNB-CU-UP CONFIGURATION UPDATE ACKNOWLEDGE message includes the *Transport Network Layer Address Info* IE, the gNB-CU-UP shall, if supported, take this IE into account for IPsec tunnel establishment.

8.2.5.3 Unsuccessful Operation

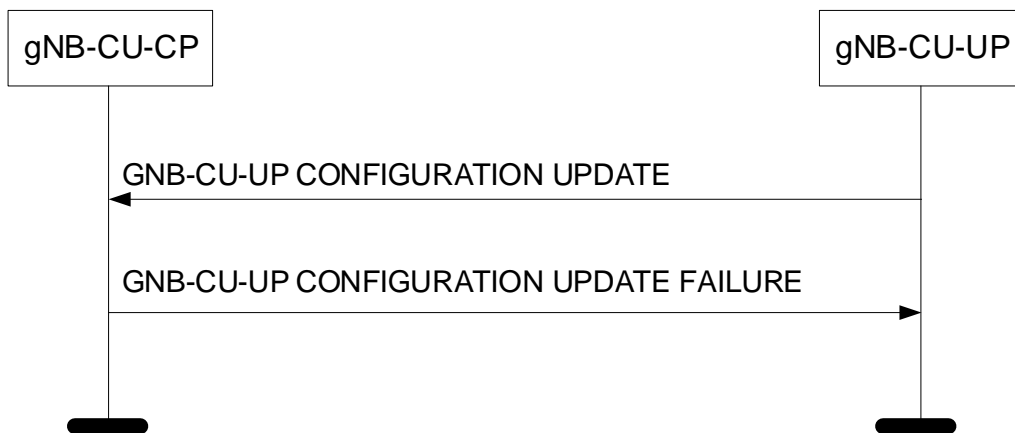


Figure 8.2.5.3-1: gNB-CU-UP Configuration Update procedure: Unsuccessful Operation.

If the gNB-CU-CP cannot accept the update, it shall respond with a GNB-CU-UP CONFIGURATION UPDATE FAILURE message and appropriate cause value.

If the GNB-CU-UP CONFIGURATION UPDATE FAILURE message includes the *Time To Wait* IE, the gNB-CU-UP shall wait at least for the indicated time before reinitiating the GNB-CU-UP CONFIGURATION UPDATE message towards the same gNB-CU-CP.

8.2.5.4 Abnormal Conditions

Not applicable.

8.2.6 gNB-CU-CP Configuration Update

8.2.6.1 General

The purpose of the gNB-CU-CP Configuration Update procedure is to update application level configuration data needed for the gNB-CU-CP and the gNB-CU-UP to interoperate correctly on the E1 interface. This procedure does not affect existing UE-related contexts, if any. The procedure uses non-UE associated signalling.

8.2.6.2 Successful Operation

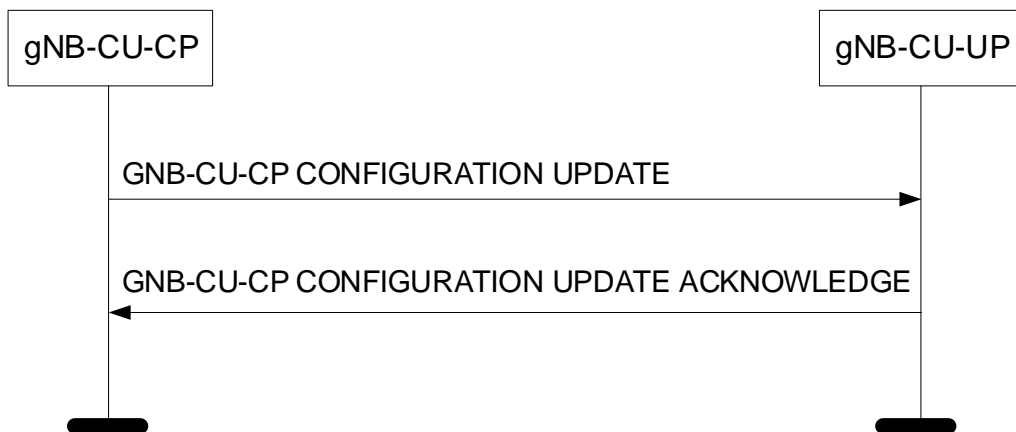


Figure 8.2.6.2-1: gNB-CU-CP Configuration Update procedure: Successful Operation.

The gNB-CU-CP initiates the procedure by sending a GNB-CU-CP CONFIGURATION UPDATE message to the gNB-CU-UP including an appropriate set of updated configuration data that it has just taken into operational use. The gNB-CU-UP responds with GNB-CU-CP CONFIGURATION UPDATE ACKNOWLEDGE message to acknowledge that it successfully updated the configuration data. If an information element is not included in the GNB-CU-CP CONFIGURATION UPDATE message, the gNB-CU-UP shall interpret that the corresponding configuration data is not changed and shall continue to operate with the existing related configuration data.

The updated configuration data shall be stored in both nodes and used as long as there is an operational TNL association or until any further update is performed.

If the *gNB-CU-CP Name IE* is included in the GNB-CU-CP CONFIGURATION UPDATE message, the gNB-CU-UP may store it or update this IE value if already stored, and use it as a human readable name of the gNB-CU-CP. If the *Extended gNB-CU-CP Name IE* is included in the GNB-CU-CP CONFIGURATION UPDATE message, the gNB-CU-UP may store it or update this IE value if already stored, and use it as a human readable name of the gNB-CU-CP and shall ignore the *gNB-CU-CP Name IE* if also included.

If the *gNB-CU-CP TNLA To Add List IE* is contained in the gNB-CU-CP CONFIGURATION UPDATE message, the gNB-CU-UP shall, if supported, use it to establish the TNL association(s) with the gNB-CU-CP. The gNB-CU-UP shall report to the gNB-CU-CP, in the GNB-CU-CP CONFIGURATION UPDATE ACKNOWLEDGE message, the successful establishment of the TNL association(s) with the gNB-CU-CP as follows:

- A list of TNL address(es) with which the gNB-CU-UP successfully established the TNL association shall be included in the *gNB-CU-CP TNLA Setup List IE*;
- A list of TNL address(es) with which the gNB-CU-UP failed to establish the TNL association shall be included in the *gNB-CU-CP TNLA Failed To Setup List IE*.

If the GNB-CU-CP CONFIGURATION UPDATE message includes *gNB-CU-CP TNLA To Remove List IE*, and the *Endpoint IP address IE* and the *Port Number IE* for both TNL endpoints of the TNL association(s) are included in the *gNB-CU-CP TNLA To Remove List IE*, the gNB-CU-UP shall, if supported, initiate removal of the TNL association(s) indicated by both received TNL endpoints towards the gNB-CU-CP. If the *Endpoint IP address IE*, or the *Endpoint IP address IE* and the *Port Number IE* for one or both of the TNL endpoints is included in the *gNB-CU-CP TNLA To Remove List IE*, the gNB-CU-UP shall, if supported, initiate removal of the TNL association(s) indicated by the received endpoint IP address(es).

If the *gNB-CU-CP TNLA To Update List IE* is contained in the gNB-CU-CP CONFIGURATION UPDATE message the gNB-CU-UP shall, if supported, overwrite the previously stored information for the related TNL association.

If the *TNLA Usage IE* is included in the *gNB-CU-CP TNLA To Add List IE* or the *gNB-CU-CP TNLA To Update List IE* in the gNB-CU-CP CONFIGURATION UPDATE message, the gNB-CU-UP shall, if supported, use it as described in TS 38.462 [18].

If the GNB-CU-CP CONFIGURATION UPDATE message includes the *Transport Network Layer Address Info IE*, the gNB-CU-UP shall, if supported, take this IE into account for IPsec tunnel establishment.

If the GNB-CU-CP CONFIGURATION UPDATE ACKNOWLEDGE message includes the *Transport Network Layer Address Info* IE, the gNB-CU-CP shall, if supported, take this IE into account for IPsec tunnel establishment.

8.2.6.3 Unsuccessful Operation

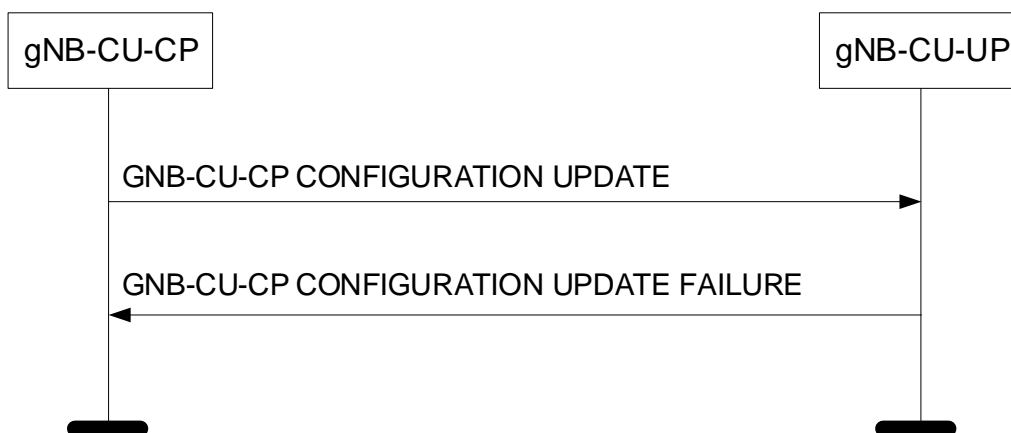


Figure 8.2.6.3-1: gNB-CU-CP Configuration Update procedure: Unsuccessful Operation.

If the gNB-CU-UP cannot accept the update, it shall respond with a GNB-CU-CP CONFIGURATION UPDATE FAILURE message and appropriate cause value.

If the GNB-CU-CP CONFIGURATION UPDATE FAILURE message includes the *Time To Wait* IE, the gNB-CU-CP shall wait at least for the indicated time before reinitiating the GNB-CU-CP CONFIGURATION UPDATE message towards the same gNB-CU-UP.

8.2.6.4 Abnormal Conditions

Not applicable.

8.2.7 E1 Release

8.2.7.1 General

The purpose of the E1 Release procedure is to release all existing signalling connections and related application level data. This procedure does not affect existing UE-related contexts, if any. The procedure uses non-UE associated signalling.

8.2.7.2 Successful Operation

8.2.7.2.1 E1 Release Procedure Initiated from the gNB-CU-CP

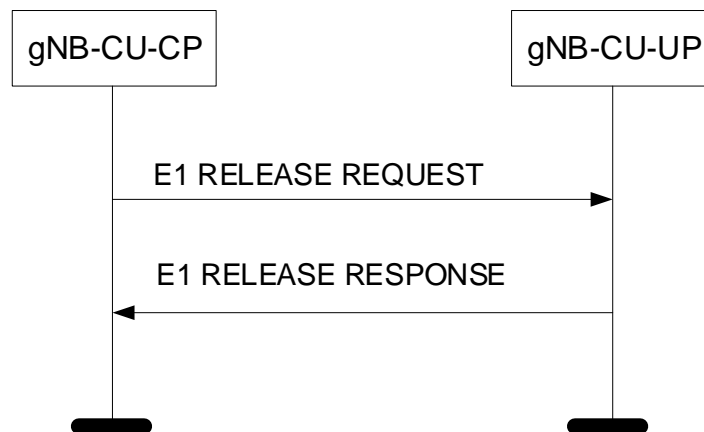


Figure 8.2.7.2.1-1: E1 Release procedure initiated from the gNB-CU-CP. Successful operation.

The gNB-CU-CP initiates the procedure by sending the E1 RELEASE REQUEST message to the gNB-CU-UP.

Upon reception of the E1 RELEASE REQUEST message, the gNB-CU-UP shall release any existing resources related to the E1 interface. The gNB-CU-UP shall respond with a E1 RELEASE RESPONSE message to confirm that it has initiated the release of the resources, if existing, and that the signalling connection for the E1AP application protocol is released.

8.2.7.2.2 E1 Release Procedure Initiated from the gNB-CU-UP

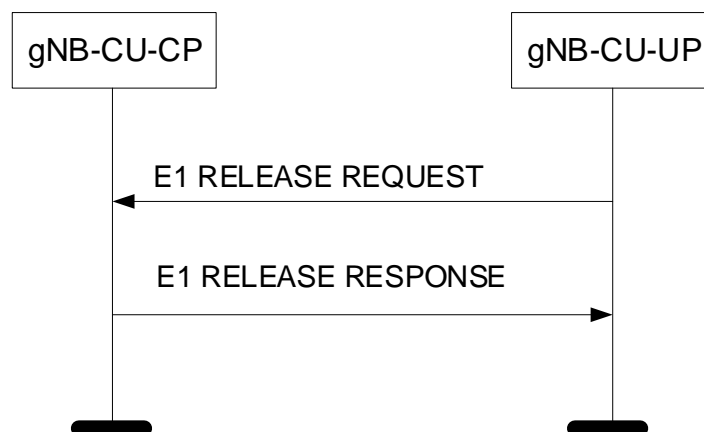


Figure 8.2.7.2.2-1: E1 Release procedure initiated from the gNB-CU-UP. Successful operation.

The gNB-CU-UP initiates the procedure by sending the E1 RELEASE REQUEST message to the gNB-CU-CP.

Upon reception of the E1 RELEASE REQUEST message, the gNB-CU-CP shall release any existing resources related to the E1 interface. The gNB-CU-CP shall respond with a E1 RELEASE RESPONSE message to confirm that it has initiated the release of the resources, if existing, and that the signalling connection for the E1AP application protocol is released.

8.2.7.3 Abnormal Conditions

Not applicable.

8.2.8 gNB-CU-UP Status Indication

8.2.8.1 General

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

8.2.8.2 Successful Operation

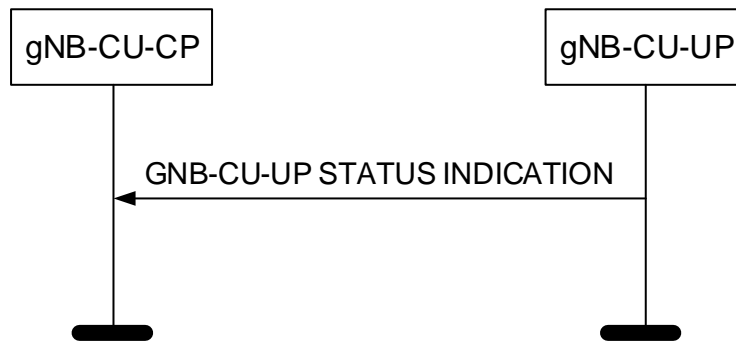


Figure 8.3.7.2-1: DL Data Notification procedure: Successful Operation.

The gNB-CU-UP initiates the procedure by sending the GNB-CU-UP STATUS INDICATION message to the gNB-CU-CP.

If the *gNB-CU-UP Overload Information* IE in the GNB-CU-UP STATUS INDICATION message indicates that the gNB-CU-UP is overloaded, the gNB-CU-CP shall apply overload reduction actions until informed, with a new GNB-CU-UP STATUS INDICATION message, that the overload situation has ceased.

The detailed overload reduction policy is up to gNB-CU-CP implementation.

8.2.8.3 Abnormal Conditions

Not applicable.

8.2.9 Resource Status Reporting Initiation

8.2.9.1 General

This procedure is used by an gNB-CU-CP to request the reporting of load measurements to gNB-CU-UP.

The procedure uses non UE-associated signalling.

8.2.9.2 Successful Operation

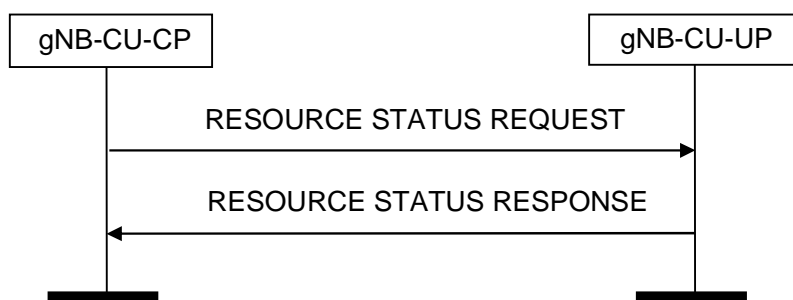


Figure 8.2.9.2-1: Resource Status Reporting Initiation, successful operation

The procedure is initiated with a RESOURCE STATUS REQUEST message sent from gNB-CU-CP to gNB-CU-UP to start a measurement or stop a measurements.

If gNB-CU-UP is capable to provide all requested resource status information, it shall initiate the measurement as requested by gNB-CU-CP, and respond with the RESOURCE STATUS RESPONSE message.

Interaction with other procedures

When starting a measurement, the *Report Characteristics* IE in the RESOURCE STATUS REQUEST indicates the type of objects gNB-CU-UP shall perform measurements on. The gNB-CU-UP shall include in the RESOURCE STATUS UPDATE message:

- the *HW Capacity Indicator* IE, if the second bit, "HW Capacity Ind Periodic" of the *Report Characteristics* IE included in the RESOURCE STATUS REQUEST message is set to 1;
- the *TNL Available Capacity Indicator* IE, if the first bit, " TNL Available Capacity Ind Periodic " of the *Report Characteristics* IE included in the RESOURCE STATUS REQUEST message is set to 1;

If the *Reporting Periodicity* IE is included in the RESOURCE STATUS REQUEST message, this indicates the periodicity for the reporting of periodic measurements. The gNB-CU-UP shall report only once, unless otherwise requested within the *Reporting Periodicity* IE.

8.2.9.3 Unsuccessful Operation

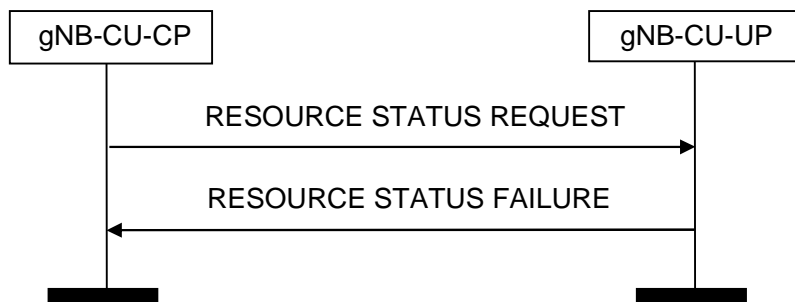


Figure 8.2.9.3-1: Resource Status Reporting Initiation, unsuccessful operation

If any of the requested measurements cannot be initiated, gNB-CU-UP shall send a RESOURCE STATUS FAILURE message with an appropriate cause value.

8.2.9.4 Abnormal Conditions

If the initiating gNB-CU-CP does not receive either RESOURCE STATUS RESPONSE message or RESOURCE STATUS FAILURE message, the gNB-CU-CP may reinitiate the Resource Status Reporting Initiation procedure towards the same gNB-CU-UP, provided that the content of the new RESOURCE STATUS REQUEST message is identical to the content of the previously unacknowledged RESOURCE STATUS REQUEST message with the same Transaction ID.

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

If the gNB-CU-UP receives a RESOURCE STATUS REQUEST message which includes the *Registration Request* IE set to "start" and the *gNB-CU-CP Measurement ID* IE corresponding to an existing on-going load measurement reporting, for which a different Transaction ID is used, then gNB-CU-UP shall initiate a RESOURCE STATUS FAILURE message with an appropriate cause value.

8.2.10 Resource Status Reporting

8.2.10.1 General

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

The procedure uses non UE-associated signalling.

8.2.10.2 Successful Operation



Figure 8.2.10.2-1: Resource Status Reporting, successful operation

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

8.2.10.3 Unsuccessful Operation

Not applicable.

8.2.10.4 Abnormal Conditions

Void.

8.3 Bearer Context Management procedures

8.3.1 Bearer Context Setup

8.3.1.1 General

The purpose of the Bearer Context Setup procedure is to allow the gNB-CU-CP to establish a bearer context in the gNB-CU-UP. The procedure uses UE-associated signalling.

8.3.1.2 Successful Operation

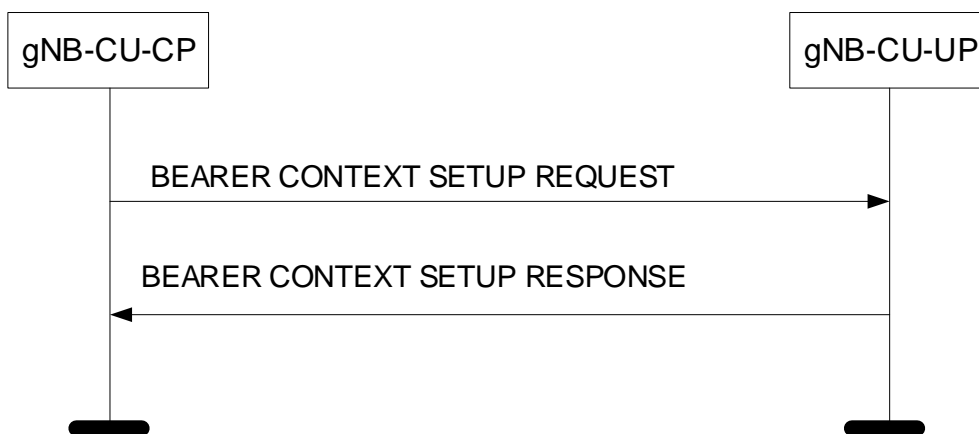


Figure 8.3.1.2-1: Bearer Context Setup procedure: Successful Operation.

The gNB-CU-CP initiates the procedure by sending the BEARER CONTEXT SETUP REQUEST message to the gNB-CU-UP. If the gNB-CU-UP succeeds to establish the requested resources, it replies to the gNB-CU-CP with the BEARER CONTEXT SETUP RESPONSE message.

The gNB-CU-UP shall report to the gNB-CU-CP, in the BEARER CONTEXT SETUP RESPONSE message, the result for all the requested resources in the following way:

For E-UTRAN:

- A list of DRBs which are successfully established shall be included in the *DRB Setup List IE*;
- A list of DRBs which failed to be established shall be included in the *DRB Failed List IE*;

For NG-RAN:

- A list of PDU Session Resources which are successfully established shall be included in the *PDU Session Resource Setup List IE*;
- A list of PDU Session Resources which failed to be established shall be included in the *PDU Session Resource Failed List IE*;
- For each established PDU Session Resource, a list of DRBs which are successfully established shall be included in the *DRB Setup List IE*;
- For each established PDU Session Resource, a list of DRBs which failed to be established shall be included in the *DRB Failed List IE*;
- For each established DRB, a list of QoS Flows which are successfully established shall be included in the *Flow Setup List IE*;
- For each established DRB, a list of QoS Flows which failed to be established shall be included in the *Flow Failed List IE*;

When the gNB-CU-UP reports the unsuccessful establishment of a PDU Session Resource, DRB or QoS Flow the cause value should be precise enough to enable the gNB-CU-CP to know the reason for the unsuccessful establishment.

If the *Existing Allocated NG DL UP Transport Layer Information IE* is contained in the BEARER CONTEXT SETUP REQUEST message, the gNB-CU-UP may re-use the indicated resources already allocated for this bearer context. If the gNB-CU-UP decides to re-use the indicated resources, it shall include the *NG DL UP Unchanged IE* in the BEARER CONTEXT SETUP RESPONSE message.

If the *PDU Session Resource DL Aggregate Maximum Bit Rate IE* is contained in the *PDU Session Resource To Setup List IE* in the BEARER CONTEXT SETUP REQUEST message, the gNB-CU-UP shall store and use the information for the down link traffic policing for the Non-GBR QoS flows for the concerned UE as specified in TS 23.501 [20].

If the *Data Forwarding Information Request IE*, *PDU Session Data Forwarding Information Request IE* or the *DRB Data Forwarding Information Request IE* are included in the BEARER CONTEXT SETUP REQUEST message, the gNB-CU-UP shall include the requested forwarding information in the *Data Forwarding Information Response IE*, *PDU Session Data Forwarding Information Response IE* or the *DRB Data Forwarding Information Response IE* in the BEARER CONTEXT SETUP RESPONSE message.

If the *DL UP Parameters IE* is contained in the *DRB To Setup List IE* in the BEARER CONTEXT SETUP REQUEST message, the gNB-CU-UP shall configure the corresponding information.

For each PDU session for which the *Security Indication IE* is included in the *PDU Session Resource To Setup List IE* of the BEARER CONTEXT SETUP REQUEST message, and the *Integrity Protection Indication IE* or *Confidentiality Protection Indication IE* is set to "preferred", then the gNB-CU-UP should, if supported, perform user plane integrity protection or ciphering, respectively, for the concerned PDU session and shall notify whether it performed the user plane integrity protection or ciphering by including the *Integrity Protection Result IE* or *Confidentiality Protection Result IE*, respectively, in the *PDU Session Resource Setup List IE* of the BEARER CONTEXT SETUP RESPONSE message.

For each PDU session for which the *Security Indication IE* is included in the *PDU Session Resource To Setup List IE* of the BEARER CONTEXT SETUP REQUEST message, and the *Integrity Protection Indication IE* or *Confidentiality Protection Indication IE* is set to "required", then the gNB-CU-UP shall perform user plane integrity protection or

ciphering, respectively, for the concerned PDU Session. If the gNB-CU-UP cannot perform the user plane integrity protection or ciphering, it shall reject the setup of the PDU Session Resources with an appropriate cause value.

For each PDU session for which the *Security Indication* IE is included in the *PDU Session Resource To Setup List* IE of the BEARER CONTEXT SETUP REQUEST message:

- if the *Integrity Protection Indication* IE is set to "not needed", then the gNB-CU-UP shall not perform user plane integrity protection for the concerned PDU session;
- if the *Confidentiality Protection Indication* IE is set to "not needed", then the gNB-CU-UP shall not perform user plane ciphering for the concerned PDU session.

For each PDU session, if the *Data Forwarding to E-UTRAN Information List* IE is included in the *PDU Session Resource To Modify List* IE in the BEARER CONTEXT MODIFICATION REQUEST message, the gNB-CU-UP shall, if supported, use it for inter-system data forwarding from 5GS to EPS as specified in TS38.300 [8].

If the *UE DL Maximum Integrity Protected Data Rate* IE is contained in the BEARER CONTEXT SETUP REQUEST message, the gNB-CU-UP shall use this value when enforcing the maximum integrity protected data rate for the UE.

If the *Bearer Context Status Change* IE is contained in the BEARER CONTEXT SETUP REQUEST message, the gNB-CU-UP shall consider the UE RRC state and act as specified in TS 38.401 [2].

For each requested DRB, if the *PDCP Duplication* IE is included in the *PDCP Configuration* IE contained in the BEARER CONTEXT SETUP REQUEST message, then the gNB-CU-UP shall include two *UP Transport Layer Information* IEs in the BEARER CONTEXT SETUP RESPONSE message to support packet duplication. If only one cell group is included in the *Cell Group Information* IE for the concerned DRB, then the gNB-CU-UP shall consider that the first *UP Transport Layer Information* IE of the two *UP Transport Layer Information* IEs is for the primary path.

For each requested DRB, if the *Additional PDCP duplication Information* IE is included in the *PDCP Configuration* IE contained in the BEARER CONTEXT SETUP REQUEST message, then the gNB-CU-UP shall, if supported, include the same number of *UP Transport Layer Information* IEs indicated by the *Additional PDCP duplication Information* IE in the BEARER CONTEXT SETUP RESPONSE message to support packet duplication. If only one cell group is included in the *Cell Group Information* IE for the concerned DRB, then the gNB-CU-UP shall consider that the first *UP Transport Layer Information* IE of these *UP Transport Layer Information* IEs is for the primary path. If more than one cell group is included in the *Cell Group Information* IE, then the gNB-CU-UP shall consider that the number of duplication tunnels for each cell group is indicated by the *Number of tunnels* IE, and that the first *UP Transport Layer Information* IE for each cell group is for the primary path or the split secondary path.

If the *PDCP SN Status Information* IE is contained within the *DRB To Setup List* IE in the BEARER CONTEXT SETUP REQUEST message, the gNB-CU-UP shall take it into account and act as specified in TS 38.401 [2].

If the *QoS Flow Mapping Indication* IE is contained in the *QoS Flows Information To Be Setup* IE within the *DRB To Setup List* IE in the BEARER CONTEXT SETUP REQUEST message, the gNB-CU-UP may take it into account that only the uplink or downlink QoS flow is mapped to the DRB.

If the *QoS Flows Remapping* IE is contained within the *DRB To Setup List* IE in the BEARER CONTEXT SETUP REQUEST message for a DRB and set to "update", the gNB-CU-UP shall, if supported, consider that QoS flows mapped for the DRB is updated to the QoS flow(s) included in the *QoS Flows Information To Be Setup* IE after finishing handling forwarded PDCP SDUs during an intra-system handover procedure. If the *QoS Flows Remapping* IE is contained within the *DRB To Setup List* IE in the BEARER CONTEXT SETUP REQUEST message for a DRB and set to "source configuration", the gNB-CU-UP shall, if supported, consider that no QoS flow is mapped to the DRB after finishing handling forwarded PDCP SDUs over that DRB during an intra-system handover procedure and ignore the information included in the *QoS Flows Information To Be Setup* IE for the concerned DRB.

For each PDU Session Resource, if the *Network Instance* IE is included in the *PDU Session Resource To Setup List* IE in the BEARER CONTEXT SETUP REQUEST message and the *Common Network Instance* IE is not included, the gNB-CU-UP shall, if supported, use it when selecting transport network resource as specified in TS 23.501 [20].

For each PDU session, if the *Common Network Instance* IE is included in the *PDU Session Resource To Setup List* IE in the BEARER CONTEXT SETUP REQUEST message, the gNB-CU-UP shall, if supported, use it when selecting transport network resource as specified in TS 23.501 [20].

For each PDU session, if the *Redundant NG UL UP Transport Layer Information* IE is included in the *PDU Session Resource To Setup List* IE in the BEARER CONTEXT SETUP REQUEST message, the gNB-CU-UP shall, if

supported, use it as the uplink termination point of the redundant tunnel for the user plane data of those QoS flows in this PDU session which need redundant transmission as described in TS 23.501 [20], and it shall include the *Redundant NG DL UP Transport Layer Information IE* in the *PDU Session Resource Setup List IE* in the BEARER CONTEXT SETUP RESPONSE message.

For each PDU Session Resource, if the *Redundant Common Network Instance IE* is included in the *PDU Session Resource To Setup List IE* in the BEARER CONTEXT SETUP REQUEST message, the gNB-CU-UP shall, if supported, use it when selecting transport network resource for the redundant transmission as specified in TS 23.501 [20].

For each PDU session, if the *Redundant QoS Flow Indicator IE* is included in the *QoS Flow QoS Parameters List IE* in the BEARER CONTEXT SETUP REQUEST message, the gNB-CU-UP shall, if supported, consider it for the redundant transmission.

For each PDU session, if the *Redundant PDU Session Information IE* is included in the *PDU Session Resource To Setup List IE* contained in the BEARER CONTEXT SETUP REQUEST message, the gNB-CU-UP shall, if supported, set up the redundant user plane resources, as specified in TS 23.501 [20] and include, if supported, the *Used Redundant PDU Session Information IE* in the *PDU Session Resource Setup List IE* in the BEARER CONTEXT SETUP RESPONSE message.

If *UE Inactivity Timer IE* or *PDU session Inactivity Timer IE* or *DRB Inactivity Timer IE* is contained in BEARER CONTEXT SETUP REQUEST message, the gNB-CU-UP shall take it into account when perform inactivity monitoring.

If the *DRB QoS IE* is contained within the *DRB To Setup List IE* in the BEARER CONTEXT SETUP REQUEST message, the gNB-CU-UP shall, if supported, take it into account as specified in TS 28.552 [22].

If the *gNB-DU-ID IE* is contained in the BEARER CONTEXT SETUP REQUEST message, the gNB-CU-UP shall store the information received.

If the *RAN UE ID IE* is contained in the BEARER CONTEXT SETUP REQUEST message, the gNB-CU-UP shall store the information received.

For each successfully established DRB, the gNB-CU-UP shall provide, in the respective *UL UP Parameters IE* of the BEARER CONTEXT SETUP RESPONSE, one UL UP Transport Layer Information Item per cell group entry contained in the respective *Cell Group Information IE* of the BEARER CONTEXT SETUP REQUEST message.

If the *Trace Activation IE* is included in the BEARER CONTEXT SETUP REQUEST message the gNB-CU-UP shall, if supported, initiate the requested trace function as described in TS 32.422 [24]. In particular, the gNB-CU-UP shall, if supported:

- if the *MDT Activation IE* is set to "Immediate MDT Only", initiate the requested MDT session as described in TS 32.422 [24] and the gNB-CU-UP shall ignore *Interfaces To Trace IE*, and *Trace Depth IE*;
- if the *MDT Activation IE* is set to "Immediate MDT and Trace", initiate the requested trace session and MDT session as described in TS 32.422 [24];

If the *Management Based MDT PLMN List IE* is contained in the BEARER CONTEXT SETUP REQUEST message, the gNB-CU-UP shall, if supported, store the received information, and use this information to allow subsequent selection of the UE for management based MDT defined in TS 32.422 [24].

For EN-DC, if the *Subscriber Profile ID for RAT/Frequency priority IE* is included in the BEARER CONTEXT SETUP REQUEST, the gNB-CU-UP may use it to apply specific RRM policies as specified in TS 36.300 [25]. If the *Additional RRM Policy Index IE* is included in the BEARER CONTEXT SETUP REQUEST, the gNB-CU-UP may use it to apply specific RRM policies as specified in TS 36.300 [25].

If the *TSC Traffic Characteristics IE* is included in the BEARER CONTEXT SETUP REQUEST message, the gNB-CU-UP shall, if supported, take into account the corresponding information received in the *TSC Traffic Characteristics IE*.

For each QoS flow whose DRB has been successfully established and the *QoS Monitoring Request IE* was included in the *QoS Flow Level QoS Parameters IE* contained in the BEARER CONTEXT SETUP REQUEST message, the gNB-CU-UP shall store this information, and, if supported, perform delay measurement and QoS monitoring, as specified in TS 23.501 [20]. If the *QoS Monitoring Reporting Frequency IE* was included in the *QoS Flow Level QoS Parameters*

IE contained in the BEARER CONTEXT SETUP REQUEST message, the gNB-CU-UP shall store this information, and, if supported, use it for RAN part delay reporting.

If the BEARER CONTEXT SETUP REQUEST message contains the *NPN Context Information* IE the gNB-CU-UP shall, if supported, take it into account when allocating UP resources for the bearer context.

For each requested DRB, if the *EHC Parameters* IE is included in the *PDCP Configuration* IE, the gNB-CU-CP shall, if supported, also include *ROHC Parameters* IE in the *PDCP Configuration* IE in the BEARER CONTEXT SETUP REQUEST message, to enable the gNB-CU-UP to perform appropriate header compression.

If the *EHC parameters* IE is included in the *PDCP Configuration* IE contained in the BEARER CONTEXT SETUP REQUEST message, the gNB-CU-UP may take these parameters into account to perform appropriate header compression for the concerned DRB.

If the *DAPS Request Information* IE is included for a DRB to be setup in the BEARER CONTEXT SETUP REQUEST message, the gNB-CU-UP shall consider that the request concerns a DAPS handover for that DRB and, if admitted, act as specified in TS 38.300 [4].

If the *CHO Initiation* IE is contained in the BEARER CONTEXT SETUP REQUEST message, the gNB-CU-UP shall consider that the request concerns conditional handover or conditional PSCell change and act as specified in TS 38.401 [2].

If the *MCG Offered GBR QoS Flow Information* IE is contained in the *QoS Flows Information To Be Setup* IE within the *DRB To Setup List* IE in the BEARER CONTEXT SETUP REQUEST message, the gNB-CU-UP may take it into account when two cell groups are served by the gNB-CU-UP.

If the *Additional Handover Information* IE is included in the BEARER CONTEXT SETUP REQUEST message and set to "Discard PDCP SN", the gNB-CU-UP shall, if supported, remove the forwarded PDCP SNs if received in the forwarded GTP-U packets, and deliver the forwarded PDCP SDUs to the UE, as specified in TS 38.300 [8].

If the *Ignore Mapping Rule Indication* IE is contained within the *DRB To Setup List* IE for a DRB in the BEARER CONTEXT SETUP REQUEST message, the gNB-CU-UP shall, if supported, ignore the QoS flow mapping information indicated by the *QoS Flows Information To Be Setup* IE for the concerned DRB.

If the *Direct Forwarding Path Availability* IE set to "inter-system direct path available" is included in the BEARER CONTEXT SETUP REQUEST message, the gNB-CU-UP shall, if supported, assign the UP Transport Layer Information for inter-system direct data forwarding from the appropriate address space, if applicable.

If the *Direct Forwarding Path Availability* IE set to "intra-system direct path available" is included in the BEARER CONTEXT SETUP REQUEST message, the gNB-CU-UP shall, if supported, assign the UP Transport Layer Information for intra-system direct data forwarding from the appropriate address space, if applicable.

If the *gNB-CU-UP UE EIAF ID* IE is contained in the BEARER CONTEXT SETUP REQUEST message, the gNB-CU-UP may use it to identify the UE context as specified in TS 38.401 [2].

If the *Data Forwarding Source IP Address* IE is included in the *DRB To Setup List E-UTRAN* IE or in the *QoS Flow Level QoS Parameters* IE contained in the BEARER CONTEXT SETUP REQUEST message, the gNB-CU-UP shall, if supported, store this information in the UE context and use it as part of its ACL functionality configuration actions, if such ACL functionality is deployed.

If the *Data Forwarding Source IP Address* IE is included in the *DRB Setup List E-UTRAN* IE or in the *Flow Setup List* IE within the *DRB Setup List* IE in the *PDU Session Resource Setup List* IE of the BEARER CONTEXT SETUP RESPONSE message, the gNB-CU-CP shall, if supported, store this information in the UE context and use it as part of its ACL functionality configuration actions, if such ACL functionality is deployed.

8.3.1.3 Unsuccessful Operation

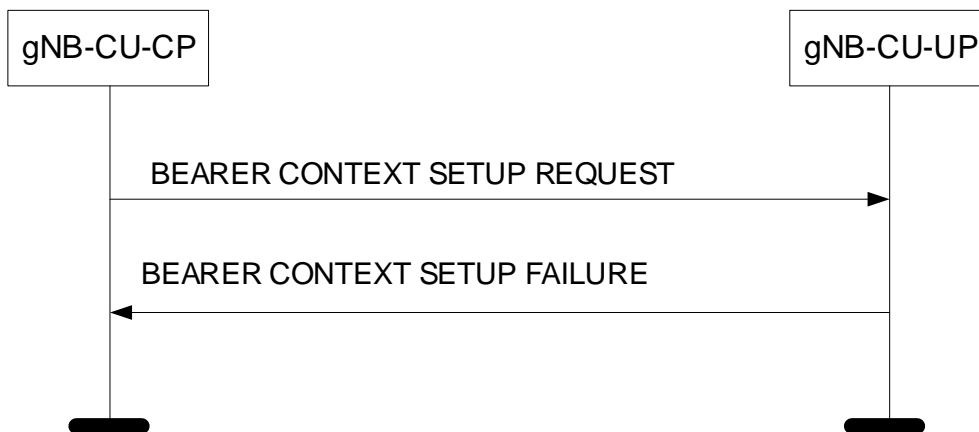


Figure 8.3.1.3-1: Bearer Context Setup procedure: Unsuccessful Operation.

If the gNB-CU-UP cannot establish the requested bearer context, or cannot even establish one bearer it shall consider the procedure as failed and respond with a BEARER CONTEXT SETUP FAILURE message and appropriate cause value.

8.3.1.4 Abnormal Conditions

If the gNB-CU-UP receives a BEARER CONTEXT SETUP REQUEST message containing a *E-UTRAN QoS* IE in the *DRB To Setup List* IE for a GBR QoS DRB but where the *GBR QoS Information* IE is not present, the gNB-CU-UP shall report the establishment of the corresponding DRB as failed in the *DRB Failed List* IE of the BEARER CONTEXT SETUP RESPONSE message with an appropriate cause value.

If the gNB-CU-UP receives a BEARER CONTEXT SETUP REQUEST message containing a *QoS Flow Level QoS Parameters* IE in the *PDU Session Resource To Setup List* IE for a GBR QoS Flow but where the *GBR QoS Flow Information* IE is not present, the gNB-CU-UP shall report the establishment of the corresponding QoS Flow as failed in the corresponding *Flow Failed List* IE of the BEARER CONTEXT SETUP RESPONSE message with an appropriate cause value.

8.3.2 Bearer Context Modification (gNB-CU-CP initiated)

8.3.2.1 General

The purpose of the Bearer Context Modification procedure is to allow the gNB-CU-CP to modify a bearer context in the gNB-CU-UP. The procedure uses UE-associated signalling.

8.3.2.2 Successful Operation

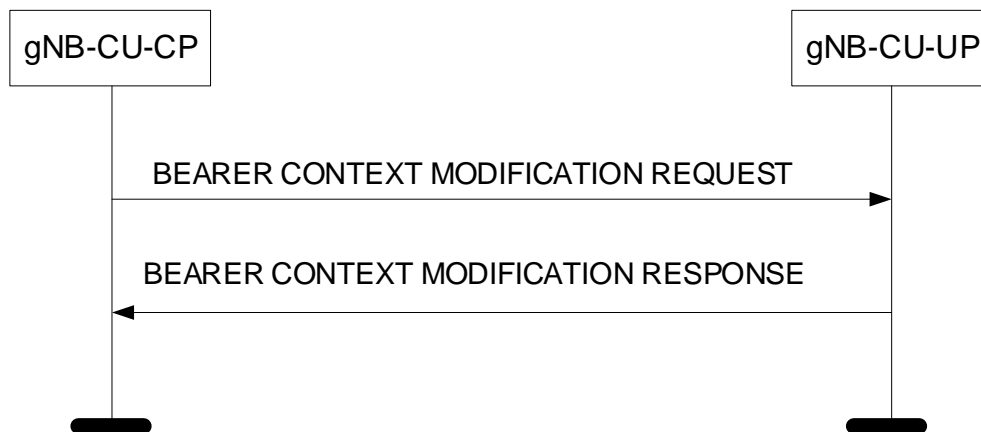


Figure 8.3.2.2-1: Bearer Context Modification procedure: Successful Operation.

The gNB-CU-CP initiates the procedure by sending the BEARER CONTEXT MODIFICATION REQUEST message to the gNB-CU-UP. If the gNB-CU-UP succeeds to modify the bearer context, it replies to the gNB-CU-CP with the BEARER CONTEXT MODIFICATION RESPONSE message.

The gNB-CU-UP shall report to the gNB-CU-CP, in the BEARER CONTEXT MODIFICATION RESPONSE message, the result for all the requested resources in the following way:

For E-UTRAN:

- A list of DRBs which are successfully established shall be included in the *DRB Setup List IE*;
- A list of DRBs which failed to be established shall be included in the *DRB Failed List IE*;
- A list of DRBs which are successfully modified shall be included in the *DRB Modified List IE*;
- A list of DRBs which failed to be modified shall be included in the *DRB Failed To Modify List IE*;

For NG-RAN:

- A list of PDU Session Resources which are successfully established shall be included in the *PDU Session Resource Setup List IE*;
- A list of PDU Session Resources which failed to be established shall be included in the *PDU Session Resource Failed List IE*;
- A list of PDU Session Resources which are successfully modified shall be included in the *PDU Session Resource Modified List IE*;
- A list of PDU Session Resources which failed to be modified shall be included in the *PDU Session Resource Failed To Modify List IE*;
- For each successfully established or modified PDU Session Resource, a list of DRBs which are successfully established shall be included in the *DRB Setup List IE*;
- For each successfully established or modified PDU Session Resource, a list of DRBs which failed to be established shall be included in the *DRB Failed List IE*;
- For each successfully modified PDU Session Resource, a list of DRBs which are successfully modified shall be included in the *DRB Modified List IE*;
- For each successfully modified PDU Session Resource, a list of DRBs which failed to be modified shall be included in the *DRB Failed To Modify List IE*;
- For each successfully established or modified DRB, a list of QoS Flows which are successfully established shall be included in the *Flow Setup List IE*;

- For each successfully established or modified DRB, a list of QoS Flows which failed to be established shall be included in the *Flow Failed List IE*;

When the gNB-CU-UP reports the unsuccessful establishment of a PDU Session Resource, DRB or QoS Flow the cause value should be precise enough to enable the gNB-CU-CP to know the reason for the unsuccessful establishment.

If the *Security Information IE* is contained in the BEARER CONTEXT MODIFICATION REQUEST message, the gNB-CU-UP shall update the corresponding information.

If the *UE DL Aggregate Maximum Bit Rate IE* is contained in the BEARER CONTEXT MODIFICATION REQUEST message, the gNB-CU-UP shall update the corresponding information.

If the *UE DL Maximum Integrity Protected Data Rate IE* is contained in the BEARER CONTEXT MODIFICATION REQUEST message, the gNB-CU-UP shall update the corresponding information.

If the *Bearer Context Status Change IE* is contained in the BEARER CONTEXT MODIFICATION REQUEST message, the gNB-CU-UP shall consider the UE RRC state and act as specified in TS 38.401 [2].

If the *Data Forwarding Information Request IE*, *PDU Session Data Forwarding Information Request IE* or the *DRB Data Forwarding Information Request IE* are included in the BEARER CONTEXT MODIFICATION REQUEST message, the gNB-CU-UP shall include the requested forwarding information in the *Data Forwarding Information Response IE*, *PDU Session Data Forwarding Information Response IE* or the *DRB Data Forwarding Information Response IE* in the BEARER CONTEXT MODIFICATION RESPONSE message.

If the *PDU Session Data Forwarding Information IE* is included in the BEARER CONTEXT MODIFICATION REQUEST message, the gNB-CU-UP shall, if supported, consider that data forwarding is applicable for the indicated QoS flows for the concerned PDU session.

If the *PDCP Configuration IE* is contained in the *DRB To Modify List IE* in the BEARER CONTEXT MODIFICATION REQUEST message, the gNB-CU-UP shall update the corresponding information, except for the *PDCP SN UL Size IE*, the *PDCP SN DL Size IE* and the *RLC mode IE* which shall be ignored.

If the *E-UTRAN QoS IE* is contained in the *DRB To Modify List IE* in the BEARER CONTEXT MODIFICATION REQUEST message, the gNB-CU-UP shall update the corresponding information.

If the *PDCP SN Status Request IE* is contained in the *DRB To Modify List IE* in the BEARER CONTEXT MODIFICATION REQUEST message, the gNB-CU-UP shall act as specified in TS 38.401 [2] and include the *UL COUNT Value IE* and the *DL COUNT Value IE* in the BEARER CONTEXT MODIFICATION RESPONSE message.

If the *PDCP SN Status Information IE* is contained in the *DRB To Setup List IE* or the *DRB To Modify List IE* in the BEARER CONTEXT MODIFICATION REQUEST message, the gNB-CU-UP shall take it into account and act as specified in TS 38.401 [2].

If the *DL UP Parameters IE* is contained in the *DRB To Modify List IE* in the BEARER CONTEXT MODIFICATION REQUEST message, the gNB-CU-UP shall update the corresponding information.

If the *Cell Group To Add IE* or the *Cell Group To Modify IE* or the *Cell Group To Remove IE* is contained in the *DRB To Modify List IE* in the BEARER CONTEXT MODIFICATION REQUEST message, the gNB-CU-UP shall add or modify or remove the corresponding cell group.

If the *PDU Session Resource DL Aggregate Maximum Bit Rate IE* is contained in the *PDU Session Resource To Setup List IE* in the BEARER CONTEXT MODIFICATION REQUEST message, the gNB-CU-UP shall replace the information in the UE context and use it when enforcing downlink traffic policing for the non GBR QoS flows for the concerned UE, as specified in TS 23.501 [20].

If the *PDU Session Resource DL Aggregate Maximum Bit Rate IE* is contained in the *PDU Session Resource To Modify List IE* in the BEARER CONTEXT MODIFICATION REQUEST message, the gNB-CU-UP shall update the corresponding information.

If the *SDAP Configuration IE* is contained in the *DRB To Modify List IE* in the BEARER CONTEXT MODIFICATION REQUEST message, the gNB-CU-UP shall update the corresponding information.

If the *Flow Mapping Information IE* is contained in the *DRB To Modify List IE* in the BEARER CONTEXT MODIFICATION REQUEST message, the gNB-CU-UP shall update the corresponding information.

For each requested DRB, if the *PDCP Duplication* IE or *Additional PDCP duplication Information* IE is included in the *PDCP Configuration* IE contained in the BEARER CONTEXT MODIFICATION REQUEST message, then the gNB-CU-CP shall include two or more *UP Transport Layer Information* IEs in the BEARER CONTEXT MODIFICATION REQUEST message, and the gNB-CU-UP shall, if supported, also include two or more *UP Transport Layer Information* IEs in the BEARER CONTEXT MODIFICATION RESPONSE message to support packet duplication. If only one cell group is included in the *Cell Group Information* IE for the concerned DRB, then the gNB-CU-UP shall consider that the first *UP Transport Layer Information* IE of these *UP Transport Layer Information* IEs is for the primary path. If more than one cell group is included in the *Cell Group Information* IE, then the gNB-CU-UP shall consider that the number of duplication tunnels for each cell group is indicated by the *Number of tunnels* IE, and that the first *UP Transport Layer Information* IE for each cell group is for the primary path or the split secondary path.

For a certain DRB which was allocated with two or more GTP-U tunnels, if such DRB is modified and given one GTP-U tunnel via the Bearer Context Modification (gNB-CU-CP initiated) procedure, i.e. only one UP Transport Layer Information per Cell Group ID is present in *DL UP Parameters* IE for the concerned DRB, then the gNB-CU-UP shall consider that PDCP duplication is deconfigured for this DRB. If such Bearer Context Modification (gNB-CU-CP initiated) procedure occurs, the *Duplication Activation* IE shall not be included for the concerned DRB.

If the *New UL TNL Information Required* IE is contained in the BEARER CONTEXT MODIFICATION REQUEST message, the gNB-CU-UP shall include the new UP Transport Layer Information in the BEARER CONTEXT MODIFICATION RESPONSE message.

For each PDU session for which the *Security Indication* IE is included in the *PDU Session Resource To Setup List* IE or the *Security Indication Modify* IE is included in the *PDU Session Resource To Modify List* IE of the BEARER CONTEXT MODIFICATION REQUEST message, and the *Integrity Protection Indication* IE or *Confidentiality Protection Indication* IE is set to "preferred", then the gNB-CU-UP should, if supported, perform user plane integrity protection or ciphering, respectively, for the concerned PDU session and shall notify whether it performed the user plane integrity protection or ciphering by including the *Integrity Protection Result* IE or *Confidentiality Protection Result* IE, respectively, in the *PDU Session Resource Setup List* IE or the *PDU Session Resource Modified List* IE of the BEARER CONTEXT MODIFICATION RESPONSE message.

For each PDU session for which the *Security Indication* IE is included in the *PDU Session Resource To Setup List* IE or the *Security Indication Modify* IE is included in the *PDU Session Resource To Modify List* IE of the BEARER CONTEXT MODIFICATION REQUEST message, and the *Integrity Protection Indication* IE or *Confidentiality Protection Indication* IE is set to "required", then the gNB-CU-UP shall perform user plane integrity protection or ciphering, respectively, for the concerned PDU Session. If the gNB-CU-UP cannot perform the user plane integrity protection or ciphering, it shall reject the setup of the PDU Session Resources with an appropriate cause value.

For each PDU session for which the *Security Indication* IE is included in the *PDU Session Resource To Setup List* IE or the *Security Indication Modify* IE is included in the *PDU Session Resource To Modify List* IE of the BEARER CONTEXT MODIFICATION REQUEST message:

- if the *Integrity Protection Indication* IE is set to "not needed", then the gNB-CU-UP shall not perform user plane integrity protection for the concerned PDU session;
- if the *Confidentiality Protection Indication* IE is set to "not needed", then the gNB-CU-UP shall not perform user plane ciphering for the concerned PDU session.

For each PDU Session Resource, if the *Network Instance* IE is included in the *PDU Session Resource To Setup List* IE or the *PDU Session Resource To Modify List* IE in the BEARER CONTEXT MODIFICATION REQUEST message and the *Common Network Instance* IE is not included, the gNB-CU-UP shall, if supported, use it when selecting transport network resource as specified in TS 23.501 [20].

For each PDU session, if the *Common Network Instance* IE is included in the *PDU Session Resource To Setup List* IE or the *PDU Session Resource To Modify List* IE in the BEARER CONTEXT MODIFICATION REQUEST message, the gNB-CU-UP shall, if supported, use it when selecting transport network resource as specified in TS 23.501 [20].

For each PDU session, if the *Redundant NG UL UP Transport Layer Information* IE is included in the *PDU Session Resource To Setup List* IE or the *PDU Session Resource To Modify List* IE in the BEARER CONTEXT MODIFICATION REQUEST message, the gNB-CU-UP shall, if supported, include the *Redundant NG DL UP Transport Layer Information* IE in the *PDU Session Resource Setup List* IE or the *PDU Session Resource Modified List* IE in the BEARER CONTEXT MODIFICATION RESPONSE message.

If the *Redundant Common Network Instance* IE is included in the *PDU Session Resource To Setup List* IE or the *PDU Session Resource To Modify List* IE in the BEARER CONTEXT MODIFICATION REQUEST message, the gNB-CU-

UP shall, if supported, use it when selecting transport network resource for the redundant transmission as specified in TS 23.501 [20].

For each PDU session for which the *Redundant QoS Flow Indicator* IE is included in *QoS Flows Information To Be Setup* IE contained in the BEARER CONTEXT MODIFICATION REQUEST message, the gNB-CU-UP shall, if supported, shall store and use it as specified in TS 23.501 [20].

For each PDU session, if the *Redundant QoS Flow Indicator* IE is set to false for all QoS flows, the gNB-CU-UP shall, if supported, stop the redundant transmission and release the redundant tunnel for the concerned PDU session as specified in TS 23.501 [20].

If the *QoS Flow Mapping Indication* IE is contained in the *QoS Flow QoS Parameters List* IE in the BEARER CONTEXT MODIFICATION REQUEST message, the gNB-CU-UP shall, if supported, replace any previously received value and take it into account that only the uplink or downlink QoS flow is mapped to the DRB.

If the *Data Discard Required* IE is contained in the BEARER CONTEXT MODIFICATION REQUEST message and the value is set to "Required", the gNB-CU-UP shall consider that a RAN Paging Failure occurred for that UE. The gNB-CU-UP shall discard the user plane data for that UE and consider that the bearer context is still suspended.

If the *UE Inactivity Timer* IE or *PDU session Inactivity Timer* IE or *DRB Inactivity Timer* IE is contained in BEARER CONTEXT MODIFICATION REQUEST message, the gNB-CU-UP shall take it into account when perform inactivity monitoring.

If the *S-NSSAI* IE is contained in the *PDU Session Resource To Modify List* IE in the BEARER CONTEXT MODIFICATION REQUEST message, the gNB-CU-UP shall store the corresponding information and replace any existing information.

If the *DRB QoS* IE is contained within the *DRB To Setup List* IE in the BEARER CONTEXT MODIFICATION REQUEST message, the gNB-CU-UP shall, if supported, take it into account for each DRB, as specified in TS 28.552 [22].

If the *DRB QoS* IE is contained within the *DRB To Modify List* IE in the BEARER CONTEXT MODIFICATION REQUEST message, the gNB-CU-UP shall, if supported, replace any previously received value and take it into account for each DRB, as specified in TS 28.552 [22].

If the *gNB-DU-ID* IE is contained in the BEARER CONTEXT MODIFICATION REQUEST message, the gNB-CU-UP shall store and replace any previous information received.

If the *RAN UE ID* IE is contained in the BEARER CONTEXT MODIFICATION REQUEST message, the gNB-CU-UP shall store and replace any previous information received.

If the gNB-CU-UP receives a BEARER CONTEXT MODIFICATION REQUEST message including *Activity Notification Level* IE and its value does not match the current bearer context, the gNB-CU-UP shall ignore the *Activity Notification Level* IE and also the requested modification of inactivity timer.

For each successfully established DRB, the gNB-CU-UP shall provide, in the respective *UL UP Parameters* IE of the BEARER CONTEXT MODIFICATION RESPONSE, one UL UP Transport Layer Information Item per cell group entry contained in the respective *Cell Group Information* IE of the BEARER CONTEXT MODIFICATION REQUEST message.

If the *Old QoS Flow List - UL End Marker expected* IE is included in the *PDU Session Resource To Modify List* IE of the BEARER CONTEXT MODIFICATION REQUEST message for a DRB to be modified, the gNB-CU-UP shall consider that the source NG-RAN node has initiated QoS flow re-mapping and has not yet received SDAP end markers, as described in TS 38.300 [8]. The gNB-CU-UP shall consider that the *Old QoS Flow List - UL End Marker expected* IE only contains UL QoS flow information for QoS flows for which no SDAP end marker has been yet received on the source side.

For EN-DC, if the *Subscriber Profile ID for RAT/Frequency priority* IE is included in the BEARER CONTEXT MODIFICATION REQUEST, the gNB-CU-UP may use it to apply specific RRM policies as specified in TS 36.300 [25]. If the *Additional RRM Policy Index* IE is included in the BEARER CONTEXT MODIFICATION REQUEST, the gNB-CU-UP may use it to apply specific RRM policies as specified in TS 36.300 [25].

If there is at least one DRB removed by the gNB-CU-UP, the gNB-CU-UP shall, if supported, include the *Retainability Measurements Information* IE in the BEARER CONTEXT MODIFICATION RESPONSE message, providing

information on the removed DRB(s) for retainability measurements in the gNB-CU-CP, as described in TS 32.425 [26] and TS 28.552 [22].

If the *TSC Traffic Characteristics* IE is included in the BEARER CONTEXT MODIFICATION REQUEST message, the gNB-CU-UP shall, if supported, take into account the corresponding information received in the *TSC Traffic Characteristics* IE.

For each QoS flow whose DRB has been successfully established or modified and the *QoS Monitoring Request* IE was included in the *QoS Flow Level QoS Parameters* IE contained in the BEARER CONTEXT MODIFICATION REQUEST message, the gNB-CU-UP shall store this information, and, if supported, perform delay measurement and QoS monitoring, as specified in TS 23.501 [20]. If the *QoS Monitoring Reporting Frequency* IE was included in the *QoS Flow Level QoS Parameters* IE contained in the BEARER CONTEXT MODIFICATION REQUEST message, the gNB-CU-UP shall store this information, and, if supported, use it for RAN part delay reporting.

For each requested DRB, if the *QoS Mapping Information* IE is contained in the *DL UP Parameters* IE in the BEARER CONTEXT MODIFICATION REQUEST message, the gNB-CU-UP shall use it to set DSCP and/or flow label fields in the downlink IP packets which are transmitted through the GTP tunnels indicated by the *UP Transport Layer Information* IE. The Diffserv code point (DSCP) marking is performed as specified in TS 38.474 [28].

If the *Early Forwarding COUNT Request* IE is contained in the *DRB To Modify List* IE in the BEARER CONTEXT MODIFICATION REQUEST message, the gNB-CU-UP shall act as specified in TS 38.401 [2] and include the requested *FIRST DL COUNT Value* IE or *DISCARD DL COUNT Value* IE in the BEARER CONTEXT MODIFICATION RESPONSE message.

If the *Early Forwarding COUNT Information* IE is contained in the *DRB To Modify List* IE in the BEARER CONTEXT MODIFICATION REQUEST message, the gNB-CU-UP shall take it into account and act as specified in TS 38.401 [2].

If the *Ignore Mapping Rule Indication* IE is contained within the *DRB To Setup List* IE for a DRB in the BEARER CONTEXT MODIFICATION REQUEST message, the gNB-CU-UP shall, if supported, ignore the QoS flow mapping information indicated by the *QoS Flows Information To Be Setup* IE for the concerned DRB.

If the *DAPS Request Information* IE is included for a DRB to be modified in the BEARER CONTEXT MODIFICATION REQUEST message, the gNB-CU-UP shall consider that the request concerns a DAPS handover for that DRB and, if admitted, act as specified in TS 38.300 [4].

If the *Early Data Forwarding Indicator* IE set to “stop” is contained in the *DRB To Modify List* IE in the BEARER CONTEXT MODIFICATION REQUEST message, the gNB-CU-UP shall, if supported and if already initiated, stop the early data forwarding for the concerned DRB. If the *DRB Data forwarding information* IE containing the *DL Data Forwarding* IE is included together in the *DRB To Modify List* IE, the gNB-CU-UP shall consider that the stop is only for the early data forwarding initiated toward that forwarding TNL.

Interaction with the Bearer Context Modification (gNB-CU-CP initiated)

If the BEARER CONTEXT MODIFICATION REQUEST message includes for a DRB in the *DRB To Modify List* IE the *PDCP SN Status Request* IE set to “requested” and if the gNB-CU-UP has not yet received a SDAP end marker packet for a QoS flow which has been previously re-configured to another DRB by means of a gNB-CU-CP initiated Bearer Context Modification procedure, the gNB-CU-UP shall include the QoS Flow Identifier of that QoS flow in the *Old QoS Flow List - UL End Marker expected* IE in the *PDU Session Resource Modified List* IE in the BEARER CONTEXT MODIFICATION RESPONSE message.

8.3.2.3 Unsuccessful Operation

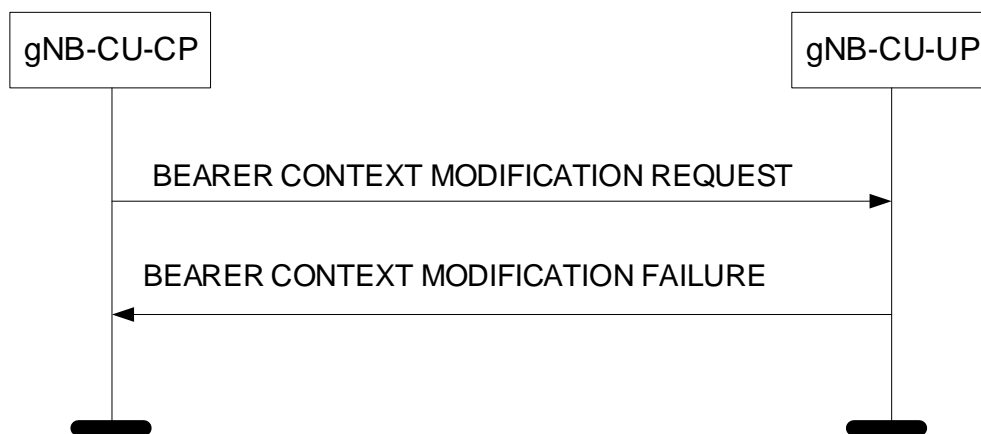


Figure 8.3.2.3-1: Bearer Context Modification procedure: Unsuccessful Operation.

If the gNB-CU-UP cannot successfully perform any of the requested bearer context modifications, it shall respond with a BEARER CONTEXT MODIFICATION FAILURE message and appropriate cause value.

If the gNB-CU-UP receives a BEARER CONTEXT MODIFICATION REQUEST message containing the *Security Indication Modify* IE in the *PDU Session Resource To Modify List* IE for a PDU session that may result in the change of security status that has been applied but the DRBs that have been established for that PDU session are not requested to be released via the *DRB To Remove List* IEs as specified in TS 38.331 [10], then the gNB-CU-UP shall respond with a BEARER CONTEXT MODIFICATION FAILURE message and appropriate cause value.

8.3.2.4 Abnormal Conditions

If the gNB-CU-UP receives a BEARER CONTEXT MODIFICATION REQUEST message containing a *E-UTRAN QoS* IE in the *DRB To Setup List* or the *DRB To Modify List* IE for a GBR QoS DRB but where the *GBR QoS Information* IE is not present, the gNB-CU-UP shall report the addition or the modification of the corresponding DRB as failed in the *DRB Failed List* IE or the *DRB Failed To Modify List* IE of the BEARER CONTEXT MODIFICATION RESPONSE message with an appropriate cause value.

If the gNB-CU-UP receives a BEARER CONTEXT MODIFICATION REQUEST message containing a *QoS Flow Level QoS Parameters* IE in the *PDU Session Resource To Setup List* IE or the *PDU Session Resource To Modify List* IE for a GBR QoS Flow but where the *GBR QoS Flow Information* IE is not present, the gNB-CU-UP shall report the addition or the modification of the corresponding QoS Flow as failed in the corresponding *Flow Failed List* IE of the BEARER CONTEXT MODIFICATION RESPONSE message with an appropriate cause value.

8.3.3 Bearer Context Modification Required (gNB-CU-UP initiated)

8.3.3.1 General

The purpose of the Bearer Context Modification Required procedure is to allow the gNB-CU-UP to modify a bearer context (e.g., due to local problems) and inform the gNB-CU-CP. The procedure uses UE-associated signalling.

8.3.3.2 Successful Operation

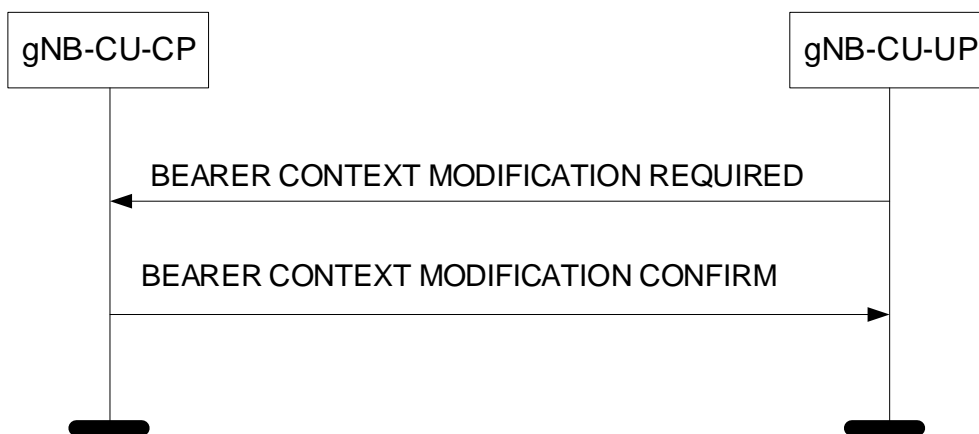


Figure 8.3.3.2-1: Bearer Context Modification Required procedure: Successful Operation.

The gNB-CU-UP initiates the procedure by sending the BEARER CONTEXT MODIFICATION REQUIRED message to the gNB-CU-CP. The gNB-CU-CP replies with the BEARER CONTEXT MODIFICATION CONFIRM message.

If the *S1 DL UP Transport Layer Information IE* or the *NG DL UP Transport Layer Information IE* or the *Redundant NG DL UP Transport Layer Information IE* is contained in the BEARER CONTEXT MODIFICATION REQUIRED message, the gNB-CU-CP shall update the corresponding information.

If the *gNB-CU-UP Cell Group Related Configuration IE* is contained in the *DRB To Modify List IE* in the BEARER CONTEXT MODIFICATION REQUIRED message, the gNB-CU-CP shall try to change the cell group related configuration accordingly. If the gNB-CU-CP is not able to update the requested cell group related configuration, it shall include the *Cell Group Information IE* with the current cell group configuration in the *DRB Modified List IE* in the BEARER CONTEXT MODIFICATION CONFIRM message.

8.3.3.3 Abnormal Conditions

Not applicable.

8.3.4 Bearer Context Release (gNB-CU-CP initiated)

8.3.4.1 General

The purpose of the Bearer Context Release procedure is to allow the gNB-CU-CP to command the release of an UE-associated logical E1 connection. The procedure uses UE-associated signalling.

8.3.4.2 Successful Operation

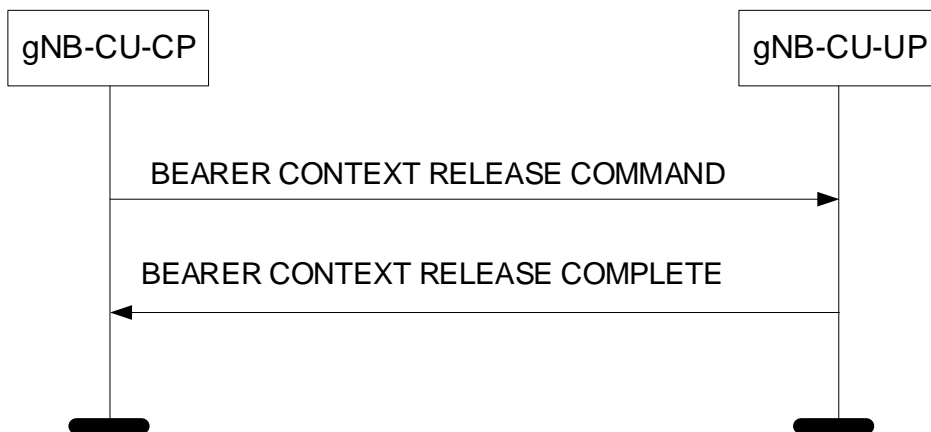


Figure 8.3.4.2-1: Bearer Context Release procedure: Successful Operation.

The gNB-CU-CP initiates the procedure by sending the BEARER CONTEXT RELEASE COMMAND message to the gNB-CU-UP. The gNB-CU-UP replies with the BEARER CONTEXT RELEASE COMPLETE message.

Upon reception of the BEARER CONTEXT RELEASE COMMAND message, the gNB-CU-UP shall release all related signalling and user data transport resources and reply with the BEARER CONTEXT RELEASE COMPLETE message.

The gNB-CU-UP shall, if supported, include the *Retainability Measurements Information* IE in the BEARER CONTEXT RELEASE COMPLETE message, providing information on the removed DRB(s) for retainability measurements in the gNB-CU-CP, as described in TS 32.425 [26] and TS 28.552 [22].

8.3.4.3 Abnormal Conditions

Not applicable.

8.3.5 Bearer Context Release Request (gNB-CU-UP initiated)

8.3.5.1 General

The purpose of the Bearer Context Release Request procedure is to allow the gNB-CU-UP to request the gNB-CU-CP to release an UE-associated logical E1 connection. The procedure uses UE-associated signalling.

8.3.5.2 Successful Operation



Figure 8.3.5.2-1: Bearer Context Release Request procedure: Successful Operation.

The gNB-CU-UP initiates the procedure by sending the BEARER CONTEXT RELEASE REQUEST message to the gNB-CU-CP.

If the *DRB Status List* IE is included in the BEARER CONTEXT RELEASE REQUEST message, the gNB-CU-CP shall act as specified in TS 38.401 [2].

Interactions with Bearer Context Release procedure:

The Bearer Context Release (gNB-CU-CP initiated) procedure may be initiated upon reception of a BEARER CONTEXT RELEASE REQUEST message.

Interaction with Bearer Context Modification (gNB-CU-CP initiated) procedure:

If applicable, as specified in TS 38.401 [2], the gNB-CU-UP may receive, after having performed the Bearer Context Release Request (gNB-CU-UP initiated) procedure, the BEARER CONTEXT MODIFICATION REQUEST message including the *Data Forwarding Information Request* IE within the *DRBs To Modify List* IE.

8.3.5.3 Abnormal Conditions

Not applicable.

8.3.6 Bearer Context Inactivity Notification

8.3.6.1 General

This procedure is initiated by the gNB-CU-UP to indicate the inactivity/resumption of activity related to the UE. The procedure uses UE-associated signalling.

8.3.6.2 Successful Operation



Figure 8.3.6.2-1: Bearer Context Inactivity Notification procedure: Successful Operation.

The gNB-CU-UP initiates the procedure by sending the BEARER CONTEXT INACTIVITY NOTIFICATION message to the gNB-CU-CP.

If the Activity Notification Level was set to “DRB” during the Bearer Context establishment, the gNB-CU-UP shall include the *DRB Activity List* IE in the BEARER CONTEXT INACTIVITY NOTIFICATION message.

If the Activity Notification Level was set to “PDU Session” during the Bearer Context establishment, the gNB-CU-UP shall include the *PDU Session Resource Activity List* IE in the BEARER CONTEXT INACTIVITY NOTIFICATION message.

If the Activity Notification Level was set to “UE” during the Bearer Context establishment, the gNB-CU-UP shall include the *UE Activity* IE in the BEARER CONTEXT INACTIVITY NOTIFICATION message.

8.3.6.3 Abnormal Conditions

Not applicable.

8.3.7 DL Data Notification

8.3.7.1 General

This procedure is initiated by the gNB-CU-UP to indicate the detection of DL data arrival for the UE, or indicate that a DL packet including a QFI value in the NG-U header not configured by the *QoS Flows Information To Be Setup* IE or the *Flow Mapping Information* IE is received for the first time. The procedure uses UE-associated signalling.

8.3.7.2 Successful Operation

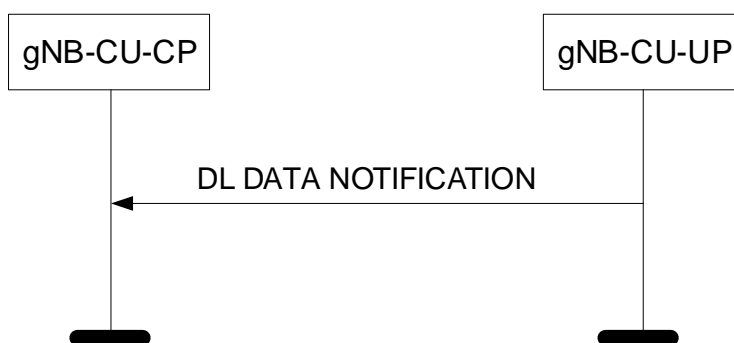


Figure 8.3.7.2-1: DL Data Notification procedure: Successful Operation.

The gNB-CU-UP initiates the procedure by sending the DL DATA NOTIFICATION message to the gNB-CU-CP.

If the *PPI* IE is included in the DL DATA NOTIFICATION message, the gNB-CU-CP shall use it for paging policy differentiation.

If the *PDU Session To Notify List* IE is included in the DL DATA NOTIFICATION message, the gNB-CU-CP shall, if supported, either map the flow(s) included in *PDU Session To Notify List* IE to the existing DRB or establish a new DRB for the flow(s).

NOTE: If a DL packet including a QFI value in the NG-U header not configured by the *QoS Flows Information To Be Setup* IE or the *Flow Mapping Information* IE is received, the gNB-CU-UP may deliver the DL packet via any existing configured DRB before it initiates DL Data Notification procedure.

8.3.7.3 Abnormal Conditions

Not applicable.

8.3.8 Data Usage Report

8.3.8.1 General

This procedure is initiated by the gNB-CU-UP to report data volume served at the gNB-CU-UP. The procedure uses UE-associated signalling.

8.3.8.2 Successful Operation

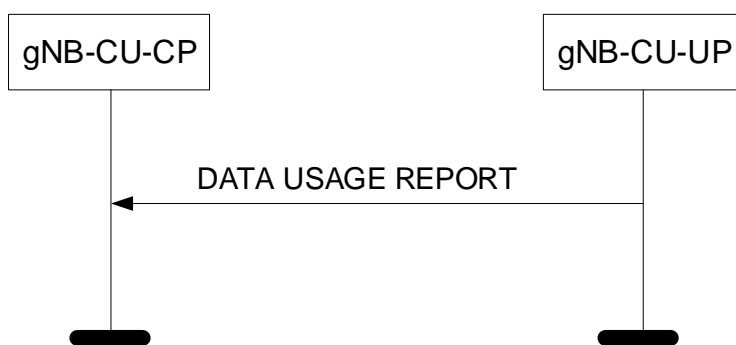


Figure 8.3.8.2-1: Data Usage Report procedure: Successful Operation.

The gNB-CU-UP initiates the procedure by sending the DATA USAGE REPORT message to the gNB-CU-CP.

8.3.8.3 Abnormal Conditions

Not applicable.

8.3.9 gNB-CU-UP Counter Check

8.3.9.1 General

This procedure is initiated by the gNB-CU-UP to request the gNB-CU-CP to execute a counter check procedure to verify the value of the PDCP COUNTs associated with DRBs established in the gNB-CU-UP.

The procedure uses UE-associated signalling.

8.3.9.2 Successful Operation

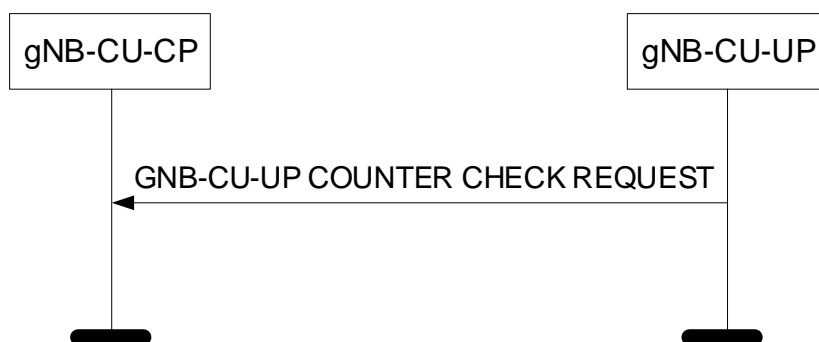


Figure 8.3.9.2-1: gNB-CU-UP Counter Check procedure, successful operation.

The gNB-CU-UP initiates the procedure by sending the gNB-CU-UP COUNTER CHECK REQUEST message to the gNB-CU-CP.

Upon reception of the gNB-CU-UP COUNTER CHECK REQUEST message, the gNB-CU-CP may perform the RRC counter check procedure as defined in TS 33.501 [13].

8.3.9.3 Unsuccessful Operation

Not applicable.

8.3.9.4 Abnormal Conditions

Not applicable.

8.3.10 UL Data Notification

8.3.10.1 General

This procedure is initiated by the gNB-CU-UP to notify the gNB-CU-CP that an UL packet including a QFI value in the SDAP header not configured by the *QoS Flows Information To Be Setup IE* or the *Flow Mapping Information IE* is received for the first time at the default DRB. The procedure uses UE-associated signalling.

8.3.10.2 Successful Operation

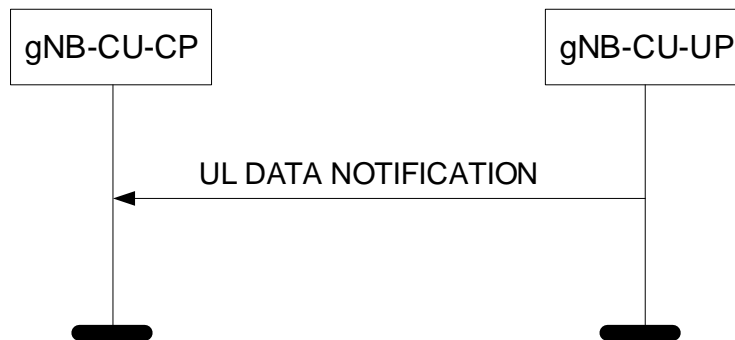


Figure 8.3.10.2-1: UL Data Notification procedure: Successful Operation.

The gNB-CU-UP initiates the procedure by sending the UL DATA NOTIFICATION message to the gNB-CU-CP.

8.3.10.3 Abnormal Conditions

Not applicable.

8.3.11 MR-DC Data Usage Report

8.3.11.1 General

This procedure is initiated by the gNB-CU-UP to report data volume served at the gNB-CU-UP, where the UE is connected to the 5GC. The procedure uses UE-associated signalling.

8.3.11.2 Successful Operation

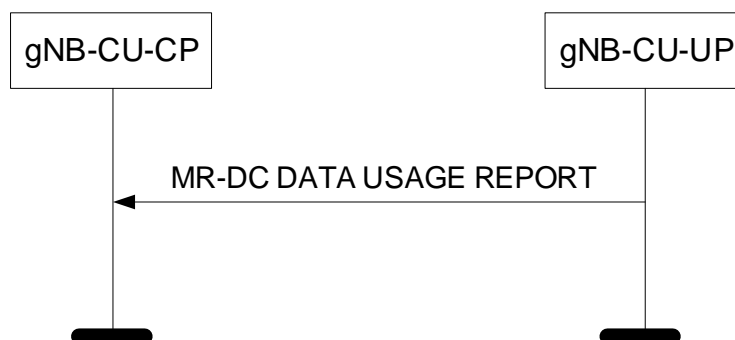


Figure 8.3.11.2-1: MR-DC Data Usage Report procedure: Successful Operation.

The gNB-CU-UP initiates the procedure by sending the MR-DC DATA USAGE REPORT message to the gNB-CU-CP.

8.3.11.3 Abnormal Conditions

Not applicable.

8.3.12 Early Forwarding SN Transfer

8.3.12.1 General

The purpose of the Early Forwarding SN Transfer procedure is to transfer, from the source gNB-CU-UP to the source gNB-CU-CP, DL COUNT of the last PDCP SDU successfully delivered or transmitted to the UE, for the purpose of discarding early forwarded downlink PDCP SDUs during Conditional Handover or conditional PSCell change.

The procedure uses UE-associated signalling.

8.3.12.2 Successful Operation



Figure 8.3.12.2-1: Early Forwarding SN Transfer procedure: Successful Operation.

The source gNB-CU-UP initiates the procedure by sending the EARLY FORWARDING SN TRANSFER message.

The *DRBs Subject To Early Forwarding List* IE included in the EARLY FORWARDING SN TRANSFER message contains the DRB ID(s) corresponding to the DRB(s) subject to early data forwarding during Conditional Handover or conditional PSCell change.

For each DRB in the *DRBs Subject To Early Forwarding List* IE, the value of the *DL COUNT Value* IE indicates the DL COUNT of the last PDCP SDU successfully delivered in-sequence to the UE, if RLC-AM, and successfully transmitted, if RLC-UM.

8.3.12.3 Unsuccessful Operation

Not applicable.

8.3.12.4 Abnormal Conditions

If the source gNB-CU-CP receives this message for a UE for which no prepared Conditional Handover exists, the source gNB-CU-CP shall ignore the message.

8.3.13 GNB-CU-CP Measurement Results Information

8.3.13.1 General

This procedure is initiated by the gNB-CU-CP to inform the measurement results received from the UE to the gNB-CU-UP.

The procedure uses UE-associated signalling.

8.3.13.2 Successful Operation

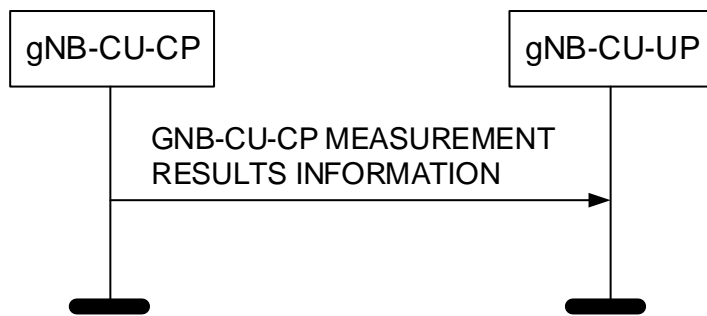


Figure 8.3.x.2-1: GNB-CU-CP Measurement Results Information procedure. Successful operation.

The gNB-CU-CP initiates the procedure by sending a GNB-CU-CP MEASUREMENT RESULTS INFORMATION message.

8.3.13.3 Abnormal Conditions

Not applicable.

8.4 Trace Procedures

8.4.1 Trace Start

8.4.1.1 General

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

8.4.1.2 Successful Operation



Figure 8.4.1.2-1: Trace start procedure: Successful Operation.

Upon reception of the TRACE START message, the gNB-CU-UP shall initiate the requested trace session for the requested UE, as described in TS 32.422 [24]. In particular, the gNB-CU-UP shall, if supported:

- if the *MDT Activation IE* is set to "Immediate MDT Only", initiate the requested MDT session as described in TS 32.422 [24] and the gNB-CU-UP shall ignore *Interfaces To Trace IE*, and *Trace Depth IE*.

8.4.1.3 Abnormal Conditions

Void.

8.4.2 Deactivate Trace

8.4.2.1 General

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

8.4.2.2 Successful Operation



Figure 8.4.2.2-1: Deactivate trace procedure: Successful Operation.

Upon reception of the DEACTIVATE TRACE message, the gNB-CU-UP shall stop the trace session for the indicated trace reference contained in the *Trace ID* IE, as described in TS 32.422 [24].

8.4.2.3 Abnormal Conditions

Void.

8.4.3 Cell Traffic Trace

8.4.3.1 General

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

8.4.3.2 Successful Operation

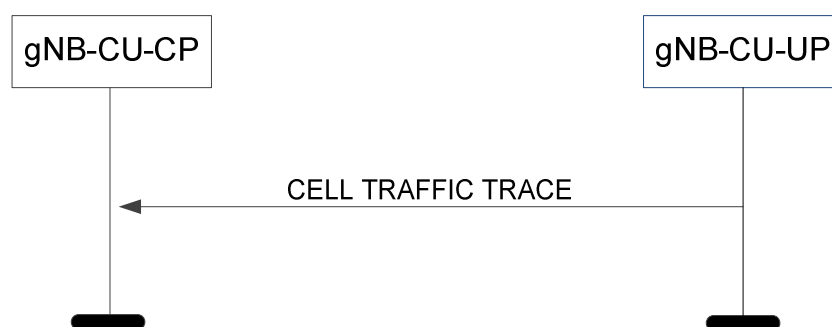


Figure 8.4.3.2-1: Cell Traffic Trace procedure. Successful operation.

The procedure is initiated with a CELL TRAFFIC TRACE message sent from the gNB-CU-UP to the gNB-CU-CP.

If the *Privacy Indicator* IE is included in the message, the gNB-CU-CP shall store the information so that it can be transferred towards the AMF.

8.4.3.3 Abnormal Conditions

Void.

8.5 IAB Procedures

8.5.1 IAB UP TNL Address Update

8.5.1.1 General

The purpose of the IAB UP TNL Address Update procedure is to allow the gNB-CU-CP to request the gNB-CU-UP to update the TNL Address(es) for all the DL F1-U GTP-U tunnels related to this (these) TNL address(es), and to allow the gNB-CU-UP to inform the gNB-CU-CP about the updated TNL Address(es) for all the UL F1-U GTP-U tunnels. The procedure uses non-UE associated signalling.

NOTE: This procedure is applicable for IAB-nodes, where the term "gNB-CU-CP" applies to IAB-donor-CU-CP, and the term "gNB-CU-UP" applies to IAB-donor-CU-UP.

NOTE: Implementation shall ensure the avoidance of potential race conditions, i.e. it must ensure that the UP configuration (e.g., UL/DL UP TNL address) update is not concurrently performed using the non-UE-associated IAB UP TNL Address Update procedure and the UE-associated procedures for Bearer Context Management.

8.5.1.2 Successful Operation

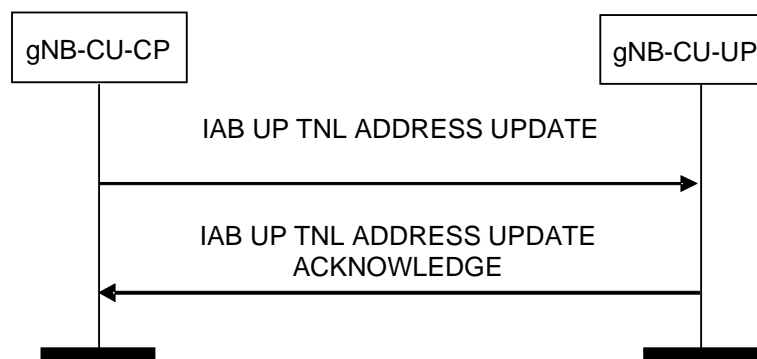


Figure 8.5.1.2-1: IAB UP TNL Address Update procedure: Successful Operation.

The gNB-CU-CP initiates the procedure by sending the IAB UP TNL ADDRESS UPDATE message to the gNB-CU-UP. If the gNB-CU-UP succeeds to update the TNL Address(es), it replies to the gNB-CU-CP with the IAB UP TNL ADDRESS UPDATE ACKNOWLEDGE message.

Upon reception of the IAB UP TNL ADDRESS UPDATE message, if the *DL UP TNL Address to Update List* IE is included therein, the gNB-CU-UP shall replace the old TNL Address(es) by the new TNL Address(es) for all the maintained DL F1-U GTP tunnels corresponding to the old TNL Address(es).

If the *UL UP TNL Address to Update List* IE is contained in the IAB UP TNL ADDRESS UPDATE ACKNOWLEDGE message, the gNB-CU-CP shall consider the new TNL address(es) as replacement for the corresponding old TNL address(es).

8.5.1.3 Unsuccessful Operation

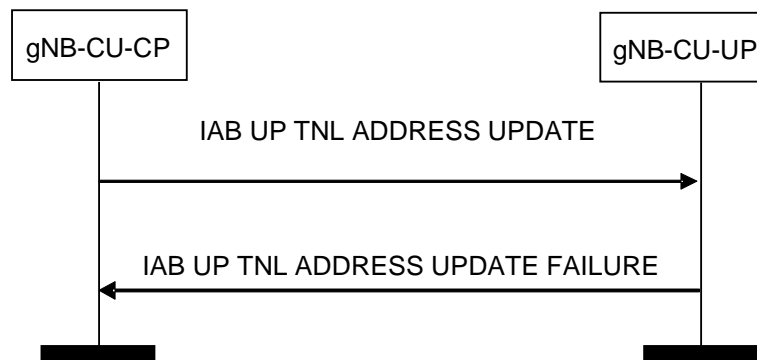


Figure 8.5.1.3-1: IAB UP TNL Address Update procedure: Unsuccessful Operation.

If the gNB-CU-UP receives an IAB UP TNL ADDRESS UPDATE message, but cannot perform the update accordingly, it shall consider the update procedure as failed and respond with an IAB UP TNL ADDRESS UPDATE FAILURE message and appropriate cause value.

If the IAB UP TNL ADDRESS UPDATE FAILURE message includes the *Time To Wait* IE, the gNB-CU-CP shall wait at least for the indicated amount of time before reinitiating the IAB UP TNL Address Update procedure towards the same gNB-CU-UP.

8.5.1.4 Abnormal Conditions

Not Applicable.

8.5.2 IAB PSK Notification

8.5.2.1 General

The purpose of the IAB PSK Notification procedure is to allow the gNB-CU-CP to send the security key info to the gNB-CU-UP, which will be used for the IKEv2 Pre-shared Secret Key (PSK) authentication to protect the F1-U interface of the IAB-node(s) as specified in TS 33.501 [13]. The procedure uses non-UE associated signalling.

NOTE: This procedure is applicable for IAB-nodes, where the term "gNB-CU-CP" applies to IAB-donor-CU-CP, and the term "gNB-CU-UP" applies to IAB-donor-CU-UP.

8.5.2.2 Successful Operation



Figure 8.5.2.2-1: IAB PSK Notification procedure: Successful Operation.

The gNB-CU-CP initiates the procedure by sending the IAB PSK NOTIFICATION message to the gNB-CU-UP.

The gNB-CU-UP uses the *IAB-Donor-CU-UP PSK Info* IE included in the IAB PSK NOTIFICATION message as specified in TS 33.501 [13].

8.5.2.3 Abnormal Conditions

Not applicable.

9 Elements for E1AP communication

9.1 General

Subclauses 9.2 and 9.3 present the E1AP message and IE definitions in tabular format. The corresponding ASN.1 definition is presented in subclause 9.4. In case there is contradiction between the tabular format and the ASN.1 definition, the ASN.1 shall take precedence, except for the definition of conditions for the presence of conditional IEs, where the tabular format shall take precedence.

The messages have been defined in accordance to the guidelines specified in TR 25.921 [5].

When specifying IEs which are to be represented by bitstrings, 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 bitstrings from other specifications, the first bit of the bitstring contains the first bit of the concerned information;

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 [6].

9.2 Message Functional Definition and Content

9.2.1 Interface Management messages

9.2.1.1 RESET

This message is sent by both the gNB-CU-CP and the gNB-CU-UP and is used to request that the E1 interface, or parts of the E1 interface, to be reset.

Direction: gNB-CU-CP → gNB-CU-UP and gNB-CU-UP → gNB-CU-CP

IE/Group Name	Presence	Range	IE type and reference	Semantics description	Criticality	Assigned Criticality
Message Type	M		9.3.1.1		YES	reject
Transaction ID	M		9.3.1.53		YES	reject
Cause	M		9.3.1.2		YES	ignore
CHOICE <i>Reset Type</i>	M				YES	reject
> <i>E1 interface</i>						
>>Reset All	M		ENUMERATED (Reset all,...)		-	
> <i>Part of E1 interface</i>						
>>UE-associated logical E1-connection list		1			-	
>>>UE-associated logical E1-connection Item		1 .. <maxnoofIndividualE1ConnectionsToReset>			EACH	reject
>>>>gNB-CU-CP UE E1AP ID	O		9.3.1.4		-	
>>>>gNB-CU-UP UE E1AP ID	O		9.3.1.5		-	

Range bound	Explanation
maxnoofIndividualE1ConnectionsToReset	Maximum no. of UE-associated logical E1-connections allowed to reset in one message. Value is 65536.

9.2.1.2 RESET ACKNOWLEDGE

This message is sent by both the gNB-CU-CP and the gNB-CU-UP as a response to a RESET message.

Direction: gNB-CU-UP → gNB-CU-CP and gNB-CU-CP → gNB-CU-UP.

IE/Group Name	Presence	Range	IE type and reference	Semantics description	Criticality	Assigned Criticality
Message Type	M		9.3.1.1		YES	reject
Transaction ID	M		9.3.1.53		YES	reject
UE-associated logical E1-connection list		0..1			YES	ignore
>UE-associated logical E1-connection Item		1 .. <maxnoofIndividualE1ConnectionsToReset>			EACH	ignore
>>gNB-CU-CP UE E1AP ID	O		9.3.1.4		-	
>>gNB-CU-UP UE E1AP ID	O		9.3.1.5		-	
Criticality Diagnostics	O		9.3.1.3		YES	ignore

Range bound	Explanation
maxnoofIndividualE1ConnectionsToReset	Maximum no. of UE-associated logical E1-connections allowed to reset in one message. Value is 65536.

9.2.1.3 ERROR INDICATION

This message is sent by both the gNB-CU-CP and the gNB-CU-UP and is used to indicate that some error has been detected in the node.

Direction: gNB-CU-CP → gNB-CU-UP and gNB-CU-UP → gNB-CU-CP

IE/Group Name	Presence	Range	IE type and reference	Semantics description	Criticality	Assigned Criticality
Message Type	M		9.3.1.1		YES	ignore
Transaction ID	M		9.3.1.53	This IE is ignored if received in UE associated signalling message.	YES	reject
gNB-CU-CP UE E1AP ID	O		9.3.1.4		YES	ignore
gNB-CU-UP UE E1AP ID	O		9.3.1.5		YES	ignore
Cause	O		9.3.1.2		YES	ignore
Criticality Diagnostics	O		9.3.1.3		YES	ignore

9.2.1.4 GNB-CU-UP E1 SETUP REQUEST

This message is sent by the gNB-CU-UP to transfer information for a TNL association.

Direction: gNB-CU-UP → gNB-CU-CP

IE/Group Name	Presence	Range	IE type and reference	Semantics description	Criticality	Assigned Criticality
Message Type	M		9.3.1.1		YES	reject
Transaction ID	M		9.3.1.53		YES	reject
gNB-CU-UP ID	M		9.3.1.15		YES	reject
gNB-CU-UP Name	O		PrintableString(SIZE(1..150,...))	Human readable name of the gNB-CU-UP.	YES	ignore
CN Support	M		ENUMERATED (EPC, 5GC, both, ...)		YES	reject
Supported PLMNs		<i>1..<maxnoofSPLMNs></i>		Supported PLMNs	YES	reject
>PLMN Identity	M		9.3.1.7		-	-
>Slice Support List	O		9.3.1.8	Supported S-NSSAIs per PLMN.	-	-
>Extended Slice Support List	O		9.3.1.94	Additional Supported S-NSSAIs per PLMN.	YES	reject
>NR CGI Support List	O		9.3.1.36	Supported cells.	-	-
>QoS Parameters Support List	O		9.3.1.37	Supported QoS parameters per PLMN.	-	-
>NPN Support Information	O		9.3.1.83		YES	reject
>Extended NR CGI Support List	O		9.3.1.97	Additional supported cells per PLMN.	YES	ignore
gNB-CU-UP Capacity	O		9.3.1.56		YES	ignore
Transport Network Layer Address Info	O		9.3.2.7		YES	ignore
Extended gNB-CU-UP Name	O		9.3.1.95		YES	ignore

Range bound	Explanation
maxnoofSPLMNs	Maximum no. of Supported PLMN Ids. Value is 12.

9.2.1.5 GNB-CU-UP E1 SETUP RESPONSE

This message is sent by the gNB-CU-CP to transfer information for a TNL association.

Direction: gNB-CU-CP → gNB-CU-UP

IE/Group Name	Presence	Range	IE type and reference	Semantics description	Criticality	Assigned Criticality
Message Type	M		9.3.1.1		YES	reject
Transaction ID	M		9.3.1.53		YES	reject
gNB-CU-CP Name	O		PrintableString (SIZE(1..150, ...))	Human readable name of the gNB-CU-CP.	YES	ignore
Transport Network Layer Address Info	O		9.3.2.7		YES	ignore
Extended gNB-CU-CP Name	O		9.3.1.96		YES	ignore

9.2.1.6 GNB-CU-UP E1 SETUP FAILURE

This message is sent by the gNB-CU-CP to indicate E1 Setup failure.

Direction: gNB-CU-CP → gNB-CU-UP

IE/Group Name	Presence	Range	IE type and reference	Semantics description	Criticality	Assigned Criticality
Message Type	M		9.3.1.1		YES	reject
Transaction ID	M		9.3.1.53		YES	reject
Cause	M		9.3.1.2		YES	ignore
Time To wait	O		9.3.1.6		YES	ignore
Criticality Diagnostics	O		9.3.1.3		YES	ignore

9.2.1.7 GNB-CU-CP E1 SETUP REQUEST

This message is sent by the gNB-CU-CP to transfer information for a TNL association.

Direction: gNB-CU-CP → gNB-CU-UP

IE/Group Name	Presence	Range	IE type and reference	Semantics description	Criticality	Assigned Criticality
Message Type	M		9.3.1.1		YES	reject
Transaction ID	M		9.3.1.53		YES	reject
gNB-CU-CP Name	O		PrintableString(SIZE(1..150, ...))	Human readable name of the gNB-CU-CP.	YES	ignore
Transport Network Layer Address Info	O		9.3.2.7		YES	ignore
Extended gNB-CU-CP Name	O		9.3.1.95		YES	ignore

9.2.1.8 GNB-CU-CP E1 SETUP RESPONSE

This message is sent by the gNB-CU-UP to transfer information for a TNL association.

Direction: gNB-CU-UP → gNB-CU-CP

IE/Group Name	Presence	Range	IE type and reference	Semantics description	Criticality	Assigned Criticality
Message Type	M		9.3.1.1		YES	reject
Transaction ID	M		9.3.1.53		YES	reject
gNB-CU-UP ID	M		9.3.1.15		YES	reject
gNB-CU-UP Name	O		PrintableString(SIZE(1..150,...))	Human readable name of the gNB-CU-UP.	YES	ignore
CN Support	M		ENUMERATED (EPC, 5GC, both, ...)		YES	reject
Supported PLMNs		<i>1..<maxnoofSPLMNs></i>		Supported PLMNs	YES	reject
>PLMN Identity	M		9.3.1.7		-	-
>Slice Support List	O		9.3.1.8	Supported S-NSSAIs per PLMN.	-	-
>Extended Slice Support List	O		9.3.1.94	Additional Supported S-NSSAIs per PLMN.	YES	reject
>NR CGI Support List	O		9.3.1.36	Supported cells.	-	-
>QoS Parameters Support List	O		9.3.1.37	Supported QoS parameters per PLMN.	-	-
>NPN Support Information	O		9.3.1.83		YES	reject
>Extended NR CGI Support List	O		9.3.1.97	Additional supported cells per PLMN.	YES	ignore
gNB-CU-UP Capacity	O		9.3.1.56		YES	ignore
Transport Network Layer Address Info	O		9.3.2.7		YES	ignore
Extended gNB-CU-UP Name	O		9.3.1.95		YES	ignore

Range bound	Explanation
maxnoofSPLMNs	Maximum no. of Supported PLMN Ids. Value is 12.

9.2.1.9 GNB-CU-CP E1 SETUP FAILURE

This message is sent by the gNB-CU-UP to indicate E1 Setup failure.

Direction: gNB-CU-UP → gNB-CU-CP

IE/Group Name	Presence	Range	IE type and reference	Semantics description	Criticality	Assigned Criticality
Message Type	M		9.3.1.1		YES	reject
Transaction ID	M		9.3.1.53		YES	reject
Cause	M		9.3.1.2		YES	ignore
Time To wait	O		9.3.1.6		YES	ignore
Criticality Diagnostics	O		9.3.1.3		YES	ignore

9.2.1.10 GNB-CU-UP CONFIGURATION UPDATE

This message is sent by the gNB-CU-UP to transfer updated information for a TNL association.

Direction: gNB-CU-UP → gNB-CU-CP

IE/Group Name	Presence	Range	IE type and reference	Semantics description	Criticality	Assigned Criticality
Message Type	M		9.3.1.1		YES	reject
Transaction ID	M		9.3.1.53		YES	reject
gNB-CU-UP ID	O		9.3.1.15		YES	reject
gNB-CU-UP Name	O		PrintableString(SIZE(1..150,...))	Human readable name of the gNB-CU-UP.	YES	ignore
Supported PLMNs		<i>0..<maxnoofSPLMNs></i>		Supported PLMNs	YES	reject
>PLMN Identity	M		9.3.1.7		-	-
>Slice Support List	O		9.3.1.8	Supported S-NSSAIs per PLMN.	-	-
>Extended Slice Support List	O		9.3.1.94	Additional Supported S-NSSAIs per PLMN.	YES	reject
>NR CGI Support List	O		9.3.1.36	Supported cells.	-	-
>QoS Parameters Support List	O		9.3.1.37	Supported QoS parameters per PLMN.	-	-
>NPN Support Information	O		9.3.1.83		YES	reject
>Extended NR CGI Support List	O		9.3.1.97	Additional supported cells per PLMN.	YES	ignore
gNB-CU-UP Capacity	O		9.3.1.56		YES	ignore
gNB-CU-UP TNLA To Remove List		<i>0..1</i>			YES	reject
>gNB-CU-UP TNLA To Remove Item IEs		<i>1..<maxnoofTNLAAssociations></i>			-	-
>>TNLA Transport Layer Address	M		CP Transport Layer Information 9.3.2.2	Transport Layer Address of the gNB-CU-UP.	-	-
>>TNLA Transport Layer Address gNB-CU-CP	O		CP Transport Layer Information 9.3.2.2	Transport Layer Address of the gNB-CU-CP.	-	-
Transport Network Layer Address Info	O		9.3.2.7		YES	ignore
Extended gNB-CU-UP Name	O		9.3.1.96		YES	ignore

Range bound	Explanation
maxnoofSPLMNs	Maximum no. of Supported PLMN Ids. Value is 12.
maxnoofTNLAAssociations	Maximum numbers of TNL Associations between the gNB-CU-UP and the gNB-CU-CP. Value is 32.

9.2.1.11 GNB-CU-UP CONFIGURATION UPDATE ACKNOWLEDGE

This message is sent by a gNB-CU-CP to a gNB-CU-UP to acknowledge update of information for a TNL association.

Direction: gNB-CU-CP → gNB-CU-UP

IE/Group Name	Presence	Range	IE type and reference	Semantics description	Criticality	Assigned Criticality
Message Type	M		9.3.1.1		YES	reject
Transaction ID	M		9.3.1.53		YES	reject
Criticality Diagnostics	O		9.3.1.3		YES	ignore
Transport Network Layer Address Info	O		9.3.2.7		YES	ignore

9.2.1.12 GNB-CU-UP CONFIGURATION UPDATE FAILURE

This message is sent by the gNB-CU-CP to indicate gNB-CU-UP Configuration Update failure.

Direction: gNB-CU-CP → gNB-CU-UP

IE/Group Name	Presence	Range	IE type and reference	Semantics description	Criticality	Assigned Criticality
Message Type	M		9.3.1.1		YES	reject
Transaction ID	M		9.3.1.53		YES	reject
Cause	M		9.3.1.2		YES	ignore
Time To wait	O		9.3.1.6		YES	ignore
Criticality Diagnostics	O		9.3.1.3		YES	ignore

9.2.1.13 GNB-CU-CP CONFIGURATION UPDATE

This message is sent by the gNB-CU-CP to transfer updated information for a TNL association.

Direction: gNB-CU-CP → gNB-CU-UP

IE/Group Name	Presence	Range	IE type and reference	Semantics description	Criticality	Assigned Criticality
Message Type	M		9.3.1.1		YES	reject
Transaction ID	M		9.3.1.53		YES	reject
gNB-CU-CP Name	O		PrintableString(SIZE(1..150,...))	Human readable name of the gNB-CU-CP	YES	ignore
gNB-CU-CP TNLA To Add List		0..1			YES	ignore
>gNB-CU-CP TNLA To Add Item IEs		1..<maxnoofTNLA associations>			-	-
>>TNLA Transport Layer Information	M		CP Transport Layer Information 9.3.2.2	Transport Layer Address of the gNB-CU-CP.	-	-
>>TNLA Usage	M		ENUMERATED (ue, non-ue, both, ...)	Indicates whether the TNLA is only used for UE-associated signalling, or non-UE-associated signalling, or both. For usage of this IE, refer to TS 38.462 [18].	-	-
gNB-CU-CP TNLA To Remove List		0..1			YES	ignore
>gNB-CU-CP TNLA To Remove Item IEs		1..<maxnoofTNLA associations>			-	-
>>TNLA Transport Layer Address	M		CP Transport Layer Information 9.3.2.2	Transport Layer Address of the gNB-CU-CP.	-	-
>>TNLA Transport Layer Address gNB-CU-UP	O		CP Transport Layer Information 9.3.2.2	Transport Layer Address of the gNB-CU-UP.	YES	reject
gNB-CU-CP TNLA To Update List		0..1			YES	ignore
>gNB-CU-CP TNLA To Update Item IEs		1..<maxnoofTNLA associations>			-	-
>>TNLA Transport Layer Address	M		CP Transport Layer Address 9.3.2.2	Transport Layer Address of the gNB-CU-CP.	-	-
>>TNLA Usage	O		ENUMERATED (ue, non-ue, both, ...)	Indicates whether the TNLA is only used for UE-associated signalling, or non-UE-associated signalling, or both. For usage of this IE, refer to TS 38.462 [18].	-	-

Transport Network Layer Address Info	O		9.3.2.7		YES	ignore
Extended gNB-CU-CP Name	O		9.3.1.95		YES	ignore

Range bound	Explanation
maxnoofTNLAAssociations	Maximum numbers of TNL Associations between the gNB-CU-CP and the gNB-CU-UP. Value is 32.

9.2.1.14 GNB-CU-CP CONFIGURATION UPDATE ACKNOWLEDGE

This message is sent by a gNB-CU-UP to a gNB-CU-CP to acknowledge update of information for a TNL association.

Direction: gNB-CU-UP → gNB-CU-CP

IE/Group Name	Presence	Range	IE type and reference	Semantics description	Criticality	Assigned Criticality
Message Type	M		9.3.1.1		YES	reject
Transaction ID	M		9.3.1.53		YES	reject
gNB-CU-CP TNLA Setup List		0..1			YES	ignore
>gNB-CU-CP TNLA Setup Item IEs		1..<maxnoofTNLAAssociations>			-	-
>>TNLA Transport Layer Address	M		CP Transport Layer Information 9.3.2.2	Transport Layer Address of the gNB-CU-CP	-	-
gNB-CU-CP TNLA Failed to Setup List		0..1			YES	ignore
>gNB-CU-CP TNLA Failed To Setup Item IEs		1..<maxnoofTNLAAssociations>			-	-
>>TNLA Transport Layer Address	M		CP Transport Layer Information 9.3.2.2	Transport Layer Address of the gNB-CU-CP	-	-
>>Cause	M		9.3.1.2			
Criticality Diagnostics	O		9.3.1.3		YES	ignore
Transport Network Layer Address Info	O		9.3.2.7		YES	ignore

Range bound	Explanation
maxnoofTNLAAssociations	Maximum numbers of TNL Associations between the gNB-CU-CP and the gNB-CU-UP. Value is 32.

9.2.1.15 GNB-CU-CP CONFIGURATION UPDATE FAILURE

This message is sent by the gNB-CU-UP to indicate gNB-CU-CP Configuration Update failure.

Direction: gNB-CU-UP → gNB-CU-CP

IE/Group Name	Presence	Range	IE type and reference	Semantics description	Criticality	Assigned Criticality
Message Type	M		9.3.1.1		YES	reject
Transaction ID	M		9.3.1.53		YES	reject
Cause	M		9.3.1.2		YES	ignore
Time To wait	O		9.3.1.6		YES	ignore
Criticality Diagnostics	O		9.3.1.3		YES	ignore

9.2.1.16 E1 RELEASE REQUEST

This message is sent by both the gNB-CU-CP and the gNB-CU-UP and is used to request the release of the E1 interface.

Direction: gNB-CU-CP → gNB-CU-UP and gNB-CU-UP → gNB-CU-CP

IE/Group Name	Presence	Range	IE type and reference	Semantics description	Criticality	Assigned Criticality
Message Type	M		9.3.1.1		YES	reject
Transaction ID	M		9.3.1.53		YES	reject
Cause	M		9.3.1.2		YES	ignore

9.2.1.17 E1 RELEASE RESPONSE

This message is sent by both the gNB-CU-CP and the gNB-CU-UP as a response to an E1 RELEASE REQUEST message.

Direction: gNB-CU-UP → gNB-CU-CP and gNB-CU-CP → gNB-CU-UP.

IE/Group Name	Presence	Range	IE type and reference	Semantics description	Criticality	Assigned Criticality
Message Type	M		9.3.1.1		YES	reject
Transaction ID	M		9.3.1.53		YES	reject

9.2.1.18 GNB-CU-UP STATUS INDICATION

This message is sent by the gNB-CU-UP to indicate to the gNB-CU-CP its status of overload.

Direction: gNB-CU-UP → gNB-CU-CP

IE/Group Name	Presence	Range	IE type and reference	Semantics description	Criticality	Assigned Criticality
Message Type	M		9.3.1.1		YES	reject
Transaction ID	M		9.3.1.53		YES	reject
gNB-CU-UP Overload Information	M		ENUMERATED (overloaded, not-overloaded)		YES	reject

9.2.1.19 RESOURCE STATUS REQUEST

This message is sent by an gNB-CU-CP to gNB-CU-UP to initiate the requested measurement according to the parameters given in the message.

Direction: gNB-CU-CP → gNB-CU-UP.

IE/Group Name	Presence	Range	IE type and reference	Semantics description	Criticality	Assigned Criticality
Message Type	M		9.3.1.1		YES	reject
Transaction ID	M		9.3.1.53		YES	reject
gNB-CU-CP Measurement ID	M		INTEGER (1..4095,...)	Allocated by gNB-CU-CP	YES	reject
gNB-CU-UP Measurement ID	C- ifRegistrati onRequest Stop		INTEGER (1..4095,...)	Allocated by gNB-CU-UP	YES	ignore
Registration Request	M		ENUMERAT ED(start, stop, ...)	Type of request for which the resource status is required.	YES	ignore
Report Characteristics	C- ifRegistrati onRequest Start		BITSTRING (SIZE(32))	Each position in the bitmap indicates measurement object the gNB-CU-UP is requested to report. First Bit = TNL Available Capacity Ind Periodic, Second Bit = HW Capacity Ind Periodic. Other bits shall be ignored by the gNB-CU-UP.	YES	reject
Reporting Periodicity	O		ENUMERAT ED (500ms, 1000ms, 2000ms, 5000ms, 10000ms, 20000ms, 30000ms, 40000ms, 50000ms, 60000ms, 70000ms, 80000ms, 90000ms, 100000ms, 110000ms, 120000ms, ...)	Periodicity that can be used for reporting. Also used as the averaging window length for all measurement object if supported.	YES	ignore

Condition	Explanation
ifRegistrationRequestStop	This IE shall be present if the <i>Registration Request</i> IE is set to the value "stop"
ifRegistrationRequestStart	This IE shall be present if the <i>Registration Request</i> IE is set to the value "start".

9.2.1.20 RESOURCE STATUS RESPONSE

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

Direction: gNB-CU-UP → gNB-CU-CP

IE/Group Name	Presence	Range	IE type and reference	Semantics description	Criticality	Assigned Criticality
Message Type	M		9.3.1.1		YES	reject
Transaction ID	M		9.3.1.53		YES	reject
gNB-CU-CP Measurement ID	M		INTEGER (1..4095,...)	Allocated by gNB-CU-CP	YES	reject
gNB-CU-UP Measurement ID	M		INTEGER (1..4095,...)	Allocated by gNB-CU-UP	YES	ignore
Criticality Diagnostics	O		9.3.1.3		YES	ignore

9.2.1.21 RESOURCE STATUS FAILURE

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

Direction: gNB-CU-UP → gNB-CU-CP.

IE/Group Name	Presence	Range	IE type and reference	Semantics description	Criticality	Assigned Criticality
Message Type	M		9.3.1.1		YES	reject
Transaction ID	M		9.3.1.53		YES	reject
gNB-CU-CP Measurement ID	M		INTEGER (1..4095,...)	Allocated by gNB-CU-CP	YES	reject
gNB-CU-UP Measurement ID	C- ifRegistrati onReques tStop		INTEGER (1..4095,...)	Allocated by gNB-CU-UP	YES	ignore
Cause	M		9.3.1.2	Ignored by the receiver when the Complete Failure Cause Information IE is included	YES	ignore
Criticality Diagnostics	O		9.3.1.3		YES	ignore

Condition	Explanation
ifRegistrationRequestStop	This IE shall be present if the <i>Registration Request</i> IE is set to the value "stop"

9.2.1.22 RESOURCE STATUS UPDATE

This message is sent by gNB-CU-UP to gNB-CU-CP to report the results of the requested measurements.

Direction: gNB-CU-UP → gNB-CU-CP.

IE/Group Name	Presence	Range	IE type and reference	Semantics description	Criticality	Assigned Criticality
Message Type	M		9.3.1.1		YES	Ignore
Transaction ID	M		9.3.1.53		YES	Reject
gNB-CU-CP Measurement ID	M		INTEGER (1..4095,...)	Allocated by gNB-CU-CP	YES	Reject
gNB-CU-UP Measurement ID	M		INTEGER (1..4095,...)	Allocated by gNB-CU-UP	YES	Reject
TNL Available Capacity Indicator	O		9.3.1.72			
HW Capacity Indicator	O		9.3.1.73			

Range bound	Explanation
maxnoofSPLMNs	Maximum no. of Supported PLMN Ids. Value is 12.
maxnoofSliceltems	Maximum no. of signalled slice support items. Value is 1024.

9.2.2 Bearer Context Management messages

9.2.2.1 BEARER CONTEXT SETUP REQUEST

This message is sent by the gNB-CU-CP to request the gNB-CU-UP to setup a bearer context.

Direction: gNB-CU-CP → gNB-CU-UP

IE/Group Name	Presence	Range	IE type and reference	Semantics description	Criticality	Assigned Criticality
Message Type	M		9.3.1.1		YES	reject
gNB-CU-CP UE E1AP ID	M		9.3.1.4		YES	reject
Security Information	M		9.3.1.10		YES	reject
UE DL Aggregate Maximum Bit Rate	M		Bit Rate 9.3.1.20		YES	reject
UE DL Maximum Integrity Protected Data Rate	O		Bit Rate 9.3.1.20	The Bit Rate is a portion of the UE's Maximum Integrity Protected Data Rate, and is enforced by the gNB-CU-UP node.	YES	reject
Serving PLMN	M		PLMN Identity 9.3.1.7		YES	ignore
Activity Notification Level	M		9.3.1.67		YES	reject
UE Inactivity Timer	O		Inactivity Timer 9.3.1.54	Included if the Activity Notification Level is set to UE.	-	-
Bearer Context Status Change	O		ENUMERATED (Suspend, Resume, ...)	Indicates the status of the Bearer Context	YES	reject
CHOICE System	M				YES	reject
>E-UTRAN						
>>DRB To Setup List	M		DRB To Setup List E-UTRAN 9.3.3.1		YES	reject
>>Subscriber Profile ID for RAT/Frequency priority	O		9.3.1.69		YES	ignore
>>Additional RRM Policy Index	O		9.3.1.70		YES	Ignore
>NG-RAN						
>>PDU Session Resource To Setup List	M		9.3.3.2		YES	reject
RAN UE ID	O		OCTET STRING (SIZE(8))		YES	ignore
gNB-DU ID	O		9.3.1.65	Included whenever it is known by the gNB-CU-CP	YES	ignore
Trace Activation	O		9.3.1.68		YES	ignore
NPN Context Information	O		9.3.1.84		YES	reject
Management Based MDT PLMN List	O		MDT PLMN List 9.3.1.89		YES	ignore
CHO Initiation	O		ENUMERATED (True, ...)		YES	reject

Additional Handover Information	O		ENUMERATED(Discard PDCP SN, ...)	If set to "Discard PDCP SN", indicates that the forwarded PDCP SNs have to be removed	YES	ignore
Direct Forwarding Path Availability	O		9.3.1.98		YES	ignore
gNB-CU-UP UE E1AP ID	O		9.3.1.5		YES	ignore

Range bound	Explanation
maxnoofDRBs	Maximum no. of DRBs for a UE. Value is 32.
maxnoofPDUSessionResource	Maximum no. of PDU Sessions for a UE. Value is 256.

9.2.2.2 BEARER CONTEXT SETUP RESPONSE

This message is sent by the gNB-CU-UP to confirm the setup of the requested bearer context.

Direction: gNB-CU-UP → gNB-CU-CP

IE/Group Name	Presence	Range	IE type and reference	Semantics description	Criticality	Assigned Criticality
Message Type	M		9.3.1.1		YES	reject
gNB-CU-CP UE E1AP ID	M		9.3.1.4		YES	reject
gNB-CU-UP UE E1AP ID	M		9.3.1.5		YES	reject
CHOICE <i>System</i>	M				YES	reject
> <i>E-UTRAN</i>						
>>DRB Setup List	M		DRB Setup List E-UTRAN 9.3.3.3		YES	reject
>>DRB Failed List	O		DRB Failed List E-UTRAN 9.3.3.4		YES	reject
> <i>NG-RAN</i>						
>>PDU Session Resource Setup List	M		9.3.3.5		YES	reject
>>PDU Session Resource Failed List	O		9.3.3.6		YES	reject

Range bound	Explanation
maxnoofDRBs	Maximum no. of DRBs for a UE. Value is 32.
maxnoofPDUSessionResource	Maximum no. of PDU Sessions for a UE. Value is 256.

9.2.2.3 BEARER CONTEXT SETUP FAILURE

This message is sent by the gNB-CU-UP to indicate that the setup of the bearer context was unsuccessful.

Direction: gNB-CU-UP → gNB-CU-CP

IE/Group Name	Presence	Range	IE type and reference	Semantics description	Criticality	Assigned Criticality
Message Type	M		9.3.1.1		YES	reject
gNB-CU-CP UE E1AP ID	M		9.3.1.4		YES	reject
gNB-CU-UP UE E1AP ID	O		9.3.1.5		YES	ignore
Cause	M		9.3.1.2		YES	ignore
Criticality Diagnostics	O		9.3.1.3		YES	ignore

9.2.2.4 BEARER CONTEXT MODIFICATION REQUEST

This message is sent by the gNB-CU-CP to request the gNB-CU-UP to modify a bearer context.

Direction: gNB-CU-CP → gNB-CU-UP

IE/Group Name	Presence	Range	IE type and reference	Semantics description	Criticality	Assigned Criticality
Message Type	M		9.3.1.1		YES	reject
gNB-CU-CP UE E1AP ID	M		9.3.1.4		YES	reject
gNB-CU-UP UE E1AP ID	M		9.3.1.5		YES	reject
Security Information	O		9.3.1.10		YES	reject
UE DL Aggregate Maximum Bit Rate	O		Bit Rate 9.3.1.20		YES	reject
UE DL Maximum Integrity Protected Data Rate	O		Bit Rate 9.3.1.20	The Bit Rate is a portion of the UE's Maximum Integrity Protected Data Rate, and is enforced by the gNB-CU-UP node.	YES	reject
Bearer Context Status Change	O		ENUMERATE D (Suspend, Resume, ...)	Indicates the status of the Bearer Context	YES	reject
New UL TNL Information Required	O		ENUMERATE D (required, ...)	Indicates that new UL TNL information has been requested to be provided.	YES	reject
UE Inactivity Timer	O		Inactivity Timer 9.3.1.54	Included if the Activity Notification Level is set to UE.	-	-
Data Discard Required	O		ENUMERATE D (required, ...)	Indicate to discard the DL user data in case of RAN paging failure.	YES	ignore
CHOICE System	O				YES	reject
>E-UTRAN						
>>DRB To Setup List	O		DRB To Setup Modification List E-UTRAN 9.3.3.7		YES	reject
>>DRB To Modify List	O		DRB To Modify List E-UTRAN 9.3.3.8		YES	reject
>>DRB To Remove List	O		DRB To Remove List E-UTRAN 9.3.3.9		YES	reject
>>Subscriber Profile ID for RAT/Frequency priority	O		9.3.1.69		YES	ignore
>>Additional RRM Policy Index	O		9.3.1.70		YES	ignore
>NG-RAN						
>>PDU Session Resource To Setup List	O		PDU Session Resource To Setup Modification List 9.3.3.10		YES	reject
>>PDU Session Resource To Modify List	O		9.3.3.11		YES	reject
>>PDU Session Resource To Remove List	O		9.3.3.12		YES	reject

RAN UE ID	O		OCTET STRING (SIZE(8))		YES	ignore
gNB-DU ID	O		9.3.1.65		YES	ignore
Activity Notification Level	O		9.3.1.67		YES	ignore

Range bound	Explanation
maxnoofDRBs	Maximum no. of DRBs for a UE. Value is 32.
maxnoofPDUSessionResource	Maximum no. of PDU Sessions for a UE. Value is 256.

9.2.2.5 BEARER CONTEXT MODIFICATION RESPONSE

This message is sent by the gNB-CU-UP to confirm the modification of the requested bearer context.

Direction: gNB-CU-UP → gNB-CU-CP

IE/Group Name	Presence	Range	IE type and reference	Semantics description	Criticality	Assigned Criticality
Message Type	M		9.3.1.1		YES	reject
gNB-CU-CP UE E1AP ID	M		9.3.1.4		YES	reject
gNB-CU-UP UE E1AP ID	M		9.3.1.5		YES	reject
CHOICE System	O				YES	ignore
>E-UTRAN						
>>DRB Setup List	O		DRB Setup Modification List E-UTRAN 9.3.3.13		YES	ignore
>>DRB Failed List	O		DRB Failed Modification List E-UTRAN 9.3.3.14		YES	ignore
>>DRB Modified List	O		DRB Modified List E-UTRAN 9.3.3.15		YES	ignore
>>DRB Failed To Modify List	O		DRB Failed To Modify List E-UTRAN 9.3.3.16		YES	ignore
>>Retainability Measurements Information	O		9.3.1.71	Provides information on all the removed DRB(s), needed for retainability measurements in the gNB-CU-CP	YES	ignore
>NG-RAN						
>>PDU Session Resource Setup List	O		PDU Session Resource Setup Modification List 9.3.3.17		YES	reject
>>PDU Session Resource Failed List	O		PDU Session Resource Failed Modification List 9.3.3.18		YES	reject
>>PDU Session Resource Modified List	O		9.3.3.19		YES	reject
>>PDU Session Resource Failed To Modify List	O		9.3.3.20		YES	reject
>>Retainability Measurements Information	O		9.3.1.71	Provides information on all the removed DRB(s), needed for retainability measurements in the gNB-CU-CP	YES	ignore

Range bound	Explanation
maxnoofDRBs	Maximum no. of DRBs for a UE. Value is 32.
maxnoofPDUSessionResource	Maximum no. of PDU Sessions for a UE. Value is 256.

9.2.2.6 BEARER CONTEXT MODIFICATION FAILURE

This message is sent by the gNB-CU-UP to indicate that the modification of the bearer context was unsuccessful.

Direction: gNB-CU-UP → gNB-CU-CP

IE/Group Name	Presence	Range	IE type and reference	Semantics description	Criticality	Assigned Criticality
Message Type	M		9.3.1.1		YES	reject
gNB-CU-CP UE E1AP ID	M		9.3.1.4		YES	reject
gNB-CU-UP UE E1AP ID	M		9.3.1.5		YES	reject
Cause	M		9.3.1.2		YES	ignore
Criticality Diagnostics	O		9.3.1.3		YES	ignore

9.2.2.7 BEARER CONTEXT MODIFICATION REQUIRED

This message is sent by the gNB-CU-UP to inform the gNB-CU-CP that a modification of a bearer context is required (e.g., due to local problems at the gNB-CU-UP).

Direction: gNB-CU-UP → gNB-CU-CP

IE/Group Name	Presence	Range	IE type and reference	Semantics description	Criticality	Assigned Criticality
Message Type	M		9.3.1.1		YES	reject
gNB-CU-CP UE E1AP ID	M		9.3.1.4		YES	reject
gNB-CU-UP UE E1AP ID	M		9.3.1.5		YES	reject
CHOICE <i>System</i>	M				YES	reject
> <i>E-UTRAN</i>						
>>DRB To Modify List	O		DRB Required To Modify List E-UTRAN 9.3.3.21		YES	reject
>>DRB To Remove List	O		DRB Required To Remove List 9.3.3.22		YES	reject
> <i>NG-RAN</i>						
>>PDU Session Resource Required To Modify List	O		PDU Session Resource Required To Modify List 9.3.3.23		YES	reject
>>PDU Session Resource To Remove List	O		9.3.3.12		YES	reject

Range bound	Explanation
maxnoofDRBs	Maximum no. of DRBs for a UE. Value is 32.
maxnoofPDUSessionResource	Maximum no. of PDU Sessions for a UE. Value is 256.

9.2.2.8 BEARER CONTEXT MODIFICATION CONFIRM

This message is sent by the gNB-CU-CP to confirm the modification of the requested bearer context.

Direction: gNB-CU-CP → gNB-CU-UP

IE/Group Name	Presence	Range	IE type and reference	Semantics description	Criticality	Assigned Criticality
Message Type	M		9.3.1.1		YES	reject
gNB-CU-CP UE E1AP ID	M		9.3.1.4		YES	reject
gNB-CU-UP UE E1AP ID	M		9.3.1.5		YES	reject
CHOICE System	O				YES	ignore
>E-UTRAN						
>>DRB Modified List	O		DRB Confirm Modified List E-UTRAN 9.3.3.24		YES	ignore
>NG-RAN						
>>PDU Session Resource Modified List	O		PDU Session Resource Confirm Modified List 9.3.3.25		YES	Ignore

Range bound	Explanation
maxnoofDRBs	Maximum no. of DRBs for a UE. Value is 32.
maxnoofPDUSessionResource	Maximum no. of PDU Sessions for a UE. Value is 256.

9.2.2.9 BEARER CONTEXT RELEASE COMMAND

This message is sent by the gNB-CU-CP to command the gNB-CU-UP to release an UE-associated logical E1 connection.

Direction: gNB-CU-CP → gNB-CU-UP

IE/Group Name	Presence	Range	IE type and reference	Semantics description	Criticality	Assigned Criticality
Message Type	M		9.3.1.1		YES	reject
gNB-CU-CP UE E1AP ID	M		9.3.1.4		YES	reject
gNB-CU-UP UE E1AP ID	M		9.3.1.5		YES	reject
Cause	M		9.3.1.2		YES	ignore

9.2.2.10 BEARER CONTEXT RELEASE COMPLETE

This message is sent by the gNB-CU-UP to confirm the release of the UE-associated logical E1 connection.

Direction: gNB-CU-UP → gNB-CU-CP

IE/Group Name	Presence	Range	IE type and reference	Semantics description	Criticality	Assigned Criticality
Message Type	M		9.3.1.1		YES	reject
gNB-CU-CP UE E1AP ID	M		9.3.1.4		YES	reject
gNB-CU-UP UE E1AP ID	M		9.3.1.5		YES	reject
Criticality Diagnostics	O		9.3.1.3		YES	ignore
Retainability Measurements Information	O		9.3.1.71	Provides information on all the removed DRB(s) and QoS Flow(s), needed for retainability measurements in the gNB-CU-CP	YES	ignore

9.2.2.11 BEARER CONTEXT RELEASE REQUEST

This message is sent by the gNB-CU-UP to request the release of an UE-associated logical E1 connection.

Direction: gNB-CU-UP → gNB-CU-CP

IE/Group Name	Presence	Range	IE type and reference	Semantics description	Criticality	Assigned Criticality
Message Type	M		9.3.1.1		YES	reject
gNB-CU-CP UE E1AP ID	M		9.3.1.4		YES	reject
gNB-CU-UP UE E1AP ID	M		9.3.1.5		YES	reject
DRB Status List		<i>0.. 1</i>			YES	ignore
>DRB Status Item		<i>1..<maxnoofDRBs ></i>			-	-
>>DRB ID	M		9.3.1.16		-	-
>>PDCP DL Count	O		PDCP Count 9.3.1.35	PDCP count for next DL packet to be assigned.	-	-
>>PDCP UL Count	O		PDCP Count 9.3.1.35	PDCP count for first un-acknowledged UL packet.	-	-
Cause	M		9.3.1.2		YES	ignore

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

9.2.2.12 BEARER CONTEXT INACTIVITY NOTIFICATION

This message is sent by the gNB-CU-UP to provide information about the UE activity to the gNB-CU-CP.

Direction: gNB-CU-UP → gNB-CU-CP

IE/Group Name	Presence	Range	IE type and reference	Semantics description	Criticality	Assigned Criticality
Message Type	M		9.3.1.1		YES	reject
gNB-CU-CP UE E1AP ID	M		9.3.1.4		YES	reject
gNB-CU-UP UE E1AP ID	M		9.3.1.5		YES	reject
CHOICE Activity Information	M				YES	reject
>DRB Activity List		1		Used if the <i>Activity Notification Level</i> IE is set as "DRB" in BEARER CONTEXT SETUP Request message	YES	reject
>>DRB Activity Item		1 .. <maxnoof DRBs>			-	-
>>>DRB ID	M		9.3.1.16		-	-
>>>DRB Activity	M		ENUMERATED (Active, Not active, ...)		-	-
>PDU Session Resource Activity List		1		Used if the <i>Activity Notification Level</i> IE is set as "PDU Session" in the BEARER CONTEXT SETUP Request message	YES	reject
>>PDU Session Resource Activity Item		1 .. <maxnoof PDU Session Resource>			-	-
>>>PDU Session ID	M		9.3.1.21		-	-
>>>PDU Session Resource Activity	M		ENUMERATED (Active, Not active, ...)		-	-
>UE Activity	M		ENUMERATED (Active, Not active, ...)	Used if the <i>Activity Notification Level</i> IE is set as "UE" in the BEARER CONTEXT SETUP Request message	YES	reject

Range bound	Explanation
maxnoofDRBs	Maximum no. of DRB for a UE, the maximum value is 32.
maxnoofPDUSessionResource	Maximum no. of PDU Sessions for a UE. Value is 256.

9.2.2.13 DL DATA NOTIFICATION

This message is sent by the gNB-CU-UP to provide information about the DL data detection to the gNB-CU-CP.

Direction: gNB-CU-UP → gNB-CU-CP

IE/Group Name	Presence	Range	IE type and reference	Semantics description	Criticality	Assigned Criticality
Message Type	M		9.3.1.1		YES	reject
gNB-CU-CP UE E1AP ID	M		9.3.1.4		YES	reject
gNB-CU-UP UE E1AP ID	M		9.3.1.5		YES	reject
Paging Priority Indicator (PPI)	O		9.3.1.55		YES	ignore
PDU Session To Notify List	O				YES	ignore
>PDU Session To Notify Item		<i>1..<maxno ofPDUSessionResource></i>			-	-
>>PDU Session ID	M		9.3.1.21		-	-
>>QoS Flow List	M		9.3.1.12		-	-

Range bound	Explanation
maxnoofPDUSessionResource	Maximum no. of PDU Sessions for a UE. Value is 256.

9.2.2.14 DATA USAGE REPORT

This message is sent by the gNB-CU-UP to report data volumes.

Direction: gNB-CU-UP → gNB-CU-CP

IE/Group Name	Presence	Range	IE type and reference	Semantics description	Criticality	Assigned Criticality
Message Type	M		9.3.1.1		YES	reject
gNB-CU-CP UE E1AP ID	M		9.3.1.4		YES	reject
gNB-CU-UP UE E1AP ID	M		9.3.1.5		YES	reject
Data Usage Report List	M		9.3.1.44		YES	ignore

9.2.2.15 GNB-CU-UP COUNTER CHECK REQUEST

This message is sent by the gNB-CU-UP to request the verification of the value of the PDCP COUNTs associated with the DRBs established in the gNB-CU-UP.

Direction: gNB-CU-UP → gNB-CU-CP.

IE/Group Name	Presence	Range	IE type and reference	Semantics description	Criticality	Assigned Criticality
Message Type	M		9.3.1.1		YES	reject
gNB-CU-CP UE E1AP ID	M		9.3.1.4		YES	reject
gNB-CU-UP UE E1AP ID	M		9.3.1.5		YES	reject
CHOICE System	M				YES	reject
>E-UTRAN						
>>DRBs Subject to Counter Check List		1			YES	ignore
>>>DRBs Subject to Counter Check Item		1 .. <maxnoof DRBs>			-	-
>>>>DRB ID	M		9.3.1.16		-	-
>>>>PDCP UL Count	M		PDCP Count 9.3.1.35	Indicates the value of uplink COUNT associated to this DRB, as specified in TS 38.331 [8].	-	-
>>>>PDCP DL Count	M		PDCP Count 9.3.1.35	Indicates the value of downlink COUNT associated to this DRB, as specified in TS 38.331 [8].	-	-
>NG-RAN						
>>DRBs Subject to Counter Check List		1			YES	ignore
>>>DRBs Subject to Counter Check Item		1 .. <maxnoof DRBs>			-	-
>>>>PDU Session ID	M		9.3.1.21		-	-
>>>>DRB ID	M		9.3.1.16		-	-
>>>>PDCP UL Count	M		PDCP Count 9.3.1.35	Indicates the value of uplink COUNT associated to this DRB, as specified in TS 38.331 [8].	-	-
>>>>PDCP DL Count	M		PDCP Count 9.3.1.35	Indicates the value of downlink COUNT associated to this DRB, as specified in TS 38.331 [8].	-	-

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

9.2.2.16 UL DATA NOTIFICATION

This message is sent by the gNB-CU-UP to provide information about the UL data detection to the gNB-CU-CP.

Direction: gNB-CU-UP → gNB-CU-CP

IE/Group Name	Presence	Range	IE type and reference	Semantics description	Criticality	Assigned Criticality
Message Type	M		9.3.1.1		YES	reject
gNB-CU-CP UE E1AP ID	M		9.3.1.4		YES	reject
gNB-CU-UP UE E1AP ID	M		9.3.1.5		YES	reject
PDU Session To Notify List		1			YES	reject
>PDU Session To Notify Item		1..<maxno ofPDUSessionResource>			-	-
>>PDU Session ID	M		9.3.1.21		-	-
>>QoS Flow List	M		9.3.1.12		-	-

9.2.2.17 MR-DC DATA USAGE REPORT

This message is sent by the gNB-CU-UP to report data volumes when the UE is connected to the 5GC.

Direction: gNB-CU-UP → gNB-CU-CP.

IE/Group Name	Presence	Range	IE type and reference	Semantics description	Criticality	Assigned Criticality
Message Type	M		9.3.1.1		YES	reject
gNB-CU-CP UE E1AP ID	M		9.3.1.4		YES	reject
gNB-CU-UP UE E1AP ID	M		9.3.1.5		YES	reject
PDU Session Resource Data Usage List		1			YES	ignore
>PDU Session Resource Data Usage Item		1.. <maxno of PDU Sessions>			-	
>>PDU Session ID	M		9.3.1.21		-	
>>MR-DC Usage Information	M		9.3.1.63		-	

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

9.2.2.18 EARLY FORWARDING SN TRANSFER

This message is sent by the source gNB-CU-UP to the source gNB-CU-CP to transfer the COUNT value(s) related to early forwarded downlink PDCP SDUs during Conditional Handover or conditional PSCell change.

Direction: gNB-CU-UP → gNB-CU-CP

IE/Group Name	Presence	Range	IE type and reference	Semantics description	Criticality	Assigned Criticality
Message Type	M		9.3.1.1		YES	reject
gNB-CU-CP UE E1AP ID	M		9.3.1.4		YES	reject
gNB-CU-UP UE E1AP ID	M		9.3.1.5		YES	reject
DRBs Subject To Early Forwarding List	M	1			YES	reject
>DRBs Subject To Early Forwarding Item		1 .. <maxnoof DRBs>			-	-
>>DRB ID	M		9.3.1.16		-	-
>>DL COUNT Value	M		PDCP Count 9.3.1.35	PDCP-SN and Hyper frame number of the last DL SDU successfully delivered in sequence to the UE, if RLC-AM, and successfully transmitted, if RLC-UM.	-	-

9.2.2.19 GNB-CU-CP MEASUREMENT RESULTS INFORMATION

This message is sent to the gNB-CU-UP to provide the measurement result received by the gNB-CU-CP.

Direction: gNB-CU-CP → gNB-CU-UP

IE/Group Name	Presence	Range	IE type and reference	Semantics description	Criticality	Assigned Criticality
Message Type	M		9.3.1.1		YES	reject
gNB-CU-CP UE E1AP ID	M		9.3.1.4		YES	reject
gNB-CU-UP UE E1AP ID	M		9.3.1.5		YES	reject
DRB Measurement Results Information List		1			YES	reject
>DRB Measurement Results Information Item		1 .. <maxnoof DRBs>			EACH	reject
>>DRB ID	M		9.3.1.16		-	
>>UL D1 Result	O		INTEGER (0 .. 10000,...)	The unit is: 0.1ms	-	

Range bound	Explanation
maxnoofDRBs	Maximum no. of DRB allowed towards one UE, the maximum value is 64.

9.2.3 Trace Messages

9.2.3.1 TRACE START

This message is sent by the gNB-CU-CP to initiate a trace session for a UE.

Direction: gNB-CU-CP → gNB-CU-UP

IE/Group Name	Presence	Range	IE type and reference	Semantics description	Criticality	Assigned Criticality
Message Type	M		9.3.1.1		YES	ignore
gNB-CU-CP UE E1AP ID	M		9.3.1.4		YES	reject
gNB-CU-UP UE E1AP ID	M		9.3.1.5		YES	reject
Trace Activation	M		9.3.1.68		YES	ignore

9.2.3.2 DEACTIVATE TRACE

This message is sent by the gNB-CU-CP to deactivate a trace session.

Direction: gNB-CU-CP → gNB-CU-UP

IE/Group Name	Presence	Range	IE type and reference	Semantics description	Criticality	Assigned Criticality
Message Type	M		9.3.1.1		YES	ignore
gNB-CU-CP UE E1AP ID	M		9.3.1.4		YES	reject
gNB-CU-UP UE E1AP ID	M		9.3.1.5		YES	reject
Trace ID	M		OCTET STRING (SIZE(8))	As per Trace ID in <i>Trace Activation</i> IE	YES	ignore

9.2.3.3 CELL TRAFFIC TRACE

This message is sent by the gNB-CU-UP to initiate a trace session for a UE.

Direction: gNB-CU-UP → gNB-CU-CP

IE/Group Name	Presence	Range	IE type and reference	Semantics description	Criticality	Assigned Criticality
Message Type	M		9.3.1.1		YES	ignore
gNB-CU-CP UE E1AP ID	M		9.3.1.4		YES	reject
gNB-CU-UP UE E1AP ID	M		9.3.1.5		YES	reject
Trace ID	M		OCTET STRING (SIZE(8))	The Trace ID IE is composed of the following: Trace Reference defined in TS 32.422 [24] (leftmost 6 octets, with PLMN information coded as in 9.2.3.8), and Trace Recording Session Reference defined in TS 32.422 [24] (last 2 octets).	YES	ignore
Trace Collection Entity IP Address	M		Transport Layer Address 9.2.2.1	For File based Reporting. Defined in TS 32.422 [24]. Should be ignored if URI is present.	YES	ignore
Privacy Indicator	O		ENUMERATED (Immediate MDT, Logged MDT, ...)		YES	ignore
Trace Collection Entity URI	O		9.3.2.8	For Streaming based Reporting. Defined in TS 32.422 [24] Replaces Trace Collection Entity IP Address if present.	YES	ignore

9.2.4 IAB Messages

9.2.4.1 IAB UP TNL ADDRESS UPDATE

This message is sent by the gNB-CU-CP to request the gNB-CU-UP to update the TNL address(es) of the DL F1-U GTP tunnel information.

Direction: gNB-CU-CP → gNB-CU-UP

IE/Group Name	Presence	Range	IE type and reference	Semantics description	Criticality	Assigned Criticality
Message Type	M		9.3.1.1		YES	reject
Transaction ID	M		9.3.1.53		YES	reject
DL UP TNL Address To Update List		0..1			YES	reject
> DL UP TNL Address To Update Item IEs		1..<max number of TNL Addresses>			-	-
>>Old TNL Address	M		9.3.2.4	The old Transport Layer Address of IAB-DU for DL F1-U GTP tunnel.	-	-
>>New TNL Address	M		9.3.2.4	The new Transport Layer Address of IAB-DU for DL F1-U GTP tunnel.	-	-

Range bound	Explanation
maxnoofTNLAddresses	Maximum no. of TNL addresses to be updated in one E1AP procedure. Value is 8.

9.2.4.2 IAB UP TNL ADDRESS UPDATE ACKNOWLEDGE

This message is sent by the gNB-CU-UP to the gNB-CU-CP to acknowledge the update of TNL address in DL F1-U GTP tunnel information, or provide the updated TNL address(es) of the UL F1-U GTP tunnel information.

Direction: gNB-CU-UP → gNB-CU-CP

IE/Group Name	Presence	Range	IE type and reference	Semantics description	Criticality	Assigned Criticality
Message Type	M		9.3.1.1		YES	reject
Transaction ID	M		9.3.1.53		YES	reject
Criticality Diagnostics	O		9.3.1.3		YES	ignore
UL UP TNL Address to Update List		<i>0..1</i>			YES	ignore
> UL UP TNL Address Updated Item IEs		<i>1..<maxnoofTNLAddresses></i>			-	-
>>Old TNL Address	M		9.3.2.4	The old Transport Layer Address of CU-UP for UL F1-U GTP tunnel.	-	-
>>New TNL Address	M		9.3.2.4	The new Transport Layer Address of CU-UP for UL F1-U GTP tunnel.	-	-

Range bound	Explanation
maxnoofTNLAddresses	Maximum no. of TNL addresses updated in one E1AP procedure. Value is 8.

9.2.4.3 IAB UP TNL ADDRESS UPDATE FAILURE

This message is sent by the gNB-CU-UP to indicate IAB UP TNL address Update failure.

Direction: gNB-CU-UP → gNB-CU-CP

IE/Group Name	Presence	Range	IE type and reference	Semantics description	Criticality	Assigned Criticality
Message Type	M		9.3.1.1		YES	reject
Transaction ID	M		9.3.1.53		YES	reject
Cause	M		9.3.1.2		YES	ignore
Time To wait	O		9.3.1.6		YES	ignore
Criticality Diagnostics	O		9.3.1.3		YES	ignore

9.2.4.4 IAB PSK NOTIFICATION

This message is sent by the gNB-CU-CP to the gNB-CU-UP to transfer the security key info to be used for the IKEv2 Pre-shared Secret Key (PSK) authentication to protect the F1-U interface of the IAB-node(s).

Direction: gNB-CU-CP → gNB-CU-UP

IE/Group Name	Presence	Range	IE type and reference	Semantics description	Criticality	Assigned Criticality
Message Type	M		9.3.1.1		YES	reject
Transaction ID	M		9.3.1.23		YES	reject
IAB-donor-CU-UP PSK Info	M		9.3.1.99		YES	reject

9.3 Information Element Definitions

9.3.1 Radio Network Layer Related IEs

9.3.1.1 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
Message Type				
>Procedure Code	M		INTEGER (0..255)	
>Type of Message	M		CHOICE (Initiating Message, Successful Outcome, Unsuccessful Outcome, ...)	

9.3.1.2 Cause

The purpose of the *Cause* IE is to indicate the reason for a particular event for the E1AP 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 (Unspecified, Unknown or already allocated gNB-CU-CP UE E1AP ID, Unknown or already allocated gNB-CU-UP UE E1AP ID, Unknown or inconsistent pair of UE E1AP ID, Interaction with other procedure, PDCP Count Wrap Around, Not supported QCI value, Not supported 5QI value, Encryption algorithms not supported, Integrity protection algorithms not supported, UP integrity protection not possible, UP confidentiality protection not possible, Multiple PDU Session ID Instances, Unknown PDU Session ID, Multiple QoS Flow ID Instances, Unknown QoS Flow ID, Multiple DRB ID Instances, Unknown DRB ID, Invalid QoS combination, Procedure cancelled, Normal release, No radio resources available, Action desirable for radio reasons, Resources not available for the slice, PDCP configuration not supported, UE DL maximum integrity protected data rate reason, UP integrity protection failure, Release due to Pre-emption, RSN not available for the UP, NPN not supported, Report Characteristics Empty, Existing Measurement ID, Measurement Temporarily not Available Measurement not Supported For The Object)	
>Transport Layer				
>>Transport Layer Cause	M		ENUMERATED (Unspecified, Transport Resource Unavailable, ..., Unknown TNL address for IAB)	
>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, Not enough User Plane Processing Resources, Hardware Failure, O&M Intervention, Unspecified, ...)	

The meaning of the different cause values is described 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
Unspecified	Sent for radio network layer cause when none of the specified cause values applies.
Unknown or already allocated gNB-CU-CP UE E1AP ID	The action failed because the gNB-CU-CP UE E1AP ID is either unknown, or (for a first message received at the gNB-CU) is known and already allocated to an existing context.
Unknown or already allocated gNB-CU-UP UE E1AP ID	The action failed because the gNB-CU-UP UE E1AP ID is either unknown, or (for a first message received at the gNB-CU-UP) is known and already allocated to an existing context.
Unknown or inconsistent pair of UE E1AP ID	The action failed because both UE E1AP IDs are unknown, or are known but do not define a single UE context.
Interaction with other procedure	The action is due to an ongoing interaction with another procedure.
PDCP COUNT wrap around	PDCP COUNT approaches the maximum value.
Not supported QCI value	The action failed because the requested QCI is not supported.
Not supported 5QI value	The action failed because the requested 5QI is not supported.
Encryption algorithms not supported	The gNB-CU-UP is unable to support the selected encryption algorithm for the UE.
Integrity protection algorithms not supported	The gNB-CU-UP is unable to support the selected integrity protection algorithm for the UE.
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.
Multiple PDU Session ID Instances	The action failed because multiple instances of the same PDU Session had been provided.
Unknown PDU Session ID	The action failed because the PDU Session ID is unknown.
Multiple QoS Flow ID Instances	The action failed because multiple instances of the same QoS flow had been provided.
Unknown QoS Flow ID	The action failed because the QoS Flow ID is unknown.
Multiple DRB ID Instances	The action failed because multiple instances of the same DRB had been provided.
Unknown DRB ID	The action failed because the DRB ID is unknown.
Invalid QoS combination	The action was failed because of invalid QoS combination.
Procedure cancelled	The sending node cancelled the procedure due to other urgent actions to be performed.
Normal release	The action is due to a normal release of the UE (e.g. because of mobility) and does not indicate an error.
No radio resources available	The requested node doesn't have sufficient radio resources available.
Action desirable for radio reasons	The reason for requesting the action is radio related.
Resources not available for the slice	The requested resources are not available for the slice.
PDCP configuration not supported,	The gNB-CU-UP is unable to support the selected PDCP configuration for the UE.
UE DL maximum integrity protected data rate reason	The request is not accepted in order to comply with the maximum downlink data rate for integrity protection supported by the UE.
UP integrity protection failure	The gNB-CU-UP detects an integrity protection failure in the UL PDU.
Release due to Pre-Emption	Release is initiated due to pre-emption.
RSN not available for the UP	The redundant user plane resources indicated by RSN are not available.
NPN not supported	The action failed because the indicated SNPN is not supported in the node.
Report Characteristics Empty	The action failed because there is no measurement object in the report characteristics.
Existing Measurement ID	The action failed because the measurement ID is already used.
Measurement Temporarily not Available	The gNB-CU-UP can temporarily not provide the requested measurement object.
Measurement not Supported For The Object	At least one of the concerned object(s) does not support the requested measurement.

Transport Layer cause	Meaning
Unspecified	Sent when none of the above cause values applies but still the cause is Transport Network Layer related.
Transport Resource Unavailable	The required transport resources are not available.
Unknown TNL address for IAB	The action failed because the TNL address is unknown. This cause value is applicable for IAB only.

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	Control processing overload.
Not Enough User Plane Processing Resources Available	No enough resources are available related to user plane processing.
Hardware Failure	Action related to hardware failure.
O&M Intervention	The action is due to O&M intervention.
Unspecified Failure	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, NAS or Protocol.

9.3.1.3 Criticality Diagnostics

The *Criticality Diagnostics* IE is sent by the gNB-CU-UP or the gNB-CU-CP 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. The conditions for inclusion of the *Transaction ID* IE are described in clause 10.

For further details on how to use the *Criticality Diagnostics* IE, (see clause 10).

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).
Transaction ID	O		9.3.1.53	
Information Element Criticality Diagnostics		<i>0 .. <maxnoof Errors></i>		
>IE Criticality	M		ENUMERATED(reject, ignore, notify)	The IE Criticality is used for reporting the criticality of the triggering IE. The value 'ignore' is not applicable.
>IE ID	M		INTEGER (0..65535)	The IE ID of the not understood or missing IE.
>Type of Error	M		ENUMERATED(not understood, missing, ...)	

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

9.3.1.4 gNB-CU-CP UE E1AP ID

The gNB-CU-CP UE E1AP ID uniquely identifies the UE association over the E1 interface within the gNB-CU-CP.

IE/Group Name	Presence	Range	IE type and reference	Semantics description
gNB-CU-CP UE E1AP ID	M		INTEGER (0 .. 2 ³² -1)	

9.3.1.5 gNB-CU-UP UE E1AP ID

The gNB-CU-UP UE E1AP ID uniquely identifies the UE association over the E1 interface within the gNB-CU-UP.

IE/Group Name	Presence	Range	IE type and reference	Semantics description
gNB-CU-UP UE E1AP ID	M		INTEGER (0 .. 2 ³² -1)	

9.3.1.6 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)	

9.3.1.7 PLMN Identity

This information element indicates the PLMN Identity.

IE/Group Name	Presence	Range	IE type and reference	Semantics description
PLMN Identity	M		OCTET STRING (SIZE(3))	<ul style="list-style-type: none"> - 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 <p>-The PLMN identity consists of 3 digits from MCC followed by either</p> <ul style="list-style-type: none"> -a filler digit plus 2 digits from MNC (in case of 2 digit MNC) or -3 digits from MNC (in case of a 3 digit MNC).

9.3.1.8 Slice Support List

This IE indicates the list of supported slices.

IE/Group Name	Presence	Range	IE type and reference	Semantics description	Criticality	Assigned Criticality
Slice Support Item IEs		1..<maxno ofSliceltems>			-	-
>S-NSSAI	M		9.3.1.9		-	

Range bound	Explanation
maxnoofSliceltems	Maximum no. of signalled slice support items. Value is 1024.

9.3.1.9 S-NSSAI

This IE indicates the S-NSSAI as defined in TS 23.003 [23].

IE/Group Name	Presence	Range	IE type and reference	Semantics description
SST	M		OCTET STRING (SIZE(1))	
SD	O		OCTET STRING (SIZE(3))	

9.3.1.10 Security Information

This IE provides the information for configuring UP ciphering and/or integrity protection.

IE/Group Name	Presence	Range	IE type and reference	Semantics description
Security Algorithm	M		9.3.1.31	
User Plane Security Keys	M		9.3.1.32	

9.3.1.11 Cell Group Information

This IE provides information about the cell group(s) (i.e., radio leg(s)) that are part of the DRB.

IE/Group Name	Presence	Range	IE type and reference	Semantics description	Criticality	Assigned Criticality
Cell Group List		1			-	-
>Cell Group Item		1..<maxnoofCellGroups>			-	-
>>Cell Group ID	M		INTEGER (0..3, ...)	Cell group ID as defined in TS 38.331 [10] (0=MCG, 1=SCG). In this version of the specification, values "2" and "3" are not used. For E-UTRA Cell Groups, the same encoding is used as for NR Cell Groups. NOTE: There is no corresponding IE defined in TS 36.331 [21].	-	-
>>UL Configuration	O		9.3.1.33	Indicates whether the Cell Group is used for UL traffic.	-	-
>>DL TX Stop	O		ENUMERATED (stop, resume, ...)		-	-
>>RAT Type	O		ENUMERATED (E-UTRA, NR, ...)	Indicates the RAT.	-	-
>>Number of tunnels	O		INTEGER (1..4, ...)	Indicates the tunnel number of PDCP duplication for this cell group.	YES	ignore

Range bound	Explanation
maxnoofCellGroups	Maximum no. of cell groups for a DRB. Value is 4.

9.3.1.12 QoS Flow List

This IE includes a list of QoS Flows that are identified by the QoS Flow Identifier.

IE/Group Name	Presence	Range	IE type and reference	Semantics description	Criticality	Assigned Criticality
QoS Flow List		1			-	-
>QoS Flow Item		1..<maxno ofQoSflows>			-	-
>>QoS Flow Identifier	M		9.3.1.24		-	-
>>QoS Flow Mapping Indication	O		9.3.1.60	Indicates that only the uplink or downlink QoS flow is mapped to the DRB	YES	ignore
>>Data Forwarding Source IP Address	O		Transport Layer Address 9.3.2.4	Identifies the TNL address used by the source node for data forwarding.	YES	ignore

Range bound	Explanation
maxnoofQoSflows	Maximum no. of QoS flows in a PDU Session. Value is 64.

9.3.1.13 UP Parameters

This IE provides information related to a DRB configured in the gNB-CU-UP.

IE/Group Name	Presence	Range	IE type and reference	Semantics description	Criticality	Assigned Criticality
UP Parameters List		1			-	-
>UP Parameters Item		1..<maxnoofUPParameters>			-	-
>>UP Transport Layer Information	M		9.3.2.1		-	-
>>Cell Group ID	M		INTEGER (0..3, ...)	Cell group ID as defined in TS 38.331 [10] (0=MCG, 1=SCG). In this version of the specification, values "2" and "3" are not used.	-	-
>>QoS Mapping Information	O		9.3.1.81	This IE is only used for IAB.	YES	reject

Range bound	Explanation
maxnoofUPParameters	Maximum no. of UP parameters (e.g., GTP tunnels) for a DRB. Value is 8

9.3.1.14 NR CGI

The NR Cell Global Identifier (NR CGI) is used to globally identify a cell.

IE/Group Name	Presence	Range	IE type and reference	Semantics description
PLMN Identity	M		9.3.1.7	
NR Cell Identity	M		BIT STRING (SIZE(36))	

9.3.1.15 gNB-CU-UP ID

The gNB-CU-UP ID uniquely identifies the gNB-CU-UP at least within a gNB-CU-CP.

IE/Group Name	Presence	Range	IE type and reference	Semantics description
gNB-CU-UP ID	M		INTEGER (0 .. 2 ³⁶ -1)	

9.3.1.16 DRB ID

This IE uniquely identifies a DRB for a UE.

IE/Group Name	Presence	Range	IE type and reference	Semantics description
DRB ID	M		INTEGER (1.. 32, ...)	Corresponds to the <i>DRB-Identity</i> defined in TS 38.331 [10].

9.3.1.17 E-UTRAN QoS

This IE defines the QoS to be applied to a DRB for EN-DC case.

IE/Group Name	Presence	Range	IE type and reference	Semantics description	Criticality	Assigned Criticality
QCI	M		INTEGER (0..255)	QoS Class Identifier defined in TS 23.401 [11]. Logical range and coding specified in TS 23.203 [12].	–	–
E-UTRAN Allocation and Retention Priority	M		9.3.1.18	E-UTRAN Allocation and Retention Priority	–	–
GBR QoS Information	O		9.3.1.19	This IE applies to GBR bearers only and is ignored otherwise.	–	–

9.3.1.18 E-UTRAN Allocation and Retention Priority

This IE specifies the relative importance compared to other E-RABs for allocation and retention of the E-UTRAN Radio Access Bearer.

IE/Group Name	Presence	Range	IE type and reference	Semantics description
Priority Level	M		INTEGER (0..15)	<p>Desc.: This IE should be understood as "priority of allocation and retention" (see TS 23.401 [11]).</p> <p>Usage: Value 15 means "no priority". Values between 1 and 14 are ordered in decreasing order of priority, i.e. 1 is the highest and 14 the lowest. Value 0 shall be treated as a logical error if received.</p>
Pre-emption Capability	M		ENUMERATED(sh all not trigger pre-emption, may trigger pre-emption)	<p>Desc.: This IE indicates the pre-emption capability of the request on other E-RABs</p> <p>Usage: The E-RAB shall not pre-empt other E-RABs or, the E-RAB may pre-empt other E-RABs The Pre-emption Capability indicator applies to the allocation of resources for an E-RAB and as such it provides the trigger to the pre-emption procedures/processes of the eNB.</p>
Pre-emption Vulnerability	M		ENUMERATED(not pre-emptable, pre-emptable)	<p>Desc.: This IE indicates the vulnerability of the E-RAB to pre-emption of other E-RABs.</p> <p>Usage: The E-RAB shall not be pre-empted by other E-RABs or the E-RAB may be pre-empted by other RABs. Pre-emption Vulnerability indicator applies for the entire duration of the E-RAB, unless modified, and as such indicates whether the E-RAB is a target of the pre-emption procedures/processes of the eNB.</p>

9.3.1.19 GBR QoS Information

This IE indicates the maximum and guaranteed bit rates of a GBR E-RAB for downlink and uplink.

IE/Group Name	Presence	Range	IE type and reference	Semantics description	Criticality	Assigned Criticality
E-RAB Maximum Bit Rate Downlink	M		Bit Rate 9.3.1.20	Maximum Bit Rate in DL (i.e. from EPC to E-UTRAN) for the bearer. Details in TS 23.401 [11].	–	–
E-RAB Maximum Bit Rate Uplink	M		Bit Rate 9.3.1.20	Maximum Bit Rate in UL (i.e. from E-UTRAN to EPC) for the bearer. Details in TS 23.401 [11].	–	–
E-RAB Guaranteed Bit Rate Downlink	M		Bit Rate 9.3.1.20	Guaranteed Bit Rate (provided that there is data to deliver) in DL (i.e. from EPC to E-UTRAN) for the bearer. Details in TS 23.401 [11].	–	–
E-RAB Guaranteed Bit Rate Uplink	M		Bit Rate 9.3.1.20	Guaranteed Bit Rate (provided that there is data to deliver) in UL (i.e. from E-UTRAN to EPC) for the bearer. Details in TS 23.401 [11].	–	–

9.3.1.20 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 aggregated 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

9.3.1.21 PDU Session ID

This IE identifies a PDU Session for a UE. The definition and use of the PDU Session ID is specified in TS 23.501 [20].

IE/Group Name	Presence	Range	IE type and reference	Semantics description
PDU Session ID	M		INTEGER (0 ..255)	

9.3.1.22 PDU Session Type

This IE indicates the PDU Session Type as specified in TS 23.501 [20].

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

9.3.1.23 Security Indication

This IE contains the user plane integrity protection indication and confidentiality protection indication which indicates the requirements on UP integrity protection and ciphering for corresponding PDU Session Resources, 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 Resource.
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 Resource.
Maximum Integrity Protected Data Rate	C- ifIntegrityPr otectionreq uiredorpref erred		9.3.1.57	If present, this is the value received from the CN for the overall UE capability. This IE is ignored when enforcing the maximum IP data rate.

Condition	Explanation
ifIntegrityProtectionrequiredorpreferred	This IE shall be present if the <i>Integrity Protection Indication</i> IE within the <i>Security Indication</i> IE is set to "required" or "preferred".

9.3.1.24 QoS Flow Identifier

This IE identifies a QoS Flow within a PDU Session. Definition and use of the QoS Flow Identifier is specified in TS 23.501 [20].

IE/Group Name	Presence	Range	IE type and reference	Semantics description
QoS Flow Identifier	M		INTEGER (0 ..63)	

9.3.1.25 QoS Flow QoS Parameters List

This IE contains a list of QoS Flows including the QoS Flow parameters.

IE/Group Name	Presence	Range	IE type and reference	Semantics description	Criticality	Assigned Criticality
QoS Flow List		1			-	-
>QoS Flow Item		1..<maxno ofQoSFlows>			-	-
>>QoS Flow Identifier	M		9.3.1.24		-	-
>>QoS Flow Level QoS Parameters	M		9.3.1.26		-	-
>>QoS Flow Mapping Indication	O		9.3.1.60	Indicates that only the uplink or downlink QoS flow is mapped to the DRB	-	-
>>Redundant QoS Flow Indicator	O		9.3.1.74	This IE indicates that this QoS flow is requested for the redundant transmission.	YES	ignore
>>TSC Traffic Characteristics	O		9.3.1.75	Traffic pattern information associated with the QFI. Details in TS 23.501 [20].	YES	ignore

Range bound	Explanation
maxnoofQoSFlows	Maximum no. of QoS flows in a PDU Session. Value is 64.

9.3.1.26 QoS Flow Level QoS Parameters

This IE defines the QoS parameters to be applied to a QoS Flow.

IE/Group Name	Presence	Range	IE type and reference	Semantics description	Criticality	Assigned Criticality
CHOICE QoS Characteristics	M				-	
>Non-dynamic 5QI						
>>Non Dynamic 5QI Descriptor	M		9.3.1.27		-	
>Dynamic 5QI						
>>Dynamic 5QI Descriptor	M		9.3.1.28		-	
NG-RAN Allocation and Retention Priority	M		9.3.1.29		-	
GBR QoS Flow Information	O		9.3.1.30	This IE shall be present for GBR QoS Flows and is ignored otherwise.	-	
Reflective QoS Attribute	O		ENUMERATE D (subject to, ...)	Details in TS 23.501 [20]. This IE applies to Non-GBR flows only and is ignored otherwise.	-	
Additional QoS Flow Information	O		ENUMERATE D (more likely, ...)	This IE indicates that traffic for this QoS flow is likely to appear more often than traffic for other flows established for the PDU Session.	-	
Paging Priority Indicator (PPI)	O		9.3.1.55		-	
RDI	O		ENUMERATE D (enabled, ...)	Indicates whether Reflective QoS flow to DRB mapping should be applied.	-	
QoS Monitoring Request	O		ENUMERATE D (UL, DL, Both, ...)	Indicates to measure UL, or DL, or both UL/DL delays for the associated QoS flow.	YES	ignore
MCG Offered GBR QoS Flow Information	O		GBR QoS Flow Information 9.3.1.30	This IE contains M-Node offered GBR QoS Flow Information.	YES	ignore
QoS Monitoring Reporting Frequency	O		INTEGER (1..1800, ...)	Indicates the Reporting Frequency for RAN part delay for QoS monitoring. Units: second	YES	ignore
QoS Monitoring Disabled	O		ENUMERATE D (true, ...)	Indicates to stop the QoS monitoring.	YES	ignore
Data Forwarding Source IP Address	O		Transport Layer Address 9.3.2.4	Identifies the TNL address used by the source node for data forwarding.	YES	ignore

9.3.1.27 Non Dynamic 5QI Descriptor

This IE indicates the QoS Characteristics for a standardized or pre-configured 5QI for downlink and uplink.

IE/Group Name	Presence	Range	IE type and reference	Semantics description	Criticality	Assigned Criticality
5QI	M		INTEGER (0..255, ...)	This IE contains the standardized or pre-configured 5QI as specified in TS 23.501 [20].	-	-
Priority Level	O		9.3.1.51	For details see TS 23.501 [20]. When included overrides standardized or pre-configured value.	-	-
Averaging Window	O		9.3.1.49	This IE applies to GBR QoS Flows only. For details see TS 23.501 [20]. When included overrides standardized or pre-configured value.	-	-
Maximum Data Burst Volume	O		9.3.1.50	For details see TS 23.501 [20]. When included overrides standardized or pre-configured value.	-	-
CN Packet Delay Budget Downlink	O		Extended Packet Delay Budget 9.3.1.79	Core Network Packet Delay Budget is specified in TS 23.501 [9]. This IE may be present in case of GBR QoS flows and is ignored otherwise.	YES	ignore
CN Packet Delay Budget Uplink	O		Extended Packet Delay Budget 9.3.1.79	Core Network Packet Delay Budget is specified in TS 23.501 [9]. This IE may be present in case of GBR QoS flows and is ignored otherwise.	YES	ignore

9.3.1.28 Dynamic 5QI Descriptor

This IE indicates the QoS Characteristics for a Non-standardised or not pre-configured 5QI for downlink and uplink.

IE/Group Name	Presence	Range	IE type and reference	Semantics description	Criticality	Assigned Criticality
Priority Level	M		9.3.1.51	For details see TS 23.501 [20].	-	-
Packet Delay Budget	M		9.3.1.47	For details see TS 23.501 [20]. This IE is ignored if the <i>Extended Packet Delay Budget</i> IE is present.	-	-
Packet Error Rate	M		9.3.1.48	For details see TS 23.501 [20].	-	-
5QI	O		INTEGER (0..255,...)	This IE contains the dynamically assigned 5QI as specified in TS 23.501 [20].	-	-
Delay Critical	C-ifGBRflow		ENUMERATE D (delay critical, non-delay critical)	For details see TS 23.501 [20].	-	-
Averaging Window	C-ifGBRflow		9.3.1.49	For details see TS 23.501 [20].	-	-
Maximum Data Burst Volume	O		9.3.1.50	For details see TS 23.501 [20]. This IE shall be included if the <i>Delay Critical</i> IE is set to "delay critical" and is ignored otherwise.	-	-
Extended Packet Delay Budget	O		Extended Packet Delay Budget 9.3.1.79	Packet Delay Budget is specified in TS 23.501 [9]	YES	ignore
CN Packet Delay Budget Downlink	O		Extended Packet Delay Budget 9.3.1.79	Core Network Packet Delay Budget is specified in TS 23.501 [9]. This IE may be present in case of GBR QoS flows and is ignored otherwise.	YES	ignore
CN Packet Delay Budget Uplink	O		Extended Packet Delay Budget 9.3.1.79	Core Network Packet Delay Budget is specified in TS 23.501 [9]. This IE may be present in case of GBR QoS flows and is ignored otherwise.	YES	ignore

Condition	Explanation
ifGBRflow	This IE shall be present if the <i>GBR QoS Flow Information</i> IE is present in the <i>QoS Flow Level QoS Parameters</i> IE.

9.3.1.29 NG-RAN Allocation and Retention Priority

This IE specifies the relative importance of a QoS flow compared to other QoS flows for allocation and retention of NG-RAN resources.

IE/Group Name	Presence	Range	IE type and reference	Semantics description
Priority Level	M		INTEGER (1..15)	Desc.: This IE defines the relative importance of a resource request (see TS 23.501 [20]). Usage: Values are ordered in decreasing order of priority, i.e., with 1 as the highest priority and 15 as the lowest priority. Further usage is defined in TS 23.501 [20].
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 flows or, the QoS flow may pre-empt other QoS flows. Specified in TS 23.501 [20] NOTE: The Pre-emption Capability indicator applies to the allocation of resources for a QoS flow and as such it provides the trigger to the pre-emption procedures/processes of the NG-RAN node.
Pre-emption Vulnerability	M		ENUMERATED (not pre-emptable, pre-emptable)	Desc.: This IE indicates the vulnerability of the QoS flow to pre-emption 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. Specified in TS 23.501 [20] NOTE: The 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 NG-RAN node.

9.3.1.30 GBR QoS Flow Information

This IE indicates QoS parameters for a GBR QoS flow for downlink and uplink.

IE/Group Name	Presence	Range	IE type and reference	Semantics description	Criticality	Assigned Criticality
Maximum Flow Bit Rate Downlink	M		Bit Rate 9.3.1.20	Maximum Bit Rate in DL. Details in TS 23.501 [20].	-	
Maximum Flow Bit Rate Uplink	M		Bit Rate 9.3.1.20	Maximum Bit Rate in UL. Details in TS 23.501 [20].	-	
Guaranteed Flow Bit Rate Downlink	M		Bit Rate 9.3.1.20	Guaranteed Bit Rate (provided there is data to deliver) in DL. Details in TS 23.501 [20].	-	
Guaranteed Flow Bit Rate Uplink	M		Bit Rate 9.3.1.20	Guaranteed Bit Rate (provided there is data to deliver). Details in TS 23.501 [20].	-	
Maximum Packet Loss Rate Downlink	O		Packet Loss Rate 9.3.1.46	Indicates the maximum rate for lost packets that can be tolerated in the downlink direction. Details in TS 23.501 [20].	-	
Maximum Packet Loss Rate Uplink	O		Packet Loss Rate 9.3.1.46	Indicates the maximum rate for lost packets that can be tolerated in the uplink direction. Details in TS 23.501 [20].	-	
Alternative QoS Parameters Set List	O		9.3.1.93	Indicates alternative sets of QoS Parameters for the QoS flow.	YES	

9.3.1.31 Security Algorithm

This IE defines the type of ciphering algorithm and/or integrity protection used for the DRBs.

IE/Group Name	Presence	Range	IE type and reference	Semantics description
Ciphering Algorithm	M		ENUMERATED (NEA0, 128-NEA1, 128-NEA2, 128-NEA3)	As defined in TS 33.501 [13].
Integrity Protection Algorithm	O		ENUMERATED (NIA0, 128-NIA1, 128-NIA2, 128-NIA3)	As defined in TS 33.501 [13] for NG-RAN.

9.3.1.32 User Plane Security Keys

This IE contains the ciphering and/or integrity protection keys generated by the gNB-CU-CP.

IE/Group Name	Presence	Range	IE type and reference	Semantics description
Encryption Key	M		OCTET STRING	As defined in TS 33.501 [13].
Integrity Protection Key	O		OCTET STRING	As defined in TS 33.501 [13] for NG-RAN.

9.3.1.33 UL Configuration

This IE includes the UL configuration for the DRB and the corresponding Cell Groups.

IE/Group Name	Presence	Range	IE type and reference	Semantics description
UL Configuration	M		ENUMERATED (no-data, shared, only, ..)	Indicates the UL configuration for a Cell Group that is part of a DRB. "no data" means that the Cell Group is not used for UL data. "shared" means that the Cell Group is used for UL data together with at least another Cell Group. "only" means that only this Cell Group is used for UL data.

9.3.1.34 gNB-CU-UP Cell Group Related Configuration

This IE provides information related to a cell group that the gNB-CU-UP is allowed to change.

IE/Group Name	Presence	Range	IE type and reference	Semantics description	Criticality	Assigned Criticality
UP Parameters List		1			-	-
>UP Parameters Item		1..<maxno ofUPParameters>			-	-
>>Cell Group ID	M		INTEGER (0..3, ...)	Cell group ID as defined in TS 38.331 [10] (0=MCG, 1=SCG). Used to identify the Cell Group to modify. In this version of the specification, values "2" and "3" are not used.	-	-
>>UP Transport Layer Information	M		9.3.2.1		-	-
>>UL Configuration	O		9.3.1.33	Indicates whether the Cell Group is used for UL traffic.	-	-

Range bound	Explanation
maxnoofUPParameters	Maximum no. of UP parameters (e.g., GTP tunnels) for a DRB. Value is 8.

9.3.1.35 PDCP Count

This IE include the PDCP Count information.

IE/Group Name	Presence	Range	IE type and reference	Semantics description
>PDCP SN	M		INTEGER (0 .. $2^{\text{PDCP_SN_Size}-1}$)	The PDCP SN Size is provided in the <i>PDCP Configuration</i> IE.
>HFN	M		INTEGER (0 .. $2^{32-\text{PDCP_SN_Size}-1}$)	The PDCP SN Size is provided in the <i>PDCP Configuration</i> IE.

9.3.1.36 NR CGI Support List

This IE indicates the list of supported NR CGIs.

IE/Group Name	Presence	Range	IE type and reference	Semantics description
NR CGI Support Item IEs		1..<maxnoofNR CGI>		
>NR CGI	M		9.3.1.14	

Range bound	Explanation
maxnoofNR CGI	Maximum no. of supported NR CGIs. Value is 512. This range may be redefined.

9.3.1.37 QoS Parameters Support List

This IE indicates the list of supported QoS parameters.

IE/Group Name	Presence	Range	IE type and reference	Semantics description
E-UTRAN QoS Support List	O			
>E-UTRAN QoS Support Item		1..<maxnoofEUTRAN QoSParameters>		
>>E-UTRAN QoS	M		9.3.1.17	
NG-RAN QoS Support List	O			
>NG-RAN QoS Support Item		1..<maxnoofNGRAN QoSParameters>		
>>Non Dynamic 5QI Descriptor	M		9.3.1.27	

Range bound	Explanation
maxnoofEUTRANQoSParameters	Maximum no. of supported E-UTRAN QoS parameters. Value is 256. This range may be redefined.
maxnoofNGRANQoSParameters	Maximum no. of supported NG-RAN QoS parameters. Value is 256. This range may be redefined.

9.3.1.38 PDCP Configuration

This IE carries the PDCP configuration.

IE/Group Name	Presence	Range	IE type and reference	Semantics description	Criticality	Assigned Criticality
PDCP SN UL Size	M		PDCP SN Size 9.3.1.61	Indicates the PDCP SN UL size in bits. For more information see <i>PDCP-Config IE</i> in TS 38.331 [10]. Is ignored if received through <i>DRB To Modify List IE</i> in the BEARER CONTEXT MODIFICATION REQUEST message.	-	-
PDCP SN DL Size	M		PDCP SN Size 9.3.1.61	Indicates the PDCP SN DL size in bits. For more information see <i>PDCP-Config IE</i> in TS 38.331 [10]. Is ignored if received through <i>DRB To Modify List IE</i> in the BEARER CONTEXT MODIFICATION REQUEST message.	-	-
RLC mode	M		ENUMERATED (RLC-TM, RLC-AM, RLC-UM-Bidirectional, RLC-UM-Unidirectional-UL, RLC-UM-Unidirectional-DL, ...)	Indicates the RLC mode for the DRB. For more information see <i>PDCP-Config IE</i> in TS 38.331 [10]. Is ignored if received through <i>DRB To Modify List IE</i> in the BEARER CONTEXT MODIFICATION REQUEST message.	-	-
ROHC Parameters	O		9.3.1.40		-	-
T-Reordering Timer	O		9.3.1.41		-	-
Discard Timer	O		9.3.1.42		-	-
UL Data Split Threshold	O		9.3.1.43		-	-
PDCP Duplication	O		ENUMERATED (True, ...)	Indicates whether PDCP duplication is to be configured for the DRB. This IE is ignored when the " <i>Additional PDCP duplication Information</i> " IE is present.	-	-
PDCP Re-establishment	O		ENUMERATED (true,...)	Indicates PDCP entity re-establishment to be triggered as defined in TS 38.323 [17]	-	-
PDCP Data Recovery	O		ENUMERATED (true,...)	Indicates PDCP data recovery to be triggered as defined in TS 38.323 [17]	-	-
Duplication Activation	O		ENUMERATED (Active, Inactive, ...)	Information on the initial state of DL PDCP duplication	-	-
Out Of Order Delivery	O		ENUMERATED (true,...)	Indicates whether or not <i>outOfOrderDelivery</i> specified in TS 38.323 [17] is configured. Out of order delivery is configured only when the radio bearer is established.	-	-

PDCP Status Report Indication	O		ENUMERATED (downlink, uplink, both, ...)	For AM DRB, "downlink" indicates that the PDCP entity is configured to send PDCP status report(s) to the UE, and "uplink" indicates that the UE is configured to send PDCP status report(s), as specified in TS 38.323 [17]. "both" indicates that both "downlink" and "uplink" should be applied.	YES	ignore
Additional PDCP duplication Information	O		ENUMERATED (three, four, ...)	Indicates the number of PDCP duplication configured when it is more than 2 for the DRB	YES	ignore
EHC Parameters	O		9.3.1.90		YES	ignore

9.3.1.39 SDAP Configuration

This IE carries the SDAP configuration.

IE/Group Name	Presence	Range	IE type and reference	Semantics description
Default DRB	M		ENUMERATED (True, False, ...)	Indicates whether or not this is the default DRB for the PDU Session Resource. For more information see <i>SDAP-Config IE</i> in TS 38.331 [10].
SDAP Header UL	M		ENUMERATED (Present, Absent, ...)	Indicates whether or not a SDAP header is present for UL data on this DRB. For more information see <i>SDAP-Config IE</i> in TS 38.331 [10].
SDAP Header DL	M		ENUMERATED (Present, Absent, ...)	Indicates whether or not a SDAP header is present for DL data on this DRB. For more information see <i>SDAP-Config IE</i> in TS 38.331 [10].

9.3.1.40 ROHC Parameters

This IE carries the ROHC parameters for header compressions.

IE/Group Name	Presence	Range	IE type and reference	Semantics description
Choice ROHC Parameters	M			For more information see <i>PDCCP-Config IE</i> in TS 38.331 [10].
>ROHC				
>>max CID	M		INTEGER (0..16383)	See description of maxCID in TS 38.331 [10]
>>ROHC Profiles	M		INTEGER (0..511)	Bitmap with supported UE profiles, bit 0 (LSB 0) = profile0x0001, bit 1 = profile0x0002, bit 2 = profile0x0003, bit 3 = profile0x0004, bit 4 = profile0x0006, bit 5 = profile0x0101, bit 6 = profile0x0102, bit 7 = profile0x0103, bit 8 = profile0x0104. See description of supportedROHC-Profiles in PDCCP-Parameters in TS 38.331 [10].
>>Continue ROHC	O		ENUMERATED (true, ...)	See description of drb-ContinueROHC in TS 38.331 [10]
>uplinkOnlyROHC				
>>max CID	M		INTEGER (0..16383)	See description of maxCID in TS 38.331 [10]
>>ROHC Profiles	M		INTEGER (0..511)	Bitmap with supported UE profiles, bit 4 = profile0x0006. See description of supportedROHC-Profiles in PDCCP-Parameters in TS 38.331 [10].
>>Continue ROHC	O		ENUMERATED (true, ...)	See description of drb-ContinueROHC in TS 38.331 [10]

9.3.1.41 T-Reordering Timer

This IE indicates the t-Reordering timer.

IE/Group Name	Presence	Range	IE type and reference	Semantics description
T-Reordering Timer	M		ENUMERATED (0, 1, 2, 4, 5, 8, 10, 15, 20, 30, 40, 50, 60, 80, 100, 120, 140, 160, 180, 200, 220, 240, 260, 280, 300, 500, 750, 1000, 1250, 1500, 1750, 2000, 2250, 2500, 2750, 3000, ...)	Indicates the t-Reordering UL timer. The values are expressed in <i>ms</i> . For more information see <i>PDCCP-Config IE</i> in TS 38.331 [10].

9.3.1.42 Discard Timer

This IE indicates PDCCP discard timer.

IE/Group Name	Presence	Range	IE type and reference	Semantics description
Discard Timer			ENUMERATED (10, 20, 30, 40, 50, 60, 75, 100, 150, 200, 250, 300, 500, 750, 1500, Infinity)	Indicates the PDCCP discard timer. The values are expressed in <i>ms</i> . For more information see <i>PDCCP-Config IE</i> in TS 38.331 [10].

9.3.1.43 UL Data Split Threshold

This IE indicates UL data split threshold.

IE/Group Name	Presence	Range	IE type and reference	Semantics description
UL Data Split Threshold			ENUMERATED (0, 100, 200, 400, 800, 1600, 3200, 6400, 12800, 25600, 51200, 102400, 204800, 409600, 819200, 1228800, 1638400, 2457600, 3276800, 4096000, 4915200, 5734400, 6553600, Infinity, ...)	Indicates the UL data split threshold. The values are expressed in bytes. For more information see <i>PDCCP-Config IE</i> in TS 38.331 [10].

9.3.1.44 Data Usage Report List

This IE provides information on the data usage for the UE, e.g., secondary NR RAT in EN-DC as specified in TS 37.340 [19].

IE/Group Name	Presence	Range	IE type and reference	Semantics description	Criticality	Assigned Criticality
Data usage report Item		1 .. <maxnoofDRBs>			-	-
>DRB ID	M		9.3.1.16		-	-
> RAT Type	M		ENUMERATED (NR, ...)		-	-
>DRB Usage Report List		1			-	-
>>DRB Usage Report Item		1.. <maxnooftimeperiods>			-	-
>>>Start timestamp	M		OCTET STRING (SIZE(4))	Encoded in the same format as the first four octets of the 64-bit timestamp format as defined in section 6 of IETF RFC 5905 [14]. It indicates the UTC time when the recording of the Data Volume was started.	-	-
>>>End timestamp	M		OCTET STRING (SIZE(4))	Encoded in the same format as the first four octets of the 64-bit timestamp format as defined in section 6 of IETF RFC 5905 [14]. It indicates the UTC time when the recording of the Data Volume was ended.	-	-
>>>Usage count UL	M		INTEGER (0..2 ⁶⁴ -1)	The unit is: octets.	-	-
>>>Usage count DL	M		INTEGER (0..2 ⁶⁴ -1)	The unit is: octets.	-	-

Range bound	Explanation
maxnoofDRBs	Maximum no. of DRBs. Value is 32.
Maxnooftimeperiods	Maximum no. of time reporting periods. Value is 2.

9.3.1.45 Flow Failed List

This IE contains a list of QoS flows with a cause value. It is used for example to indicate failed QoS flow(s) or QoS flow(s) to be released.

IE/Group Name	Presence	Range	IE type and reference	Semantics description	Criticality	Assigned Criticality
QoS Flow Item IEs		1..<maxnoofQoSFlows>			-	-
>QoS Flow Identifier	M		9.3.1.24		-	-
>Cause	M		9.3.1.2		-	-

Range bound	Explanation
maxnoofQoSFlows	Maximum no. of QoS flows in a PDU Session. Value is 64.

9.3.1.46 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.

9.3.1.47 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 unit of 0.5ms.

9.3.1.48 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 x 10-k where k is the Exponent.
Exponent	M		INTEGER (0..9, ...)	

9.3.1.49 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. The default value is 2000ms.

9.3.1.50 Maximum Data Burst Volume

This IE indicates the Maximum Data Burst Volume for a QoS Flow and applies to delay critical GBR QoS flows only.

IE/Group Name	Presence	Range	IE type and reference	Semantics description
Maximum Data Burst Volume	M		INTEGER (0..4095, ..., 4096.. 2000000)	Unit: byte.

9.3.1.51 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.

9.3.1.52 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 Resource.
Confidentiality Protection Result	M		ENUMERATED (performed, not performed, ...)	Indicates whether UP ciphering is performed or not for the concerned PDU Session Resource.

9.3.1.53 Transaction ID

The *Transaction ID* IE uniquely identifies a procedure among all ongoing parallel procedures of the same type initiated by the same protocol peer. Messages belonging to the same procedure shall use the same Transaction ID. The Transaction ID is determined by the initiating peer of a procedure.

IE/Group Name	Presence	Range	IE type and reference	Semantics description
Transaction ID	M		INTEGER (0..255, ...)	

9.3.1.54 Inactivity timer

This IE indicates the inactivity timer.

IE/Group Name	Presence	Range	IE type and reference	Semantics description
Inactivity Timer	M		INTEGER (1.. 7200, ...)	Indicates the inactivity timer. The values are expressed in <i>seconds</i> .

9.3.1.55 Paging Priority Indicator (PPI)

The Paging Policy Indicator is used for paging policy differentiation (see details in TS 23.501 [20]).

IE/Group Name	Presence	Range	IE type and reference	Semantics description
PPI	M		INTEGER (0.. 7, ...)	

9.3.1.56 gNB-CU-UP Capacity

This IE indicates the relative processing capacity of an gNB-CU-UP with respect to other gNB-CU-UPs in order to load-balance among different gNB-CU-UPs.

IE/Group Name	Presence	Range	IE type and reference	Semantics description	Criticality	Assigned Criticality
gNB-CU-UP Capacity	M		INTEGER(0..255)		-	-

9.3.1.57 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 [8].

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.

9.3.1.58 PDCP SN Status Information

This IE contains information about PDCP PDU transfer status of a DRB.

IE/Group Name	Presence	Range	IE type and reference	Semantics description	Criticality	Assigned Criticality
PDCP Status Transfer UL		1			–	
>Receive Status Of PDCP SDU	O		BIT STRING (SIZE(1..131072))	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		PDCP Count 9.3.1.35	PDCP-SN and Hyper Frame Number of the first missing UL SDU	–	
PDCP Status Transfer DL		1			–	
>DL COUNT Value	M		PDCP Count 9.3.1.35	PDCP-SN and Hyper Frame Number that the target NG-RAN node (handover) or the NG-RAN node to which the DRB context is transferred (dual connectivity) should assign for the next DL SDU not having an SN yet.	–	

9.3.1.59 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
QoS Flow Mapping Item		1..<maxno of QoS Flows>			–	
>QoS Flow Identifier	M		9.3.1.24		–	
>QoS Flow Mapping Indication	O		9.3.1.60		–	

Range bound	Explanation
maxnoofQoSFlows	Maximum no. of QoS flows allowed within one PDU Session. Value is 64.

9.3.1.60 QoS Flow Mapping Indication

This IE is used to indicate whether only the uplink or only the downlink of a QoS flow is mapped to a DRB.

IE/Group Name	Presence	Range	IE type and reference	Semantics description
QoS Flow Mapping Indication	M		ENUMERATED (ul, dl, ...)	Indicates that only the uplink or downlink QoS flow is mapped to the DRB

9.3.1.61 PDCP SN Size

This IE carries the PDCP SN Size.

IE/Group Name	Presence	Range	IE type and reference	Semantics description
PDCP SN Size	M		ENUMERATED (s-12, s-18, ...)	Indicates the PDCP SN size in bits. For more information see <i>PDCP-Config IE</i> in TS 38.331 [10].

9.3.1.62 Network Instance

This IE provides the network instance to be used by the NG-RAN node when selecting a particular transport network resource as described in TS 23.501 [20].

IE/Group Name	Presence	Range	IE type and reference	Semantics description
Network Instance	M		INTEGER (1..256, ...)	

9.3.1.63 MR-DC Usage Information

This IE provides information on the data usage for the UE connected to 5GC, e.g., secondary RAT in MR-DC as specified in TS 37.340 [19].

IE/Group Name	Presence	Range	IE type and reference	Semantics description	Criticality	Assigned Criticality
Data Usage per PDU Session Report	O				-	
>Secondary RAT Type	M		ENUMERATED (nR, e-UTRA...)			
>PDU session Timed Report List	M		MR-DC Data Usage Report List 9.3.1.64			
Data Usage per QoS Flow List	O					
>Data Usage per QoS Flow Item		1..<maxno ofQoSFlows>			-	
>>QoS Flow Indicator	M		9.3.1.24		-	
>>Secondary RAT Type	M		ENUMERATED (nR, e-UTRA...)		-	
>>QoS Flow Timed Report List	M		MR-DC Data Usage Report List 9.3.1.64		-	

Range bound	Explanation
maxnoofQoSFlows	Maximum no. of QoS flows allowed within one PDU session. Value is 64.

9.3.1.64 MR-DC Data Usage Report List

This IE provides information on the data usage.

IE/Group Name	Presence	Range	IE type and reference	Semantics description
MR-DC Data Usage Report Item		1..<maxnooftimeperiods>		
>Start timestamp	M		OCTET STRING (SIZE(4))	UTC time encoded in the same format as the first four octets of the 64-bit timestamp format as defined in section 6 of IETF RFC 5905 [14]. It indicates the start time of the collecting period of the included <i>Usage Count UL</i> IE and <i>Usage Count DL</i> IE.
>End timestamp	M		OCTET STRING (SIZE(4))	UTC time encoded in the same format as the first four octets of the 64-bit timestamp format as defined in section 6 of IETF RFC 5905 [14]. It indicates the end time of the collecting period of the included <i>Usage Count UL</i> IE and <i>Usage Count DL</i> IE.
>Usage count UL	M		INTEGER (0..2 ⁶⁴ -1)	The unit is: octets.
>Usage count DL	M		INTEGER (0..2 ⁶⁴ -1)	The unit is: octets.

Range bound	Explanation
maxnooftimeperiods	Maximum no. of time reporting periods. Value is 2.

9.3.1.65 gNB-DU ID

The gNB-DU ID uniquely identifies a gNB-DU at least within a gNB-CU.

IE/Group Name	Presence	Range	IE type and reference	Semantics description
gNB-DU ID	M		INTEGER (0 .. 2 ³⁶ -1)	The gNB-DU ID is independently configured from cell identifiers, i.e. no connection between gNB-DU ID and cell identifiers.

9.3.1.66 Common Network Instance

This IE provides the common network instance to be used by the NG-RAN node when selecting a particular transport network resource as described in TS 23.501 [9] in a format common with 5GC.

IE/Group Name	Presence	Range	IE type and reference	Semantics description
Common Network Instance	M		OCTET STRING	The octets of OCTET STRING are encoded as the Network Instance field of the <i>Network Instance</i> IE specified in TS 29.244 [29]

9.3.1.67 Activity Notification Level

This IE contains information on which level activity notification shall be performed..

IE/Group Name	Presence	Range	IE type and reference	Semantics description
Activity Notification Level	M		ENUMERATED (DRB, PDU Session, UE, ...)	

9.3.1.68 Trace Activation

This IE defines parameters related to a trace session activation.

IE/Group Name	Presence	Range	IE type and reference	Semantics description	Criticality	Assigned Criticality
Trace ID	M		OCTET STRING (SIZE(8))	This IE is composed of the following: Trace Reference defined in TS 32.422 [24] (leftmost 6 octets, with PLMN information encoded as in 9.3.1.7), and Trace Recording Session Reference defined in TS 32.422 [24] (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 [24].	-	-
Trace Collection Entity IP Address	M		Transport Layer Address 9.3.2.4	For File based Reporting. Defined in TS 32.422 [24]. Should be ignored if URI is present.	-	-
Trace Collection Entity URI	O		9.3.2.8	For Streaming based Reporting. Defined in TS 32.422 [24] Replaces Trace Collection Entity IP Address if present.	YES	ignore
MDT Configuration	O		9.3.1.85		YES	ignore

9.3.1.69 Subscriber Profile ID for RAT/Frequency priority

This parameter is used to define local configuration for RRM strategies.

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

9.3.1.70 Additional RRM Policy Index

The *Additional RRM Policy Index* IE is used to provide additional information as specified in TS 36.300 [25].

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

9.3.1.71 Retainability Measurements Information

This IE contains information on removed DRB(s) and QoS Flow(s) which are needed to perform retainability measurements.

IE/Group Name	Presence	Range	IE type and reference	Semantics description	Criticality	Assigned Criticality
DRB Removed List		1			-	
>DRB Removed Item		1..<maxnoofDRBs>			-	
>>DRB ID	M		9.3.1.16		-	
>>DRB Released In Session	O		ENUMERATED (released in session, not released in session, ...)	Indicates if the DRB was "in session" or not (as defined in TS 32.425 [26] and TS 28.552 [22]) when released	-	
>>DRB Accumulated Session Time	O		OCTET STRING (SIZE(5))	Accumulated "in session" time for the DRB, as defined in TS 32.425 [26] and TS 28.552 [22], in milliseconds	-	
>>QoS Flow Removed List		0..1			-	
>>>QoS Flow Removed Item		1..<maxnoofQoSFlows>			-	
>>>>QoS Flow Identifier	M		9.3.1.24		-	
>>>>QoS Flow Released In Session	O		ENUMERATED (released in session, not released in session, ...)	Indicates if the QoS Flow was "in session" or not (as defined in TS 28.552 [22]), when released	-	
>>>>QoS Flow Accumulated Session Time	O		OCTET STRING (SIZE(5))	Accumulated "in session" time for the QoS Flow, as defined in TS 28.552 [22], in milliseconds	-	

Range bound	Explanation
maxnoofDRBs	Maximum no. of DRBs for a UE. Value is 32.
maxnoofQoSFlows	Maximum no. of QoS flows in a PDU Session. Value is 64.

9.3.1.72 TNL Available Capacity Indicator

The *TNL Available Capacity Indicator* IE indicates offered and available capacity of the Transport Network.

IE/Group Name	Presence	Range	IE type and reference	Semantics description
DL TNL Offered Capacity	M		INTEGER (0..16777216,...)	Maximum capacity in kbps
DL TNL Available Capacity	M		INTEGER (0.. 100,...)	Available capacity. Value 100 corresponds to the offered capacity.
UL TNL Offered Capacity	M		INTEGER (0..16777216,...)	Maximum capacity in kbps
UL TNL Available Capacity	M		INTEGER (0.. 100,...)	Available capacity. Value 100 corresponds to the offered capacity.

9.3.1.73 HW Capacity Indicator

The *HW Capacity Indicator* IE indicates offered and available throughput experienced by the gNB-CU-UP.

IE/Group Name	Presence	Range	IE type and reference	Semantics description
Offered Throughput	M		INTEGER (1..16777216,...)	Maximum capacity offered by the gNB-CU-UP in kbps
Available Throughput	M		INTEGER(0..100, ...)	Average available capacity at the gNB-CU-UP. Value 100 corresponds to the offered throughput.

9.3.1.74 Redundant QoS Flow Indicator

This IE provides the Redundant QoS Flow Indicator for a QoS flow as specified in TS 23.501 [20].

IE/Group Name	Presence	Range	IE type and reference	Semantics description
Redundant QoS Flow Indicator	M		ENUMERATED (true, false)	This IE indicates that this QoS flow is requested for the redundant transmission. Value "true" indicates that redundant transmission is requested for this QoS flow. Value "false" indicates that redundant transmission is requested to be stopped if started.

9.3.1.75 TSC Traffic Characteristics

This IE provides the traffic characteristics of TSC QoS flows.

IE/Group Name	Presence	Range	IE type and reference	Semantics description
TSC Assistance Information Downlink	O		TSC Assistance Information 9.3.1.76	
TSC Assistance Information Uplink	O		TSC Assistance Information 9.3.1.76	

9.3.1.76 TSC Assistance Information

This IE provides the TSC assistance information for a TSC QoS flow in the uplink or downlink (see TS 23.501 [20]).

IE/Group Name	Presence	Range	IE type and reference	Semantics description
Periodicity	M		9.3.1.77	
Burst Arrival Time	O		9.3.1.78	

9.3.1.77 Periodicity

This IE indicates the Periodicity of the TSC QoS flow as defined in TS 23.501 [20].

IE/Group Name	Presence	Range	IE type and reference	Semantics description
Periodicity	M		INTEGER (0..640000, ...)	Periodicity expressed in units of 1 us.

9.3.1.78 Burst Arrival Time

This IE indicates the Burst Arrival Time of the TSC QoS flow as defined in TS 23.501 [9].

IE/Group Name	Presence	Range	IE type and reference	Semantics description
Burst Arrival Time	M		OCTET STRING	Encoded in the same format as the <i>ReferenceTime</i> IE as defined in TS 38.331 [10]. The value is truncated to 1 us granularity.

9.3.1.79 Extended Packet Delay Budget

This IE indicates the Packet Delay Budget for a QoS flow.

IE/Group Name	Presence	Range	IE type and reference	Semantics description
Extended Packet Delay Budget	M		INTEGER (0..65535, ...)	Upper bound value for the delay that a packet may experience expressed in unit of 0.01ms.

9.3.1.80 Redundant PDU Session Information

This IE defines Redundancy information to be applied to a PDU Session.

IE/Group Name	Presence	Range	IE type and reference	Semantics description
RSN	M		ENUMERATED (v1, v2, ...)	

9.3.1.81 QoS Mapping Information

This IE indicates the DSCP and/or IPv6 Flow Label field(s) of IP packet which is sent through the GTP-U tunnel of a requested DRB. This IE is only used for IAB.

IE/Group Name	Presence	Range	IE type and reference	Semantics description
DSCP	O		BIT STRING (SIZE(6))	
Flow Label	O		BIT STRING (SIZE(20))	

9.3.1.82 NID

This IE contains the Network Identifier of an SNPN, as specified in TS 23.501 [20]. The NID is specified in TS 23.003 [23].

IE/Group Name	Presence	Range	IE type and reference	Semantics description
NID	M		BIT STRING (SIZE(44))	

9.3.1.83 NPN Support Information

This IE provides NPN related information.

IE/Group Name	Presence	Range	IE type and reference	Semantics description
CHOICE <i>NPN Support Information</i>	M			
> <i>NPN Support Information</i> - <i>SNPN</i>				
>>NID	M		9.3.1.82	This IE is associated with the PLMN Identity and the Slice Support List contained in the <i>Supported PLMNs</i> IE. Together with the PLMN Identity it identifies the SNPN supported by the gNB-CU-UP.

9.3.1.84 NPN Context Information

This IE provides bearer context related NPN information.

IE/Group Name	Presence	Range	IE type and reference	Semantics description
CHOICE <i>NPN Context Information</i>	M			
> <i>SNPN Information</i>				
>>NID	M		9.3.1.82	This IE is associated with Serving PLMN information contained in bearer context related E1AP message. Together with the Serving PLMN identity it identifies the serving SNPN.

9.3.1.85 MDT Configuration

The IE defines the NR MDT configuration parameters.

IE/Group Name	Presence	Range	IE type and reference	Semantics description
MDT Activation	M		ENUMERATED (Immediate MDT only, Immediate MDT and Trace,...)	
CHOICE <i>MDT Mode</i>	M			
> <i>Immediate MDT</i>				
>>Measurements to Activate	M		BITSTRING (SIZE(8))	Each position in the bitmap indicates a MDT measurement, as defined in TS 37.320 [27]. Fourth Bit = M4, Seventh Bit = M6, Eighth Bit = M7. Value "1" indicates "activate" and value "0" indicates "do not activate". This version of the specification does not use bits 1, bit 2, bit 3, bit 5 and bit 6.
>>M4 Configuration	C-ifM4		9.3.1.86	
>>M6 Configuration	C-ifM6		9.3.1.87	
>>M7 Configuration	C-ifM7		9.3.1.88	

Condition	Explanation
ifM4	This IE shall be present if the <i>Measurements to Activate</i> IE has the fourth bit set to "1".
ifM6	This IE shall be present if the <i>Measurements to Activate</i> IE has the seventh bit set to "1".
ifM7	This IE shall be present if the <i>Measurements to Activate</i> IE has the eighth bit set to "1".

9.3.1.86 M4 Configuration

This IE defines the parameters for M4 measurement collection.

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

9.3.1.87 M6 Configuration

This IE defines the parameters for M6 measurement collection.

IE/Group Name	Presence	Range	IE type and reference	Semantics description
M6 Report Interval	M		ENUMERATED (ms120, ms240, ms480, ms640,ms1024, ms2048, ms5120, ms10240, ms20480, ms40960, min1,min6, min12, min30, ...)	
M6 Links to log	M		ENUMERATED(uplink, downlink, both-uplink-and-downlink, ...)	

9.3.1.88 M7 Configuration

This IE defines the parameters for M7 measurement collection.

IE/Group Name	Presence	Range	IE type and reference	Semantics description
M7 Collection Period	M		INTEGER (1..60, ...)	
M7 Links to log	M		ENUMERATED(uplink, ...)	

9.3.1.89 MDT PLMN List

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

IE/Group Name	Presence	Range	IE type and reference	Semantics description
MDT PLMN List		<i>1..<maxnoofMD TPLMNs></i>		
>PLMN Identity	M		9.3.1.7	

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

9.3.1.90 EHC Parameters

This IE carries the EHC parameters for ethernet header compression.

IE/Group Name	Presence	Range	IE type and reference	Semantics description	Criticality	Assigned Criticality
EHC Common	M				-	-
>EHC-CID-Length	M		ENUMERATED { bits7, bits15, ... }	See description of ehc-CID-Length in TS 38.331 [10]	-	-
EHC Downlink	O				-	-
>drb-ContinueEHC-DL	M		ENUMERATED { true, ... }	See description of drb-ContinueEHC-DL in TS 38.331 [10]	-	-
>maxCID-EHC-DL	O		INTEGER(1..32 767, ...)	Indicate the maximum number of DL EHC contexts that can be established for the DRB. The total value of maxCID-EHC-DL plus maxCID-EHC-UL (as specified in TS 38.331) across all bearers for the UE should be less than or equal to the value of maxNumberEHC-Contexts parameter as indicated by the UE.	YES	ignore
EHC Uplink	O				-	-
>drb-ContinueEHC-UL	M		ENUMERATED { true, ... }	See description of drb-ContinueEHC-UL in TS 38.331 [10]	-	-

9.3.1.91 DAPS Request Information

The *DAPS Indicator* IE indicates that DAPS HO is requested for the concerned DRB.

IE/Group Name	Presence	Range	IE type and reference	Semantics description
DAPS Indicator	M		ENUMERATED (DAPS HO required, ...)	Indicates that DAPS HO is requested

9.3.1.92 Early Forwarding COUNT Information

This IE contains DL COUNT value related to early data forwarding during DAPS Handover or Conditional Handover or conditional PSCell change.

IE/Group Name	Presence	Range	IE type and reference	Semantics description
CHOICE <i>Early Forwarding</i> > <i>First DL COUNT</i>	M			
>>FIRST DL COUNT Value	M		PDCP Count 9.3.1.35	PDCP-SN and Hyper frame number of the first DL SDU that the source NG-RAN node forwards to the target NG-RAN node
> <i>DL Discarding</i>				
>>DISCARD DL COUNT Value	M		PDCP Count 9.3.1.35	PDCP-SN and Hyper frame number for which the target NG-RAN node should discard forwarded DL SDUs associated with lower values.

9.3.1.93 Alternative QoS Parameters Set List

This IE contains alternative sets of QoS parameters which the NG-RAN node can indicate to be fulfilled when notification control is enabled and it cannot fulfil the requested list of QoS parameters.

IE/Group Name	Presence	Range	IE type and reference	Semantics description
Alternative QoS Parameters Item		1..<maxnoofQoSParaSets>		
>Alternative QoS Parameters Index	M		INTEGER (1..8,..)	
>Guaranteed Flow Bit Rate Downlink	O		Bit Rate 9.3.1.20	
>Guaranteed Flow Bit Rate Uplink	O		Bit Rate 9.3.1.20	
>Packet Delay Budget	O		9.3.1.47	
>Packet Error Rate	O		9.3.1.48	

Range bound	Explanation
maxnoofQoSParaSets	Maximum no. of alternative sets of QoS Parameters allowed for the QoS under Notification Control. Value is 8.

9.3.1.94 Extended Slice Support List

This IE indicates a list of supported slices.

IE/Group Name	Presence	Range	IE type and reference	Semantics description	Criticality	Assigned Criticality
Slice Support Item IEs		1..<maxnoofExtSliceItems>			-	
>S-NSSAI	M		9.3.1.9		-	

Range bound	Explanation
maxnoofExtSliceItems	Maximum no. of signalled slice support items. Value is 65535.

9.3.1.95 Extended gNB-CU-CP Name

This IE provides extended human readable name of the gNB-CU-CP.

IE/Group Name	Presence	Range	IE type and reference	Semantics description	Criticality	Assigned Criticality
gNB-CU-CP Name Visible	O		VisibleString (SIZE(1..150, ...))		-	
gNB-CU-CP Name UTF8	O		UTF8String (SIZE(1..150, ...))		-	

9.3.1.96 Extended gNB-CU-UP Name

This IE provides extended human readable name of the gNB-CU-UP.

IE/Group Name	Presence	Range	IE type and reference	Semantics description	Criticality	Assigned Criticality
gNB-CU-UP Name Visible	O		VisibleString (SIZE(1..150, ...))		-	
gNB-CU-UP Name UTF8	O		UTF8String (SIZE(1..150, ...))		-	

9.3.1.97 Extended NR CGI Support List

This IE indicates the list of supported NR CGIs.

IE/Group Name	Presence	Range	IE type and reference	Semantics description
Extended NR CGI Support Item IEs		<i>0..<maxnoofExtN RCGI></i>		
>NR CGI	M		9.3.1.14	

Range bound	Explanation
maxnoofExtNR CGI	Maximum no. of extended NR CGIs supported. Value is 16384.

9.3.1.98 Direct Forwarding Path Availability

This IE indicates whether a direct forwarding path is available.

IE/Group Name	Presence	Range	IE type and reference	Semantics description
Direct Forwarding Path Availability	M		ENUMERATED (inter-system direct path available, ..., intra-system direct path available)	

9.3.1.99 IAB-donor-CU-UP PSK Info

This IE contains the IAB-Donor-CU-UP Pre-Shared Key generated by the gNB-CU-CP and IP addresses for IAB-donor-CU-UP and IAB-DU.

IE/Group Name	Presence	Range	IE type and reference	Semantics description
IAB-donor-CU-UP PSK Info Item IEs		<i>1..<maxnoofPSKs></i>		
>IAB-Donor-CU-UP PSK	M		OCTET STRING	This IE contains the $K_{\text{IAB-CU-UP}}$ as defined in TS 33.501 [13].
>IAB-Donor-CU-UP IP Address	M		9.3.2.4	
>IAB-DU IP Address	M		9.3.2.4	

Range bound	Explanation

maxnoofPSKs	Maximum no. of PSKs to be updated in one E1AP procedure. Value is 256.
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9.3.2 Transport Network Layer Related IEs

9.3.2.1 UP Transport Layer Information

The *UP Transport Layer Information* IE identifies an transport bearer associated to a DRB. It contains a Transport Layer Address and a GTP Tunnel Endpoint Identifier. The Transport Layer Address is an IP address to be used for the user plane transport.

IE/Group Name	Presence	Range	IE type and reference	Semantics description
CHOICE <i>Transport Layer Information</i>	M			
> <i>GTP Tunnel</i>				
>>Transport Layer Address	M		9.3.2.4	
>>GTP-TEID	M		9.3.2.3	

9.3.2.2 CP Transport Layer Information

This IE is used to provide the E1 control plane transport layer information associated with an gNB-CU-CP and gNB-CU-UP pair.

IE/Group Name	Presence	Range	IE type and reference	Semantics description	Criticality	Assigned Criticality
CHOICE <i>CP Transport Layer Information</i>						
> <i>Endpoint-IP-address</i>					-	-
>> Endpoint IP address	M		Transport Layer Address 9.3.2.4		-	-
>Endpoint-IP-address-and-port					YES	reject
>>Endpoint IP address	M		Transport Layer Address 9.3.2.4		-	-
>>Port Number	M		BIT STRING (SIZE(16))		-	-

9.3.2.3 GTP-TEID

The *GTP-TEID* IE is the GTP Tunnel Endpoint Identifier to be used for the user plane transport.

IE/Group Name	Presence	Range	IE type and reference	Semantics description
GTP-TEID	M		OCTET STRING (SIZE(4))	For details and range, see TS 29.281 [15].

9.3.2.4 Transport Layer Address

This *Transport Layer Address* IE is an IP address.

IE/Group Name	Presence	Range	IE type and reference	Semantics description
Transport Layer Address	M		BIT STRING (SIZE(1..160, ...))	The Radio Network Layer is not supposed to interpret the address information. It should pass it to the Transport Layer for interpretation. For details, see TS 38.414 [16].

9.3.2.5 Data Forwarding Information Request

This IE offers the possibility for the gNB-CU-CP to request data forwarding addresses to the gNB-CU-UP. It also offers the possibility for the gNB-CU-CP to provide a list of QoS flows subject to PDU Session level or DRB level data forwarding to the gNB to which DRBs or QoS flows have been offloaded.

IE/Group Name	Presence	Range	IE type and reference	Semantics description
Data Forwarding Request	M		ENUMERATED (UL, DL, both, ...)	
QoS Flows forwarded on the forwarding tunnel(s)	O		QoS Flow Mapping List 9.3.1.59	This IE contains information for which QoS flows forwarded data packets are sent on: - either the PDU Session forwarding tunnel (UL and DL) - or the DRB forwarding tunnel (UL and DL).

9.3.2.6 Data Forwarding Information

This IE provides the data forwarding information when performing handover or data offloading.

IE/Group Name	Presence	Range	IE type and reference	Semantics description	Criticality	Assigned Criticality
UL Data Forwarding	O		UP Transport Layer Information 9.3.2.1		-	-
DL Data Forwarding	O		UP Transport Layer Information 9.3.2.1		-	-
Data Forwarding to NG-RAN QoS Flow Information List		0..1		Providing QoS flows accepted for data forwarding to the source gNB-CU-UP.	YES	ignore
>Data Forwarding to NG-RAN QoS Flow Information List Item		1..<maxnofQoSflows>			-	-
>>QoS Flow Identifier	M		QoS Flow Identifier 9.3.1.24		-	-

9.3.2.7 Transport Network Layer Address Info

This IE is used for signalling TNL address information.

IE/Group Name	Presence	Range	IE type and reference	Semantics description
Transport UP Layer Addresses Info to Add List		0..1		
>Transport UP Layer Addresses Info to Add Item		1..<maxnoofTLAs>		
>>IPsec Transport Layer Address	M		Transport Layer Address 9.3.2.4	Transport Network Layer address for IPsec endpoint.
>>>GTP Transport Layer Addresses To Add List		0..1		
>>>>GTP Transport Layer Addresses To Add Item		1..<maxnoofGTPTLAs>		
>>>>>GTP Transport Layer Address Info	M		Transport Layer Address 9.3.2.4	GTP Transport Layer Addresses for GTP end-points.
Transport UP Layer Addresses Info to Remove List		0..1		
>Transport UP Layer Addresses Info to Remove Item		1..<maxnoofTLAs>		
>>IPsec Transport Layer Address	M		Transport Layer Address 9.3.2.4	Transport Network Layer address for IPsec endpoint.
>>>GTP Transport Layer Addresses To Remove List		0..1		
>>>>GTP Transport Layer Addresses To Remove Item		1..<maxnoofGTPTLAs>		
>>>>>GTP Transport Layer Address Info	M		Transport Layer Address 9.3.2.4	GTP Transport Layer Addresses for GTP end-points.

Range bound	Explanation
maxnoofTLAs	Maximum no. of Transport Layer Addresses in the message. Value is 16.
maxnoofGTPTLAs	Maximum no. of GTP Transport Layer Addresses for a GTP end-point in the message. Value is 16.

9.3.2.8 URI

This IE is defined to contain a URI address.

IE/Group Name	Presence	Range	IE type and reference	Semantics description
URI	M		VisibleString	String representing URI (Uniform Resource Identifier)

9.3.3 Container and List IE definitions

9.3.3.1 DRB To Setup List E-UTRAN

This IE contains DRB related information used at Bearer Context Setup Request in E-UTRAN

IE/Group Name	Presence	Range	IE type and reference	Semantics description	Criticality	Assigned Criticality
DRB To Setup Item E-UTRAN		<i>1..<maxnoof DRBs></i>			-	-
>DRB ID	M		9.3.1.16		-	-
>PDCP Configuration	M		9.3.1.38		-	-
>E-UTRAN QoS	M		9.3.1.17		-	-
>S1 UL UP Transport Layer Information	M		UP Transport Layer Information 9.3.2.1		-	-
>Data Forwarding Information Request	O		9.3.2.5	Requesting forwarding info from the target gNB-CU-UP.	-	-
>Cell Group Information	M		9.3.1.11		-	-
>DL UP Parameters	O		UP Parameters 9.3.1.13		-	-
>DRB Inactivity Timer	O		Inactivity Timer 9.3.1.54	Included if the Activity Notification Level is set to DRB.	-	-
>Existing Allocated S1 DL UP Transport Layer Information	O		UP Transport Layer Information 9.3.2.1	This IE is not used in this version of the specification.	-	-
>Data Forwarding Source IP Address	O		Transport Layer Address 9.3.2.4	Identifies the TNL address used by the source node for data forwarding.	YES	ignore

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

9.3.3.2 PDU Session Resource To Setup List

This IE contains PDU session resource related information used at Bearer Context Setup Request

IE/Group Name	Presence	Range	IE type and reference	Semantics description	Criticality	Assigned Criticality
PDU Session Resource To Setup Item		<i>1..<maxnoof PDU Session Resource></i>			-	-
>PDU Session ID	M		9.3.1.21		-	-
>PDU Session Type	M		9.3.1.22		-	-
>S-NSSAI	M		9.3.1.9		-	-
>Security Indication	M		9.3.1.23		-	-
>PDU Session Resource DL Aggregate Maximum Bit Rate	O		Bit Rate 9.3.1.20	This IE shall be present when at least one Non-GBR QoS Flows is being setup.	-	-
>NG UL UP Transport Layer Information	M		UP Transport Layer Information 9.3.2.1		-	-
>PDU Session Data Forwarding Information Request	O		Data Forwarding Information Request 9.3.2.5		-	-
>PDU Session Inactivity Timer	O		Inactivity Timer 9.3.1.54	Included if the Activity Notification Level is set to PDU Session.	-	-
>Existing Allocated NG DL UP Transport Layer Information	O		UP Transport Layer Information 9.3.2.1		-	-
>Network Instance	O		9.3.1.62	This IE is ignored if the <i>Common Network Instance</i> IE is included.	YES	ignore
>Common Network Instance	O		9.3.1.66		YES	ignore
>DRB To Setup List		<i>1</i>			-	-
>>DRB To Setup Item		<i>1..<maxnoof DRBs></i>			-	-
>>>DRB ID	M		9.3.1.16		-	-
>>>SDAP Configuration	M		9.3.1.39		-	-
>>>PDCP Configuration	M		9.3.1.38		-	-
>>>Cell Group Information	M		9.3.1.11		-	-
>>>QoS Flows Information To Be Setup	M		QoS Flow QoS Parameters List 9.3.1.25		-	-
>>>DRB Data forwarding information Request	O		Data Forwarding Information Request 9.3.2.5	Requesting forwarding info from the target gNB-CU-UP.	-	-
>>>DRB Inactivity Timer	O		Inactivity Timer 9.3.1.54	Included if the Activity Notification Level is set to DRB.	-	-
>>>PDCP SN Status Information	O		9.3.1.58	Contains the PDCP SN Status at setup after Resume.	-	-

>>>DRB QoS	O		9.3.1.26	Indicates the DRB QoS when more than one QoS Flow is mapped to the DRB.	YES	ignore
>>>DAPS Request Information	O		9.3.1.91		YES	ignore
>>>Ignore Mapping Rule Indication	O		ENUMERATED (True, ...)	Included if the QoS flow mapping rule for the DRB has not been decided by gNB-CU-CP.	YES	reject
>>>QoS Flows Remapping	O		ENUMERATED (update, source configuration, ...)	Indicates that the target gNB-CU-CP requests QoS flow remapping during an intra-system lossless handover as specified in TS 38.300 [4].	YES	reject
>Redundant NG UL UP Transport Layer Information	O		UP Transport Layer Information 9.3.2.1		YES	ignore
>Redundant Common Network Instance	O		Common Network Instance 9.3.1.66		YES	ignore
>Redundant PDU Session Information	O		9.3.1.80		YES	ignore

Range bound	Explanation
maxnoofDRBs	Maximum no. of DRBs for a UE. Value is 32.
maxnoofPDUSessionResource	Maximum no. of PDU Sessions for a UE. Value is 256.

9.3.3.3 DRB Setup List E-UTRAN

This IE contains setup DRB related information at Bearer Context Setup Response in E-UTRAN

IE/Group Name	Presence	Range	IE type and reference	Semantics description	Criticality	Assigned Criticality
DRB Setup Item E-UTRAN		<i>1..<maxnoof DRBs></i>			-	-
>DRB ID	M		9.3.1.16		-	-
>S1 DL UP Transport Layer Information	M		UP Transport Layer Information 9.3.2.1		-	-
>Data Forwarding Information Response	O		Data Forwarding Information 9.3.2.6	Providing forwarding info from the target gNB-CU-UP.	-	-
>UL UP Parameters	M		UP Parameters 9.3.1.13		-	-
>S1 DL UP Unchanged	O		ENUMERATED (True, ...)	This IE is not used in this version of the specification.	-	-
>Data Forwarding Source IP Address	O		Transport Layer Address 9.3.2.4	Identifies the TNL address used by the source node for data forwarding.	YES	ignore

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

9.3.3.4 DRB Failed List E-UTRAN

This IE contains failed to setup DRB related information at Bearer Context Setup Response in E-UTRAN

IE/Group Name	Presence	Range	IE type and reference	Semantics description
DRB Failed Item E-UTRAN		<i>1..<maxnoof DRBs></i>		
>DRB ID	M		9.3.1.16	
>Cause	M		9.3.1.2	

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

9.3.3.5 PDU Session Resource Setup List

This IE contains setup PDU session resource related information used at Bearer Context Setup Response

IE/Group Name	Presence	Range	IE type and reference	Semantics description	Criticality	Assigned Criticality
PDU Session Resource Setup Item		<i>1..<maxnoof PDU Session Resource></i>			-	-
>PDU Session ID	M		9.3.1.21		-	-
>Security Result	O		9.3.1.52		-	-
>NG DL UP Transport Layer Information	M		UP Transport Layer Information 9.3.2.1		-	-
>PDU Session Data Forwarding Information Response	O		Data Forwarding Information 9.3.2.6	Providing forwarding info from the target gNB-CU-UP.	-	-
>NG DL UP Unchanged	O		ENUMERATE D (True, ...)		-	-
>DRB Setup List		<i>1</i>			-	-
>>DRB Setup Item		<i>1..<maxnoof DRBs></i>			-	-
>>>DRB ID	M		9.3.1.16		-	-
>>>DRB Data forwarding information Response	O		Data Forwarding Information 9.3.2.6	Providing forwarding info from the target gNB-CU-UP.	-	-
>>>UL UP Parameters	M		UP Parameters 9.3.1.13		-	-
>>>Flow Setup List	M		QoS Flow List 9.3.1.12		-	-
>>>Flow Failed List	O		Flow Failed List 9.3.1.45		-	-
>DRB Failed List		<i>0.. 1</i>			-	-
>>DRB Failed Item		<i>1..<maxnoof DRBs></i>			-	-
>>>DRB ID	M		9.3.1.16		-	-
>>>Cause	M		9.3.1.2		-	-
>Redundant NG DL UP Transport Layer Information	O		UP Transport Layer Information 9.3.2.1		YES	ignore
>Used Redundant PDU Session Information	O		9.3.1.80		YES	ignore
Range bound		Explanation				
maxnoofDRBs		Maximum no. of DRBs for a UE. Value is 32.				
maxnoofPDU Session Resource		Maximum no. of PDU Sessions for a UE. Value is 256.				

9.3.3.6 PDU Session Resource Failed List

This IE contains failed PDU session resource related information used at Bearer Context Setup Response

IE/Group Name	Presence	Range	IE type and reference	Semantics description
PDU Session Resource Failed Item		<i>1..<maxnoof PDU Session Resource></i>		
>PDU Session ID	M		9.3.1.21	
>Cause	M		9.3.1.2	

Range bound	Explanation
maxnoofPDU Session Resource	Maximum no. of PDU Sessions for a UE. Value is 256.

9.3.3.7 DRB To Setup Modification List E-UTRAN

This IE contains DRB to setup related information used at Bearer Context Modification Request in E-UTRAN

IE/Group Name	Presence	Range	IE type and reference	Semantics description
DRB To Setup Modification Item E-UTRAN		<i>1..<maxnoof DRBs></i>		
>DRB ID	M		9.3.1.16	
>PDCP Configuration	M		9.3.1.38	
>E-UTRAN QoS	M		9.3.1.17	
>S1 UL UP Transport Layer Information	M		UP Transport Layer Information 9.3.2.1	
>Data Forwarding Information Request	O		9.3.2.5	Requesting forwarding info from the target gNB-CU-UP.
>Cell Group Information	M		9.3.1.11	
>DL UP Parameters	O		UP Parameters 9.3.1.13	
>DRB Inactivity Timer	O		Inactivity Timer 9.3.1.54	Included if the Activity Notification Level is set to DRB.

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

9.3.3.8 DRB To Modify List E-UTRAN

This IE contains DRB to modify related information used at Bearer Context Modification Request in E-UTRAN

IE/Group Name	Presence	Range	IE type and reference	Semantics description
DRB To Modify Item E-UTRAN		<i>1..<maxnoof DRBs></i>		
>DRB ID	M		9.3.1.16	
>PDCP Configuration	O		9.3.1.38	
>E-UTRAN QoS	O		9.3.1.17	
>S1 UL UP Transport Layer Information	O		UP Transport Layer Information 9.3.2.1	
>Data Forwarding Information	O		9.3.2.6	Providing forwarding info to the source gNB-CU-UP.
>PDCP SN Status Request	O		ENUMERATED (requested, ...)	The gNB-CU-CP requests the gNB-CU-UP to provide the PDCP SN Status in the response message.
>PDCP SN Status Information	O		9.3.1.58	Providing SN Status information to the target gNB-CU-UP.
>DL UP Parameters	O		UP Parameters 9.3.1.13	
>Cell Group To Add	O		Cell Group Information 9.3.1.11	
>Cell Group To Modify	O		Cell Group Information 9.3.1.11	
>Cell Group To Remove	O		Cell Group Information 9.3.1.11	
>DRB Inactivity Timer	O		Inactivity Timer 9.3.1.54	Included if the Activity Notification Level is set to DRB.

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

9.3.3.9 DRB To Remove List E-UTRAN

This IE contains DRB to remove related information used at Bearer Context Modification Request in E-UTRAN

IE/Group Name	Presence	Range	IE type and reference	Semantics description
DRB To Remove Item E-UTRAN		<i>1..<maxnoof DRBs></i>		
>DRB ID	M		9.3.1.16	

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

9.3.3.10 PDU Session Resource To Setup Modification List

This IE contains PDU session resource to setup related information used at Bearer Context Modification Request

IE/Group Name	Presence	Range	IE type and reference	Semantics description	Criticality	Assigned Criticality
PDU Session Resource To Setup Modification Item		<i>1..<maxnoof PDU Session Resource></i>			-	-
>PDU Session ID	M		9.3.1.21		-	-
>PDU Session Type	M		9.3.1.22		-	-
>S-NSSAI	M		9.3.1.9		-	-
>Security Indication	M		9.3.1.23		-	-
>PDU Session Resource DL Aggregate Maximum Bit Rate	O		Bit Rate 9.3.1.20	This IE shall be present when Non-GBR QoS Flows are setting up.	-	-
>NG UL UP Transport Layer Information	M		UP Transport Layer Information 9.3.2.1		-	-
>PDU Session Data Forwarding Information Request	O		Data Forwarding Information Request 9.3.2.5	Requesting forwarding info from the target gNB-CU-UP.	-	-
>PDU Session Inactivity Timer	O		Inactivity Timer 9.3.1.54	Included if the Activity Notification Level is set to PDU Session.	-	-
>Network Instance	O		9.3.1.62		-	-
>Common Network Instance	O		9.3.1.66		YES	ignore
>DRB To Setup List		<i>1</i>			-	-
>>DRB To Setup Item		<i>1..<maxnoof DRBs></i>			-	-
>>>DRB ID	M		9.3.1.16		-	-
>>>SDAP Configuration	M		9.3.1.39		-	-
>>>PDCP Configuration	M		9.3.1.38		-	-
>>>Cell Group Information	M		9.3.1.11		-	-
>>>QoS Flows Information To Be Setup	M		QoS Flow QoS Parameters List 9.3.1.25		-	-
>>>DRB Data forwarding information Request	O		Data Forwarding Information Request 9.3.2.5	Requesting forwarding info from the target gNB-CU-UP.	-	-
>>>DRB Inactivity Timer	O		Inactivity Timer 9.3.1.54	Included if the Activity Notification Level is set to DRB.	-	-
>>>PDCP SN Status Information	O		9.3.1.58	Provides the PDCP SN Status at setup after Resume to the target gNB-CU-UP.	-	-
>>>DRB QoS	O		9.3.1.26	Indicates the DRB QoS when more than one QoS Flow is mapped to the DRB	YES	ignore

>>>Ignore Mapping Rule Indication	O		ENUMERATED (True, ...)	Included if the QoS flow mapping rule for the DRB has not been decided by gNB-CU-CP.	YES	reject
>>>DAPS Request Information	O		9.3.1.91	This IE is not used in this version of the specification.	YES	ignore
>Redundant NG UL UP Transport Layer Information	O		UP Transport Layer Information 9.3.2.1		YES	ignore
>Redundant Common Network Instance	O		Common Network Instance 9.3.1.66		YES	ignore

Range bound	Explanation
maxnoofDRBs	Maximum no. of DRBs for a UE. Value is 32.
maxnoofPDUSessionResource	Maximum no. of PDU Sessions for a UE. Value is 256.

9.3.3.11 PDU Session Resource To Modify List

This IE contains PDU session resource to modify related information used at Bearer Context Modification Request

IE/Group Name	Presence	Range	IE type and reference	Semantics description	Criticality	Assigned Criticality
PDU Session Resource To Modify Item		<i>1..<maxnoof PDU Session Resource></i>			-	-
>PDU Session ID	M		9.3.1.21		-	-
>Security Indication	O		9.3.1.23	This IE is not used in this release.	-	-
>PDU Session Resource DL Aggregate Maximum Bit Rate	O		Bit Rate 9.3.1.20		-	-
>NG UL UP Transport Layer Information	O		UP Transport Layer Information 9.3.2.1		-	-
>PDU Session Data Forwarding Information Request	O		Data Forwarding Information Request 9.3.2.5	Requesting forwarding information from the target gNB-CU-UP.	-	-
>PDU Session Data Forwarding Information	O		Data Forwarding Information 9.3.2.6	Providing forwarding information to the source gNB-CU-UP.	-	-
>PDU Session Inactivity Timer	O		Inactivity Timer 9.3.1.54	Included if the Activity Notification Level is set to PDU Session.	-	-
>Network Instance	O		9.3.1.62	This IE is ignored if the <i>Common Network Instance</i> IE is included.	YES	ignore
>Common Network Instance	O		9.3.1.66		YES	ignore
>DRB To Setup List		<i>0..1</i>			-	-
>>DRB To Setup Item		<i>1..<maxnoof DRBs></i>			-	-
>>>DRB ID	M		9.3.1.16		-	-
>>>SDAP Configuration	M		9.3.1.39		-	-
>>>PDCP Configuration	M		9.3.1.38		-	-
>>>Cell Group Information	M		9.3.1.11		-	-
>>>QoS Flow Information To Be Setup	M		QoS Flow QoS Parameters List 9.3.1.25		-	-
>>>DRB Data Forwarding Information Request	O		Data Forwarding Information Request 9.3.2.5	Requesting forwarding information from the target gNB-CU-UP.	-	-
>>>DRB Inactivity Timer	O		Inactivity Timer 9.3.1.54	Included if the Activity Notification Level is set to DRB.	-	-
>>>PDCP SN Status Information	O		9.3.1.58	Provides the PDCP SN Status at setup after Resume to the target gNB-CU-UP.	-	-

>>>DRB QoS	O		9.3.1.26	Indicates the DRB QoS when more than one QoS Flow is mapped to the DRB	YES	ignore
>>>Ignore Mapping Rule Indication	O		ENUMERATE D (True, ...)	Included if the QoS flow mapping rule for the DRB has not been decided by gNB-CU-CP.	YES	reject
>>>DAPS Request Information	O		9.3.1.91	This IE is not used in this version of the specification.	YES	ignore
>>>QoS Flows Remapping	O		ENUMERATE D (update, source configuration, ...)	This IE is not used in this version of the specification.	YES	reject
>DRB To Modify List		<i>0.. 1</i>			-	-
>>DRB To Modify Item		<i>1..<maxnoof DRBs></i>			-	-
>>>DRB ID	M		9.3.1.16		-	-
>>>SDAP Configuration	O		9.3.1.39		-	-
>>>PDCP Configuration	O		9.3.1.38		-	-
>>>DRB Data forwarding information	O		Data Forwarding Information 9.3.2.6	Providing forwarding information to the source gNB-CU-UP.	-	-
>>>PDCP SN Status Request	O		ENUMERATE D (requested, ...)	The gNB-CU-CP requests the gNB-CU-UP to provide the PDCP SN Status in the response message.	-	-
>>>PDCP SN Status Information	O		9.3.1.58	Provides the PDCP SN Status to the target gNB-CU-UP.	-	-
>>>DL UP Parameters	O		UP Parameters 9.3.1.13		-	-
>>>Cell Group To Add	O		Cell Group Information 9.3.1.11		-	-
>>>Cell Group To Modify	O		Cell Group Information 9.3.1.11		-	-
>>>Cell Group To Remove	O		Cell Group Information 9.3.1.11		-	-
>>>Flow Mapping Information	O		QoS Flow QoS Parameters List 9.3.1.25	Overrides previous mapping information.	-	-
>>>DRB Inactivity Timer	O		Inactivity Timer 9.3.1.54	Included if the Activity Notification Level is set to DRB.	-	-

>>>Old QoS Flow List - UL End Marker expected	O		QoS Flow List 9.3.1.12	Indicates that the source NG-RAN node has initiated QoS flow re-mapping and has not yet received SDAP end markers, as described in TS 38.300 [8].	YES	reject
>>>DRB QoS	O		9.3.1.26	Indicates the DRB QoS when more than one QoS Flow is mapped to the DRB	YES	ignore
>>>Early Forwarding COUNT Request	O		ENUMERATE D (First DL count, DL discarding, ...)	Requests early data forwarding information from the source gNB-CU-UP	YES	reject
>>>Early Forwarding COUNT Information	O		9.3.1.92	Provides early data forwarding information to the target gNB-CU-UP.	YES	reject
>>>DAPS Request Information	O		9.3.1.91	Used to request intra-gNB-CU-UP DAPS HO	YES	ignore
>>>Early Data Forwarding Indicator	O		ENUMERATE D (stop, ...)		YES	ignore
>DRB To Remove List		0.. 1			-	-
>>DRB To Remove Item		1..<maxnoof DRBs>			-	-
>>>DRB ID	M		9.3.1.16		-	-
>S-NSSAI	O		9.3.1.9		YES	reject
>Redundant NG UL UP Transport Layer Information	O		UP Transport Layer Information 9.3.2.1		YES	ignore
>Redundant Common Network Instance	O		Common Network Instance 9.3.1.66		YES	ignore
>Data Forwarding to E-UTRAN Information List		0.. 1		Contains a list of DL Data Forwarding tunnels and the associated QoS Flows to be forwarded on each tunnel	YES	ignore
>>Data Forwarding to E-UTRAN Information List Item		1..<maxnoof DataForwardingTunnelto E-UTRAN>			-	-
>>>Data forwarding tunnel information	M		UP Transport Layer Information 9.3.2.1		-	-
>>>QoS Flows to be forwarded List		1			-	-
>>>>QoS Flows to be forwarded Item		1..<maxnoof QoSflows>			-	-
>>>>>QoS Flow Identifier	M		QoS Flow Identifier 9.3.1.24		-	-

>Security Indication Modify	O		Security Indication 9.3.1.23		YES	ignore
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Range bound	Explanation
maxnoofDRBs	Maximum no. of DRBs for a UE. Value is 32.
maxnoofPDUSessionResource	Maximum no. of PDU Sessions for a UE. Value is 256.
maxnoofDataForwardingTunneltoE-UTRAN	Maximum no. of Data Forwarding Tunnels to E-UTRAN for a UE. Value is 256.
maxnoofQoSflows	Maximum no. of QoS flows in a PDU Session. Value is 64.

9.3.3.12 PDU Session Resource To Remove List

This IE contains PDU session resource to remove related information

IE/Group Name	Presence	Range	IE type and reference	Semantics description	Criticality	Assigned Criticality
PDU Session Resource To Remove Item		<i>1..<maxnoof PDUSession Resource></i>			-	-
>PDU Session ID	M		9.3.1.21		-	-
>Cause	O		9.3.1.2		YES	ignore

Range bound	Explanation
maxnoofPDUSessionResource	Maximum no. of PDU Sessions for a UE. Value is 256.

9.3.3.13 DRB Setup Modification List E-UTRAN

This IE contains setup DRB related information at Bearer Context Modification Response in E-UTRAN

IE/Group Name	Presence	Range	IE type and reference	Semantics description
DRB Setup Modification Item E-UTRAN		<i>1..<maxnoof DRBs></i>		
>DRB ID	M		9.3.1.16	
>S1 DL UP Transport Layer Information	M		UP Transport Layer Information 9.3.2.1	
>Data Forwarding Information Response	O		9.3.2.6	Provides forwarding information from the target gNB-CU-UP.
>UL UP Parameters	M		UP Parameters 9.3.1.13	

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

9.3.3.14 DRB Failed Modification List E-UTRAN

This IE contains failed to setup DRB related information at Bearer Context Modification Response in E-UTRAN

IE/Group Name	Presence	Range	IE type and reference	Semantics description
DRB Failed Modification Item E-UTRAN		<i>1..<maxnoof DRBs></i>		
>DRB ID	M		9.3.1.16	
>Cause	M		9.3.1.2	

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

9.3.3.15 DRB Modified List E-UTRAN

This IE contains modified DRB related information at Bearer Context Modification Response in E-UTRAN

IE/Group Name	Presence	Range	IE type and reference	Semantics description
DRB Modified Item E-UTRAN		<i>1..<maxnoof DRBs></i>		
>DRB ID	M		9.3.1.16	
>S1 DL UP Transport Layer Information	O		UP Transport Layer Information 9.3.2.1	
>PDCP SN Status Information	O		9.3.1.58	Provides the PDCP SN Status from the source gNB-CU-UP.
>UL UP Parameters	O		UP Parameters 9.3.1.13	Carries the UL UP parameters.

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

9.3.3.16 DRB Failed To Modify List E-UTRAN

This IE contains failed to modify DRB related information at Bearer Context Modification Response in E-UTRAN

IE/Group Name	Presence	Range	IE type and reference	Semantics description
DRB Failed To Modify Item E-UTRAN		<i>1..<maxnoof DRBs></i>		
>DRB ID	M		9.3.1.16	
>Cause	M		9.3.1.2	

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

9.3.3.17 PDU Session Resource Setup Modification List

This IE contains setup PDU session resource related information used at Bearer Context Modification Response

IE/Group Name	Presence	Range	IE type and reference	Semantics description	Criticality	Assigned Criticality
PDU Session Resource Setup Modification Item		<i>1..<maxnoof PDU Session Resource></i>			-	-
>PDU Session ID	M		9.3.1.21		-	-
>Security Result	O		9.3.1.52		-	-
>NG DL UP Transport Layer Information	M		UP Transport Layer Information 9.3.2.1		-	-
>PDU Session Data Forwarding Information Response	O		Data Forwarding Information 9.3.2.6	Provides forwarding information from the target gNB-CU-UP.	-	-
>DRB Setup List		<i>1</i>			-	-
>>DRB Setup Item		<i>1..<maxnoof DRBs></i>			-	-
>>>DRB ID	M		9.3.1.16		-	-
>>>DRB Data forwarding information Response	O		Data Forwarding Information 9.3.2.6	Provides forwarding information from the target gNB-CU-UP.	-	-
>>>UL UP Parameters	M		UP Parameters 9.3.1.13		-	-
>>>Flow Setup List	M		QoS Flow List 9.3.1.12		-	-
>>>Flow Failed List	O		Flow Failed List 9.3.1.45		-	-
>DRB Failed List		<i>0.. 1</i>			-	-
>>DRB Failed Item		<i>1..<maxnoof DRBs></i>			-	-
>>>DRB ID	M		9.3.1.16		-	-
>>>Cause	M		9.3.1.2		-	-
>Redundant NG DL UP Transport Layer Information	O		UP Transport Layer Information 9.3.2.1		YES	ignore

Range bound	Explanation
maxnoofDRBs	Maximum no. of DRBs for a UE. Value is 32.
maxnoofPDU SessionResource	Maximum no. of PDU Sessions for a UE. Value is 256.

9.3.3.18 PDU Session Resource Failed Modification List

This IE contains failed to setup PDU session resource related information used at Bearer Context Modification Response

IE/Group Name	Presence	Range	IE type and reference	Semantics description
PDU Session Resource Failed Modification Item		<i>1..<maxnoof PDU Session Resource></i>		
>PDU Session ID	M		9.3.1.21	
>Cause	M		9.3.1.2	

Range bound	Explanation
maxnoofPDU SessionResource	Maximum no. of PDU Sessions for a UE. Value is 256.

9.3.3.19 PDU Session Resource Modified List

This IE contains modified PDU session resource related information used at Bearer Context Modification Response

IE/Group Name	Presence	Range	IE type and reference	Semantics description	Criticality	Assigned Criticality
PDU Session Resource Modified Item		<i>1..<maxnoof PDUSession Resource></i>			-	
>PDU Session ID	M		9.3.1.21		-	
>NG DL UP Transport Layer Information	O		UP Transport Layer Information 9.3.2.1		-	
>Security Result	O		9.3.1.52		-	
>PDU Session Data Forwarding Information Response	O		Data Forwarding Information 9.3.2.6		-	
>DRB Setup List		<i>0.. 1</i>			-	
>>DRB Setup Item		<i>1..<maxnoof DRBs></i>			-	
>>>DRB ID	M		9.3.1.16		-	
>>>DRB Data forwarding information Response	O		Data Forwarding Information 9.3.2.6		-	
>>>UL UP Parameters	M		UP Parameters 9.3.1.13		-	
>>>Flow Setup List	M		QoS Flow List 9.3.1.12		-	
>>>Flow Failed List	O		Flow Failed List 9.3.1.45		-	
>DRB Failed List		<i>0.. 1</i>			-	
>>DRB Failed Item		<i>1..<maxnoof DRBs></i>			-	
>>>DRB ID	M		9.3.1.16		-	
>>>Cause	M		9.3.1.2		-	
>DRB Modified List		<i>0.. 1</i>			-	
>>DRB Modified Item		<i>1..<maxnoof DRBs></i>			-	
>>>DRB ID	M		9.3.1.16		-	
>>>UL UP Parameters	O		UP Parameters 9.3.1.13	Carries the UL UP parameters.	-	
>>>PDCP SN Status Information	O		9.3.1.58	Provides PDCP SN Status to the target gNB-CU-UP.	-	
>>>Flow Setup List	O		QoS Flow List 9.3.1.12		-	
>>>Flow Failed List	O		Flow Failed List 9.3.1.45		-	
>>>Early Forwarding COUNT Information	O		9.3.1.92	Provides early data forwarding information from the source gNB-CU-UP.	-	
>>> Old QoS Flow List - UL End Marker expected	O		QoS Flow List 9.3.1.12	Indicates the QoS flow(s) for which the gNB-CU-UP has not yet received SDAP end markers after the gNB-CU-CP reconfigured those QoS flow(s) to another DRB.	Yes	ignore

>DRB Failed To Modify List		0.. 1			-	-
>>DRB Failed To Modify Item		1..<maxnoof DRBs>			-	-
>>>DRB ID	M		9.3.1.16		-	-
>>>Cause	M		9.3.1.2		-	-
>Redundant NG DL UP Transport Layer Information	O		UP Transport Layer Information 9.3.2.1		YES	ignore

Range bound	Explanation
maxnoofDRBs	Maximum no. of DRBs for a UE. Value is 32.
maxnoofPDUSessionResource	Maximum no. of PDU Sessions for a UE. Value is 256.

9.3.3.20 PDU Session Resource Failed To Modify List

This IE contains failed to modify PDU session resource related information used at Bearer Context Modification Response

IE/Group Name	Presence	Range	IE type and reference	Semantics description
PDU Session Resource Failed To Modify Item		1..<maxnoof PDUSession Resource>		
>PDU Session ID	M		9.3.1.21	
>Cause	M		9.3.1.2	

Range bound	Explanation
maxnoofPDUSessionResource	Maximum no. of PDU Sessions for a UE. Value is 256.

9.3.3.21 DRB Required To Modify List E-UTRAN

This IE contains DRB to modify related information used at Bearer Context Modification Required in E-UTRAN

IE/Group Name	Presence	Range	IE type and reference	Semantics description
DRB Required To Modify Item E-UTRAN		1..<maxnoof DRBs>		
>DRB ID	M		9.3.1.16	
>S1 DL UP Transport Layer Information	O		UP Transport Layer Information 9.3.2.1	
>gNB-CU-UP Cell Group Related Configuration	O		9.3.1.34	
>Cause	O		9.3.1.2	

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

9.3.3.22 DRB Required To Remove List E-UTRAN

This IE contains DRB to remove related information used at Bearer Context Modification Required in E-UTRAN

IE/Group Name	Presence	Range	IE type and reference	Semantics description
DRB Required To Remove Item E-UTRAN		1..<maxnoof DRBs>		
>DRB ID	M		9.3.1.16	
>Cause	M		9.3.1.2	

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

9.3.3.23 PDU Session Resource Required To Modify List

This IE contains PDU session resource to modify related information used at Bearer Context Modification Required

IE/Group Name	Presence	Range	IE type and reference	Semantics description	Criticality	Assigned Criticality
PDU Session Resource Required To Modify Item		<i>1..<maxnoof PDU Session Resource></i>			-	-
>PDU Session ID	M		9.3.1.21		-	-
>NG DL UP Transport Layer Information	O		UP Transport Layer Information 9.3.2.1		-	-
>DRB To Modify List		<i>0.. 1</i>			-	-
>>DRB To Modify Item		<i>1..<maxnoof DRBs></i>			-	-
>>>DRB ID	M		9.3.1.16		-	-
>>>gNB-CU-UP Cell Group Related Configuration	O		9.3.1.34		-	-
>>>Flow To Remove	O		QoS Flow List 9.3.1.12		-	-
>>>Cause	O		9.3.1.2		-	-
>DRB To Remove List		<i>0.. 1</i>			-	-
>>DRB To Remove Item		<i>1..<maxnoof DRBs></i>			-	-
>>>DRB ID	M		9.3.1.16		-	-
>>>Cause	M		9.3.1.2		-	-
>Redundant NG DL UP Transport Layer Information	O		UP Transport Layer Information 9.3.2.1		YES	ignore

Range bound	Explanation
maxnoofDRBs	Maximum no. of DRBs for a UE. Value is 32.
maxnoofPDU SessionResource	Maximum no. of PDU Sessions for a UE. Value is 256.

9.3.3.24 DRB Confirm Modified List E-UTRAN

This IE contains modified DRB related information at Bearer Context Modification Confirm in E-UTRAN

IE/Group Name	Presence	Range	IE type and reference	Semantics description
DRB Confirm Modified Item E-UTRAN		<i>1..<maxnoof DRBs></i>		
>DRB ID	M		9.3.1.16	
>Cell Group Information	O		9.3.1.11	Included if the gNB-CU-CP was unable to change cell group related information as requested in the <i>gNB-CU-UP Cell Group Related Configuration</i> IE (e.g., UL Configuration).

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

9.3.3.25 PDU Session Resource Confirm Modified List

This IE contains modified PDU session resource related information used at Bearer Context Modification Confirm

IE/Group Name	Presence	Range	IE type and reference	Semantics description
PDU Session Resource Modified Item		<i>1..<maxnoof PDU Session Resource></i>		
>PDU Session ID	M		9.3.1.21	
>DRB Modified List		<i>0.. 1</i>		
>>DRB Modified Item		<i>1..<maxnoof DRBs></i>		
>>>DRB ID	M		9.3.1.16	
>>>Cell Group Information	O		9.3.1.11	Included if the gNB-CU-CP was unable to change cell group related information as requested in the <i>gNB-CU-UP Cell Group Related Configuration</i> IE (e.g., UL Configuration).

Range bound	Explanation
maxnoofDRBs	Maximum no. of DRBs for a UE. Value is 32.
maxnoofPDUSessionResource	Maximum no. of PDU Sessions for a UE. Value is 256.

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

9.4.1 General

E1AP ASN.1 definition conforms to ITU-T Rec. X.691 [7], ITU-T Rec. X.680 [8] and ITU-T Rec. X.681 [9].

The ASN.1 definition specifies the structure and content of E1AP messages. E1AP 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 E1AP 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 where 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 will have different IE IDs.

If an E1AP 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.

9.4.2 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 interoperability;

- 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.

9.4.3 Elementary Procedure Definitions

```
-- ASN1START
-- *****
--
-- Elementary Procedure definitions
--
-- *****

ElAP-PDU-Descriptions {
itu-t (0) identified-organization (4) etsi (0) mobileDomain (0)
ngran-access (22) modules (3) elap (5) version1 (1) elap-PDU-Descriptions (0) }

DEFINITIONS AUTOMATIC TAGS ::=

BEGIN

-- *****
--
-- IE parameter types from other modules
--
-- *****

IMPORTS
    Criticality,
    ProcedureCode

FROM ElAP-CommonDataTypes
    Reset,
    ResetAcknowledge,
    ErrorIndication,
    GNB-CU-UP-ElSetupRequest,
    GNB-CU-UP-ElSetupResponse,
    GNB-CU-UP-ElSetupFailure,
    GNB-CU-CP-ElSetupRequest,
    GNB-CU-CP-ElSetupResponse,
    GNB-CU-CP-ElSetupFailure,
    GNB-CU-UP-ConfigurationUpdate,
    GNB-CU-UP-ConfigurationUpdateAcknowledge,
    GNB-CU-UP-ConfigurationUpdateFailure,
    GNB-CU-CP-ConfigurationUpdate,
    GNB-CU-CP-ConfigurationUpdateAcknowledge,
    GNB-CU-CP-ConfigurationUpdateFailure,
    BearerContextSetupRequest,
    BearerContextSetupResponse,
    BearerContextSetupFailure,
    BearerContextModificationRequest,
    BearerContextModificationResponse,
    BearerContextModificationFailure,
    BearerContextModificationRequired,
    BearerContextModificationConfirm,
```

BearerContextReleaseCommand,
BearerContextReleaseComplete,
BearerContextReleaseRequest,
BearerContextInactivityNotification,
DLDataNotification,
ULDataNotification,
DataUsageReport,
E1ReleaseRequest,
E1ReleaseResponse,
GNB-CU-UP-CounterCheckRequest,
GNB-CU-UP-StatusIndication,
MRDC-DataUsageReport,
DeactivateTrace,
TraceStart,
PrivateMessage,
ResourceStatusRequest,
ResourceStatusResponse,
ResourceStatusFailure,
ResourceStatusUpdate,
IAB-UPTNLAddressUpdate,
IAB-UPTNLAddressUpdateAcknowledge,
IAB-UPTNLAddressUpdateFailure,
CellTrafficTrace,
EarlyForwardingSNTransfer,
GNB-CU-CPMeasurementResultsInformation,
IABPSKNotification

FROM E1AP-PDU-Contents

id-reset,
id-errorIndication,
id-gNB-CU-UP-E1Setup,
id-gNB-CU-CP-E1Setup,
id-gNB-CU-UP-ConfigurationUpdate,
id-gNB-CU-CP-ConfigurationUpdate,
id-e1Release,
id-bearerContextSetup,
id-bearerContextModification,
id-bearerContextModificationRequired,
id-bearerContextRelease,
id-bearerContextReleaseRequest,
id-bearerContextInactivityNotification,
id-dLDataNotification,
id-uLDataNotification,
id-dataUsageReport,
id-gNB-CU-UP-CounterCheck,
id-gNB-CU-UP-StatusIndication,
id-mRDC-DataUsageReport,
id-DeactivateTrace,
id-TraceStart,
id-privateMessage,
id-resourceStatusReportingInitiation,
id-resourceStatusReporting,
id-iAB-UPTNLAddressUpdate,
id-CellTrafficTrace,

```

id-earlyForwardingSNTransfer,
id-gNB-CU-CPMeasurementResultsInformation,
id-iABPSKNotification

FROM ElAP-Constants;

-- *****
--
-- Interface Elementary Procedure Class
--
-- *****

ElAP-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
--
-- *****

ElAP-PDU ::= CHOICE {
    initiatingMessage          InitiatingMessage,
    successfulOutcome          SuccessfulOutcome,
    unsuccessfulOutcome        UnsuccessfulOutcome,
    ...
}

InitiatingMessage ::= SEQUENCE {
    procedureCode              ElAP-ELEMENTARY-PROCEDURE.&procedureCode      ({ElAP-ELEMENTARY-PROCEDURES}),
    criticality                ElAP-ELEMENTARY-PROCEDURE.&criticality         ({ElAP-ELEMENTARY-PROCEDURES}@procedureCode}),
    value                      ElAP-ELEMENTARY-PROCEDURE.&InitiatingMessage  ({ElAP-ELEMENTARY-PROCEDURES}@procedureCode})
}

SuccessfulOutcome ::= SEQUENCE {
    procedureCode              ElAP-ELEMENTARY-PROCEDURE.&procedureCode      ({ElAP-ELEMENTARY-PROCEDURES}),
    criticality                ElAP-ELEMENTARY-PROCEDURE.&criticality         ({ElAP-ELEMENTARY-PROCEDURES}@procedureCode}),
    value                      ElAP-ELEMENTARY-PROCEDURE.&SuccessfulOutcome  ({ElAP-ELEMENTARY-PROCEDURES}@procedureCode})
}

UnsuccessfulOutcome ::= SEQUENCE {

```



```

    procedureCode      E1AP-ELEMENTARY-PROCEDURE.&procedureCode      ({E1AP-ELEMENTARY-PROCEDURES}),
    criticality        E1AP-ELEMENTARY-PROCEDURE.&criticality        ({E1AP-ELEMENTARY-PROCEDURES}@procedureCode}),
    value              E1AP-ELEMENTARY-PROCEDURE.&UnsuccessfulOutcome ({E1AP-ELEMENTARY-PROCEDURES}@procedureCode)})
}

-- *****
--
-- Interface Elementary Procedure List
--
-- *****

E1AP-ELEMENTARY-PROCEDURES E1AP-ELEMENTARY-PROCEDURE ::= {
    E1AP-ELEMENTARY-PROCEDURES-CLASS-1 |
    E1AP-ELEMENTARY-PROCEDURES-CLASS-2 ,
    ...
}

E1AP-ELEMENTARY-PROCEDURES-CLASS-1 E1AP-ELEMENTARY-PROCEDURE ::= {
    reset |
    gNB-CU-UP-E1Setup |
    gNB-CU-CP-E1Setup |
    gNB-CU-UP-ConfigurationUpdate |
    gNB-CU-CP-ConfigurationUpdate |
    e1Release |
    bearerContextSetup |
    bearerContextModification |
    bearerContextModificationRequired |
    bearerContextRelease |
    resourceStatusReportingInitiation |
    iAB-UPTNLAddressUpdate |
    ...
}

E1AP-ELEMENTARY-PROCEDURES-CLASS-2 E1AP-ELEMENTARY-PROCEDURE ::= {
    errorIndication |
    bearerContextReleaseRequest |
    bearerContextInactivityNotification |
    dLDataNotification |
    uLDataNotification |
    dataUsageReport |
    gNB-CU-UP-CounterCheck |
    gNB-CU-UP-StatusIndication |
    mRDC-DataUsageReport |
    deactivateTrace |
    traceStart |
    privateMessage |
    cellTrafficTrace |
    resourceStatusReporting |
    earlyForwardingSNTransfer |
    gNB-CU-CPMeasurementResultsInformation |
    iABPSKNotification,
    ...
}

```

```
-- *****
--
-- Interface Elementary Procedures
--
-- *****

reset ElAP-ELEMENTARY-PROCEDURE ::= {
    INITIATING MESSAGE      Reset
    SUCCESSFUL OUTCOME      ResetAcknowledge
    PROCEDURE CODE          id-reset
    CRITICALITY             reject
}

errorIndication ElAP-ELEMENTARY-PROCEDURE ::= {
    INITIATING MESSAGE      ErrorIndication
    PROCEDURE CODE          id-errorIndication
    CRITICALITY             ignore
}

gNB-CU-UP-ElSetup ElAP-ELEMENTARY-PROCEDURE ::= {
    INITIATING MESSAGE      GNB-CU-UP-ElSetupRequest
    SUCCESSFUL OUTCOME      GNB-CU-UP-ElSetupResponse
    UNSUCCESSFUL OUTCOME    GNB-CU-UP-ElSetupFailure
    PROCEDURE CODE          id-gNB-CU-UP-ElSetup
    CRITICALITY             reject
}

gNB-CU-CP-ElSetup ElAP-ELEMENTARY-PROCEDURE ::= {
    INITIATING MESSAGE      GNB-CU-CP-ElSetupRequest
    SUCCESSFUL OUTCOME      GNB-CU-CP-ElSetupResponse
    UNSUCCESSFUL OUTCOME    GNB-CU-CP-ElSetupFailure
    PROCEDURE CODE          id-gNB-CU-CP-ElSetup
    CRITICALITY             reject
}

gNB-CU-UP-ConfigurationUpdate ElAP-ELEMENTARY-PROCEDURE ::= {
    INITIATING MESSAGE      GNB-CU-UP-ConfigurationUpdate
    SUCCESSFUL OUTCOME      GNB-CU-UP-ConfigurationUpdateAcknowledge
    UNSUCCESSFUL OUTCOME    GNB-CU-UP-ConfigurationUpdateFailure
    PROCEDURE CODE          id-gNB-CU-UP-ConfigurationUpdate
    CRITICALITY             reject
}

gNB-CU-CP-ConfigurationUpdate ElAP-ELEMENTARY-PROCEDURE ::= {
    INITIATING MESSAGE      GNB-CU-CP-ConfigurationUpdate
    SUCCESSFUL OUTCOME      GNB-CU-CP-ConfigurationUpdateAcknowledge
    UNSUCCESSFUL OUTCOME    GNB-CU-CP-ConfigurationUpdateFailure
    PROCEDURE CODE          id-gNB-CU-CP-ConfigurationUpdate
    CRITICALITY             reject
}

elRelease ElAP-ELEMENTARY-PROCEDURE ::= {
    INITIATING MESSAGE      ElReleaseRequest

```

```
    SUCCESSFUL OUTCOME      E1ReleaseResponse
    PROCEDURE CODE          id-e1Release
    CRITICALITY              reject
}

bearerContextSetup E1AP-ELEMENTARY-PROCEDURE ::= {
    INITIATING MESSAGE      BearerContextSetupRequest
    SUCCESSFUL OUTCOME      BearerContextSetupResponse
    UNSUCCESSFUL OUTCOME    BearerContextSetupFailure
    PROCEDURE CODE          id-bearerContextSetup
    CRITICALITY              reject
}

bearerContextModification E1AP-ELEMENTARY-PROCEDURE ::= {
    INITIATING MESSAGE      BearerContextModificationRequest
    SUCCESSFUL OUTCOME      BearerContextModificationResponse
    UNSUCCESSFUL OUTCOME    BearerContextModificationFailure
    PROCEDURE CODE          id-bearerContextModification
    CRITICALITY              reject
}

bearerContextModificationRequired E1AP-ELEMENTARY-PROCEDURE ::= {
    INITIATING MESSAGE      BearerContextModificationRequired
    SUCCESSFUL OUTCOME      BearerContextModificationConfirm
    PROCEDURE CODE          id-bearerContextModificationRequired
    CRITICALITY              reject
}

bearerContextRelease E1AP-ELEMENTARY-PROCEDURE ::= {
    INITIATING MESSAGE      BearerContextReleaseCommand
    SUCCESSFUL OUTCOME      BearerContextReleaseComplete
    PROCEDURE CODE          id-bearerContextRelease
    CRITICALITY              reject
}

bearerContextReleaseRequest E1AP-ELEMENTARY-PROCEDURE ::= {
    INITIATING MESSAGE      BearerContextReleaseRequest
    PROCEDURE CODE          id-bearerContextReleaseRequest
    CRITICALITY              ignore
}

bearerContextInactivityNotification E1AP-ELEMENTARY-PROCEDURE ::= {
    INITIATING MESSAGE      BearerContextInactivityNotification
    PROCEDURE CODE          id-bearerContextInactivityNotification
    CRITICALITY              ignore
}

dLDataNotification E1AP-ELEMENTARY-PROCEDURE ::= {
    INITIATING MESSAGE      DLDataNotification
    PROCEDURE CODE          id-dLDataNotification
    CRITICALITY              ignore
}

uLDataNotification E1AP-ELEMENTARY-PROCEDURE ::= {
```

```
INITIATING MESSAGE      ULDataNotification
PROCEDURE CODE          id-uLDataNotification
CRITICALITY             ignore
}

dataUsageReport ElAP-ELEMENTARY-PROCEDURE ::= {
  INITIATING MESSAGE      DataUsageReport
  PROCEDURE CODE          id-dataUsageReport
  CRITICALITY             ignore
}

gNB-CU-UP-CounterCheck ElAP-ELEMENTARY-PROCEDURE ::= {
  INITIATING MESSAGE      GNB-CU-UP-CounterCheckRequest
  PROCEDURE CODE          id-gNB-CU-UP-CounterCheck
  CRITICALITY             ignore
}

gNB-CU-UP-StatusIndication ElAP-ELEMENTARY-PROCEDURE ::= {
  INITIATING MESSAGE      GNB-CU-UP-StatusIndication
  PROCEDURE CODE          id-gNB-CU-UP-StatusIndication
  CRITICALITY             ignore
}

privateMessage ElAP-ELEMENTARY-PROCEDURE ::= {
  INITIATING MESSAGE      PrivateMessage
  PROCEDURE CODE          id-privateMessage
  CRITICALITY             ignore
}

gNB-CU-CPMeasurementResultsInformation ElAP-ELEMENTARY-PROCEDURE ::= {
  INITIATING MESSAGE      GNB-CU-CPMeasurementResultsInformation
  PROCEDURE CODE          id-gNB-CU-CPMeasurementResultsInformation
  CRITICALITY             ignore
}

mRDC-DataUsageReport ElAP-ELEMENTARY-PROCEDURE ::= {
  INITIATING MESSAGE      MRDC-DataUsageReport
  PROCEDURE CODE          id-mRDC-DataUsageReport
  CRITICALITY             ignore
}

deactivateTrace ElAP-ELEMENTARY-PROCEDURE ::= {
  INITIATING MESSAGE      DeactivateTrace
  PROCEDURE CODE          id-DeactivateTrace
  CRITICALITY             ignore
}

traceStart ElAP-ELEMENTARY-PROCEDURE ::= {
  INITIATING MESSAGE      TraceStart
  PROCEDURE CODE          id-TraceStart
  CRITICALITY             ignore
}

resourceStatusReportingInitiation ElAP-ELEMENTARY-PROCEDURE ::= {
```

```

    INITIATING MESSAGE      ResourceStatusRequest
    SUCCESSFUL OUTCOME      ResourceStatusResponse
    UNSUCCESSFUL OUTCOME    ResourceStatusFailure
    PROCEDURE CODE          id-resourceStatusReportingInitiation
    CRITICALITY              reject
}

resourceStatusReporting ElAP-ELEMENTARY-PROCEDURE ::= {
    INITIATING MESSAGE      ResourceStatusUpdate
    PROCEDURE CODE          id-resourceStatusReporting
    CRITICALITY              ignore
}

iAB-UPTNLAddressUpdate ElAP-ELEMENTARY-PROCEDURE ::= {
    INITIATING MESSAGE      IAB-UPTNLAddressUpdate
    SUCCESSFUL OUTCOME      IAB-UPTNLAddressUpdateAcknowledge
    UNSUCCESSFUL OUTCOME    IAB-UPTNLAddressUpdateFailure
    PROCEDURE CODE          id-iAB-UPTNLAddressUpdate
    CRITICALITY              reject
}

cellTrafficTrace ElAP-ELEMENTARY-PROCEDURE ::= {
    INITIATING MESSAGE      CellTrafficTrace
    PROCEDURE CODE          id-CellTrafficTrace
    CRITICALITY              ignore
}

earlyForwardingSNTransfer ElAP-ELEMENTARY-PROCEDURE ::= {
    INITIATING MESSAGE      EarlyForwardingSNTransfer
    PROCEDURE CODE          id-earlyForwardingSNTransfer
    CRITICALITY              ignore
}

iABPSKNotification ElAP-ELEMENTARY-PROCEDURE ::= {
    INITIATING MESSAGE      IABPSKNotification
    PROCEDURE CODE          id-iABPSKNotification
    CRITICALITY              reject
}

END
-- ASN1STOP

```

9.4.4 PDU Definitions

```

-- ASN1START
-- *****
--
-- PDU definitions for ElAP
--
-- *****

ElAP-PDU-Contents {
itu-t (0) identified-organization (4) etsi (0) mobileDomain (0)

```

```
ngran-access (22) modules (3) elap (5) version1 (1) elap-PDU-Contents (1) }
```

```
DEFINITIONS AUTOMATIC TAGS ::=
```

```
BEGIN
```

```
-- *****  
--  
-- IE parameter types from other modules  
--  
-- *****
```

```
IMPORTS
```

```
Cause,  
CriticalityDiagnostics,  
GNB-CU-CP-UE-ElAP-ID,  
GNB-CU-UP-UE-ElAP-ID,  
UE-associatedLogicalE1-ConnectionItem,  
GNB-CU-UP-ID,  
GNB-CU-UP-Name,  
Extended-GNB-CU-UP-Name,  
GNB-CU-CP-Name,  
Extended-GNB-CU-CP-Name,  
CNSupport,  
PLMN-Identity,  
Slice-Support-List,  
NR-CGI-Support-List,  
QoS-Parameters-Support-List,  
SecurityInformation,  
BitRate,  
BearerContextStatusChange,  
DRB-To-Setup-List-EUTRAN,  
DRB-Setup-List-EUTRAN,  
DRB-Failed-List-EUTRAN,  
DRB-To-Modify-List-EUTRAN,  
DRB-Measurement-Results-Information-List,  
DRB-Modified-List-EUTRAN,  
DRB-Failed-To-Modify-List-EUTRAN,  
DRB-To-Remove-List-EUTRAN,  
DRB-Required-To-Remove-List-EUTRAN,  
DRB-Required-To-Modify-List-EUTRAN,  
DRB-Confirm-Modified-List-EUTRAN,  
DRB-To-Setup-Mod-List-EUTRAN,  
DRB-Setup-Mod-List-EUTRAN,  
DRB-Failed-Mod-List-EUTRAN,  
ExtendedSliceSupportList,  
PDU-Session-Resource-To-Setup-List,  
PDU-Session-Resource-Setup-List,  
PDU-Session-Resource-Failed-List,  
PDU-Session-Resource-To-Modify-List,  
PDU-Session-Resource-Modified-List,  
PDU-Session-Resource-Failed-To-Modify-List,  
PDU-Session-Resource-To-Remove-List,
```

PDU-Session-Resource-Required-To-Modify-List,
PDU-Session-Resource-Confirm-Modified-List,
PDU-Session-Resource-To-Setup-Mod-List,
PDU-Session-Resource-Setup-Mod-List,
PDU-Session-Resource-Failed-Mod-List,
PDU-Session-To-Notify-List,
DRB-Status-Item,
DRB-Activity-Item,
Data-Usage-Report-List,
TimeToWait,
ActivityNotificationLevel,
ActivityInformation,
New-UL-TNL-Information-Required,
GNB-CU-CP-TNLA-Setup-Item,
GNB-CU-CP-TNLA-Failed-To-Setup-Item,
GNB-CU-CP-TNLA-To-Add-Item,
GNB-CU-CP-TNLA-To-Remove-Item,
GNB-CU-CP-TNLA-To-Update-Item,
GNB-CU-UP-TNLA-To-Remove-Item,
TransactionID,
Inactivity-Timer,
DRBs-Subject-To-Counter-Check-List-EUTRAN,
DRBs-Subject-To-Counter-Check-List-NG-RAN,
PPI,
GNB-CU-UP-Capacity,
GNB-CU-UP-OverloadInformation,
DataDiscardRequired,
PDU-Session-Resource-Data-Usage-List,
RANUEID,
GNB-DU-ID,
TraceID,
TraceActivation,
SubscriberProfileIDforRFP,
AdditionalRRMPriorityIndex,
RetainabilityMeasurementsInfo,
Transport-Layer-Address-Info,
HW-CapacityIndicator,
RegistrationRequest,
ReportCharacteristics,
ReportingPeriodicity,
TNL-AvailableCapacityIndicator,
DLUPTNLAddressToUpdateItem,
ULUPTNLAddressToUpdateItem,
NPNContextInfo,
NPNSupportInfo,
MDTPLMNLList,
PrivacyIndicator,
URIaddress,
DRBs-Subject-To-Early-Forwarding-List,
CHOInitiation,
ExtendedSliceSupportList,
TransportLayerAddress,
AdditionalHandoverInfo,
Extended-NR-CGI-Support-List,

DirectForwardingPathAvailability,
IAB-Donor-CU-UPPSKInfo-Item

FROM ElAP-IEs

PrivateIE-Container{ },
ProtocolExtensionContainer{ },
ProtocolIE-Container{ },
ProtocolIE-ContainerList{ },
ProtocolIE-SingleContainer{ },
ElAP-PRIVATE-IES,
ElAP-PROTOCOL-EXTENSION,
ElAP-PROTOCOL-IES

FROM ElAP-Containers

id-Cause,
id-CriticalityDiagnostics,
id-gNB-CU-CP-UE-ElAP-ID,
id-gNB-CU-UP-UE-ElAP-ID,
id-ResetType,
id-UE-associatedLogicalEl-ConnectionItem,
id-UE-associatedLogicalEl-ConnectionListResAck,
id-gNB-CU-UP-ID,
id-gNB-CU-UP-Name,
id-Extended-GNB-CU-UP-Name,
id-gNB-CU-CP-Name,
id-Extended-GNB-CU-CP-Name,
id-CNSupport,
id-SupportedPLMNs,
id-NPNSupportInfo,
id-NPNContextInfo,
id-SecurityInformation,
id-UEDLAggregateMaximumBitRate,
id-BearerContextStatusChange,
id-System-BearerContextSetupRequest,
id-System-BearerContextSetupResponse,
id-System-BearerContextModificationRequest,
id-System-BearerContextModificationResponse,
id-System-BearerContextModificationConfirm,
id-System-BearerContextModificationRequired,
id-DRB-Status-List,
id-Data-Usage-Report-List,
id-TimeToWait,
id-ActivityNotificationLevel,
id-ActivityInformation,
id-New-UL-TNL-Information-Required,
id-GNB-CU-CP-TNLA-Setup-List,
id-GNB-CU-CP-TNLA-Failed-To-Setup-List,
id-GNB-CU-CP-TNLA-To-Add-List,
id-GNB-CU-CP-TNLA-To-Remove-List,
id-GNB-CU-CP-TNLA-To-Update-List,

id-GNB-CU-UP-TNLA-To-Remove-List,
id-DRB-To-Setup-List-EUTRAN,
id-DRB-To-Modify-List-EUTRAN,
id-DRB-To-Remove-List-EUTRAN,
id-DRB-Required-To-Modify-List-EUTRAN,
id-DRB-Required-To-Remove-List-EUTRAN,
id-DRB-Setup-List-EUTRAN,
id-DRB-Failed-List-EUTRAN,
id-DRB-Measurement-Results-Information-List,
id-DRB-Modified-List-EUTRAN,
id-DRB-Failed-To-Modify-List-EUTRAN,
id-DRB-Confirm-Modified-List-EUTRAN,
id-DRB-To-Setup-Mod-List-EUTRAN,
id-DRB-Setup-Mod-List-EUTRAN,
id-DRB-Failed-Mod-List-EUTRAN,
id-PDU-Session-Resource-To-Setup-List,
id-PDU-Session-Resource-To-Modify-List,
id-PDU-Session-Resource-To-Remove-List,
id-PDU-Session-Resource-Required-To-Modify-List,
id-PDU-Session-Resource-Setup-List,
id-PDU-Session-Resource-Failed-List,
id-PDU-Session-Resource-Modified-List,
id-PDU-Session-Resource-Failed-To-Modify-List,
id-PDU-Session-Resource-Confirm-Modified-List,
id-PDU-Session-Resource-Setup-Mod-List,
id-PDU-Session-Resource-Failed-Mod-List,
id-PDU-Session-Resource-To-Setup-Mod-List,
id-PDU-Session-To-Notify-List,
id-TransactionID,
id-Serving-PLMN,
id-UE-Inactivity-Timer,
id-System-GNB-CU-UP-CounterCheckRequest,
id-DRBs-Subject-To-Counter-Check-List-EUTRAN,
id-DRBs-Subject-To-Counter-Check-List-NG-RAN,
id-PPI,
id-gNB-CU-UP-Capacity,
id-GNB-CU-UP-OverloadInformation,
id-UEDLMaximumIntegrityProtectedDataRate,
id-DataDiscardRequired,
id-PDU-Session-Resource-Data-Usage-List,
id-RANUEID,
id-GNB-DU-ID,
id-TraceID,
id-TraceActivation,
id-SubscriberProfileIDforRFP,
id-AdditionalRRMPriorityIndex,
id-RetainabilityMeasurementsInfo,
id-Transport-Layer-Address-Info,
id-gNB-CU-CP-Measurement-ID,
id-gNB-CU-UP-Measurement-ID,
id-RegistrationRequest,
id-ReportCharacteristics,
id-ReportingPeriodicity,
id-TNL-AvailableCapacityIndicator,

```

id-HW-CapacityIndicator,
id-DLUPTNLAddressToUpdateList,
id-ULUPTNLAddressToUpdateList,
id-ManagementBasedMDTPLMNList,
id-TraceCollectionEntityIPAddress,
id-PrivacyIndicator,
id-URIaddress,
id-DRBs-Subject-To-Early-Forwarding-List,
id-CHOInitiation,
id-ExtendedSliceSupportList,
id-AdditionalHandoverInfo,
id-Extended-NR-CGI-Support-List,
id-DirectForwardingPathAvailability,
id-IAB-Donor-CU-UPPSKInfo,

maxnoofErrors,
maxnoofSPLMNs,
maxnoofDRBs,
maxnoofTNLAssociations,
maxnoofIndividualE1ConnectionsToReset,
maxnoofTNLAddresses,
maxnoofPSKs

FROM ElAP-Constants;

-- *****
--
-- RESET
--
-- *****

-- *****
--
-- Reset
--
-- *****

Reset ::= SEQUENCE {
    protocolIEs      ProtocolIE-Container      { {ResetIEs} },
    ...
}

ResetIEs ElAP-PROTOCOL-IES ::= {
    { ID id-TransactionID          CRITICALITY reject TYPE TransactionID          PRESENCE mandatory }|
    { ID id-Cause                  CRITICALITY ignore TYPE Cause                PRESENCE mandatory }|
    { ID id-ResetType              CRITICALITY reject TYPE ResetType          PRESENCE mandatory },
    ...
}

ResetType ::= CHOICE {
    el-Interface                ResetAll,
    partOfE1-Interface          UE-associatedLogicalE1-ConnectionListRes,
    choice-extension            ProtocolIE-SingleContainer {{ResetType-ExtIEs}}
}

```

```

}

ResetType-ExtIEs E1AP-PROTOCOL-IES ::= {
  ...
}

ResetAll ::= ENUMERATED {
  reset-all,
  ...
}

UE-associatedLogicalE1-ConnectionListRes ::= SEQUENCE (SIZE(1.. maxnoofIndividualE1ConnectionsToReset)) OF ProtocolIE-SingleContainer { { UE-
associatedLogicalE1-ConnectionItemRes } }

UE-associatedLogicalE1-ConnectionItemRes E1AP-PROTOCOL-IES ::= {
  { ID id-UE-associatedLogicalE1-ConnectionItem  CRITICALITY reject  TYPE UE-associatedLogicalE1-ConnectionItem  PRESENCE mandatory},
  ...
}

-- *****
--
-- Reset Acknowledge
--
-- *****

ResetAcknowledge ::= SEQUENCE {
  protocolIEs          ProtocolIE-Container          { {ResetAcknowledgeIEs} },
  ...
}

ResetAcknowledgeIEs E1AP-PROTOCOL-IES ::= {
  { ID id-TransactionID                CRITICALITY reject  TYPE TransactionID                PRESENCE mandatory  }|
  { ID id-UE-associatedLogicalE1-ConnectionListResAck  CRITICALITY ignore  TYPE UE-associatedLogicalE1-ConnectionListResAck  PRESENCE
optional  }|
  { ID id-CriticalityDiagnostics        CRITICALITY ignore  TYPE CriticalityDiagnostics        PRESENCE optional  },
  ...
}

UE-associatedLogicalE1-ConnectionListResAck ::= SEQUENCE (SIZE(1.. maxnoofIndividualE1ConnectionsToReset)) OF ProtocolIE-SingleContainer { { UE-
associatedLogicalE1-ConnectionItemResAck } }

UE-associatedLogicalE1-ConnectionItemResAck E1AP-PROTOCOL-IES ::= {
  { ID id-UE-associatedLogicalE1-ConnectionItem  CRITICALITY ignore  TYPE UE-associatedLogicalE1-ConnectionItem  PRESENCE mandatory },
  ...
}

-- *****
--
-- ERROR INDICATION
--
-- *****

```

```

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

ErrorIndication-IEs E1AP-PROTOCOL-IES ::= {
    { ID id-TransactionID          CRITICALITY reject  TYPE TransactionID          PRESENCE mandatory }|
    { ID id-gNB-CU-CP-UE-E1AP-ID   CRITICALITY ignore TYPE GNB-CU-CP-UE-E1AP-ID   PRESENCE optional }|
    { ID id-gNB-CU-UP-UE-E1AP-ID   CRITICALITY ignore TYPE GNB-CU-UP-UE-E1AP-ID   PRESENCE optional }|
    { ID id-Cause                  CRITICALITY ignore TYPE Cause                  PRESENCE optional }|
    { ID id-CriticalityDiagnostics CRITICALITY ignore TYPE CriticalityDiagnostics PRESENCE optional },
    ...
}

-- *****
--
-- GNB-CU-UP E1 SETUP
--
-- *****
--
-- *****
--
-- GNB-CU-UP E1 Setup Request
--
-- *****

GNB-CU-UP-E1SetupRequest ::= SEQUENCE {
    protocolIEs      ProtocolIE-Container    { {GNB-CU-UP-E1SetupRequestIEs} },
    ...
}

GNB-CU-UP-E1SetupRequestIEs E1AP-PROTOCOL-IES ::= {
    { ID id-TransactionID          CRITICALITY reject  TYPE TransactionID          PRESENCE mandatory }|
    { ID id-gNB-CU-UP-ID           CRITICALITY reject  TYPE GNB-CU-UP-ID           PRESENCE mandatory }|
    { ID id-gNB-CU-UP-Name         CRITICALITY ignore  TYPE GNB-CU-UP-Name         PRESENCE optional }|
    { ID id-CNSupport              CRITICALITY reject  TYPE CNSupport              PRESENCE mandatory }|
    { ID id-SupportedPLMNs         CRITICALITY reject  TYPE SupportedPLMNs-List    PRESENCE mandatory }|
    { ID id-gNB-CU-UP-Capacity     CRITICALITY ignore  TYPE GNB-CU-UP-Capacity     PRESENCE optional }|
    { ID id-Transport-Layer-Address-Info CRITICALITY ignore TYPE Transport-Layer-Address-Info PRESENCE optional }|
    { ID id-Extended-GNB-CU-UP-Name CRITICALITY ignore  TYPE Extended-GNB-CU-UP-Name PRESENCE optional },
    ...
}

SupportedPLMNs-List ::= SEQUENCE (SIZE (1..maxnoofSPLMNs)) OF SupportedPLMNs-Item

SupportedPLMNs-Item ::= SEQUENCE {
    pLMN-Identity          PLMN-Identity,
    slice-Support-List     Slice-Support-List          OPTIONAL,
    nR-CGI-Support-List    NR-CGI-Support-List        OPTIONAL,
    qoS-Parameters-Support-List QoS-Parameters-Support-List OPTIONAL,
    IE-Extensions          ProtocolExtensionContainer { { SupportedPLMNs-ExtIEs } } OPTIONAL,
    ...
}

```

```

SupportedPLMNs-ExtIEs E1AP-PROTOCOL-EXTENSION ::= {
  { ID id-NPNSupportInfo          CRITICALITY reject  EXTENSION NPNSupportInfo          PRESENCE optional }|
  { ID id-ExtendedSliceSupportList CRITICALITY reject  EXTENSION ExtendedSliceSupportList PRESENCE optional }|
  { ID id-Extended-NR-CGI-Support-List CRITICALITY ignore  EXTENSION Extended-NR-CGI-Support-List PRESENCE optional },
  ...
}

-- *****
--
-- GNB-CU-UP E1 Setup Response
--
-- *****

GNB-CU-UP-E1SetupResponse ::= SEQUENCE {
  protocolIEs          ProtocolIE-Container      { {GNB-CU-UP-E1SetupResponseIEs} },
  ...
}

GNB-CU-UP-E1SetupResponseIEs E1AP-PROTOCOL-IES ::= {
  { ID id-TransactionID          CRITICALITY reject  TYPE TransactionID          PRESENCE mandatory }|
  { ID id-gNB-CU-CP-Name         CRITICALITY ignore  TYPE GNB-CU-CP-Name         PRESENCE optional }|
  { ID id-Transport-Layer-Address-Info CRITICALITY ignore  TYPE Transport-Layer-Address-Info PRESENCE optional }|
  { ID id-Extended-GNB-CU-CP-Name CRITICALITY ignore  TYPE Extended-GNB-CU-CP-Name PRESENCE optional },
  ...
}

-- *****
--
-- GNB-CU-UP E1 Setup Failure
--
-- *****

GNB-CU-UP-E1SetupFailure ::= SEQUENCE {
  protocolIEs          ProtocolIE-Container      { {GNB-CU-UP-E1SetupFailureIEs} },
  ...
}

GNB-CU-UP-E1SetupFailureIEs E1AP-PROTOCOL-IES ::= {
  { ID id-TransactionID          CRITICALITY reject  TYPE TransactionID          PRESENCE mandatory }|
  { 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 },
  ...
}

-- *****
--
-- GNB-CU-CP E1 SETUP
--
-- *****

-- *****
--
-- GNB-CU-CP E1 Setup Request

```

```

--
-- *****
GNB-CU-CP-E1SetupRequest ::= SEQUENCE {
  protocolIEs          ProtocolIE-Container      { {GNB-CU-CP-E1SetupRequestIEs} },
  ...
}

GNB-CU-CP-E1SetupRequestIEs E1AP-PROTOCOL-IES ::= {
  { ID id-TransactionID          CRITICALITY reject TYPE TransactionID          PRESENCE mandatory }|
  { ID id-gNB-CU-CP-Name         CRITICALITY ignore TYPE GNB-CU-CP-Name         PRESENCE optional }|
  { ID id-Transport-Layer-Address-Info CRITICALITY ignore TYPE Transport-Layer-Address-Info PRESENCE optional }|
  { ID id-Extended-GNB-CU-CP-Name CRITICALITY ignore TYPE Extended-GNB-CU-CP-Name PRESENCE optional },
  ...
}

-- *****
--
-- GNB-CU-CP E1 Setup Response
--
-- *****

GNB-CU-CP-E1SetupResponse ::= SEQUENCE {
  protocolIEs          ProtocolIE-Container      { {GNB-CU-CP-E1SetupResponseIEs} },
  ...
}

GNB-CU-CP-E1SetupResponseIEs E1AP-PROTOCOL-IES ::= {
  { ID id-TransactionID          CRITICALITY reject TYPE TransactionID          PRESENCE mandatory }|
  { ID id-gNB-CU-UP-ID          CRITICALITY reject TYPE GNB-CU-UP-ID          PRESENCE mandatory }|
  { ID id-gNB-CU-UP-Name        CRITICALITY ignore TYPE GNB-CU-UP-Name        PRESENCE optional }|
  { ID id-CNSupport             CRITICALITY reject TYPE CNSupport             PRESENCE mandatory }|
  { ID id-SupportedPLMNs        CRITICALITY reject TYPE SupportedPLMNs-List        PRESENCE mandatory }|
  { ID id-gNB-CU-UP-Capacity     CRITICALITY ignore TYPE GNB-CU-UP-Capacity     PRESENCE optional }|
  { ID id-Transport-Layer-Address-Info CRITICALITY ignore TYPE Transport-Layer-Address-Info PRESENCE optional }|
  { ID id-Extended-GNB-CU-UP-Name CRITICALITY ignore TYPE Extended-GNB-CU-UP-Name PRESENCE optional },
  ...
}

-- *****
--
-- GNB-CU-CP E1 Setup Failure
--
-- *****

GNB-CU-CP-E1SetupFailure ::= SEQUENCE {
  protocolIEs          ProtocolIE-Container      { {GNB-CU-CP-E1SetupFailureIEs} },
  ...
}

GNB-CU-CP-E1SetupFailureIEs E1AP-PROTOCOL-IES ::= {
  { ID id-TransactionID          CRITICALITY reject TYPE TransactionID          PRESENCE mandatory }|
  { 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 },
    ...
}

-- *****
--
-- GNB-CU-UP CONFIGURATION UPDATE
--
-- *****
--
-- *****
--
-- GNB-CU-UP Configuration Update
--
-- *****

GNB-CU-UP-ConfigurationUpdate ::= SEQUENCE {
    protocolIEs          ProtocolIE-Container      { {GNB-CU-UP-ConfigurationUpdateIEs} },
    ...
}

GNB-CU-UP-ConfigurationUpdateIEs ELAP-PROTOCOL-IES ::= {
    { ID id-TransactionID              CRITICALITY reject  TYPE TransactionID          PRESENCE mandatory }|
    { ID id-gNB-CU-UP-ID                CRITICALITY reject  TYPE GNB-CU-UP-ID          PRESENCE mandatory }|
    { ID id-gNB-CU-UP-Name              CRITICALITY ignore  TYPE GNB-CU-UP-Name        PRESENCE optional }|
    { ID id-SupportedPLMNs              CRITICALITY reject  TYPE SupportedPLMNs-List    PRESENCE optional }|
    { ID id-gNB-CU-UP-Capacity          CRITICALITY ignore  TYPE GNB-CU-UP-Capacity     PRESENCE optional }|
    { ID id-gNB-CU-UP-TNLA-To-Remove-List CRITICALITY reject  TYPE GNB-CU-UP-TNLA-To-Remove-List PRESENCE optional }|
    { ID id-Transport-Layer-Address-Info CRITICALITY ignore  TYPE Transport-Layer-Address-Info PRESENCE optional }|
    { ID id-Extended-GNB-CU-UP-Name     CRITICALITY ignore  TYPE Extended-GNB-CU-UP-Name PRESENCE optional },
    ...
}

GNB-CU-UP-TNLA-To-Remove-List ::= SEQUENCE (SIZE(1.. maxnoofTNLAAssociations)) OF GNB-CU-UP-TNLA-To-Remove-Item

-- *****
--
-- GNB-CU-UP Configuration Update Acknowledge
--
-- *****

GNB-CU-UP-ConfigurationUpdateAcknowledge ::= SEQUENCE {
    protocolIEs          ProtocolIE-Container      { {GNB-CU-UP-ConfigurationUpdateAcknowledgeIEs} },
    ...
}

GNB-CU-UP-ConfigurationUpdateAcknowledgeIEs ELAP-PROTOCOL-IES ::= {
    { ID id-TransactionID              CRITICALITY reject  TYPE TransactionID          PRESENCE mandatory }|
    { ID id-CriticalityDiagnostics      CRITICALITY ignore  TYPE CriticalityDiagnostics  PRESENCE optional }|
    { ID id-Transport-Layer-Address-Info CRITICALITY ignore  TYPE Transport-Layer-Address-Info PRESENCE optional },
    ...
}

-- *****

```

```

--
-- GNB-CU-UP Configuration Update Failure
--
-- *****
GNB-CU-UP-ConfigurationUpdateFailure ::= SEQUENCE {
    protocolIEs          ProtocolIE-Container          { {GNB-CU-UP-ConfigurationUpdateFailureIEs} },
    ...
}

GNB-CU-UP-ConfigurationUpdateFailureIEs E1AP-PROTOCOL-IES ::= {
    { ID id-TransactionID          CRITICALITY reject  TYPE TransactionID          PRESENCE mandatory }|
    { 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 },
    ...
}

-- *****
--
-- GNB-CU-CP CONFIGURATION UPDATE
--
-- *****
--
-- *****
--
-- GNB-CU-CP Configuration Update
--
-- *****

GNB-CU-CP-ConfigurationUpdate ::= SEQUENCE {
    protocolIEs          ProtocolIE-Container          { {GNB-CU-CP-ConfigurationUpdateIEs} },
    ...
}

GNB-CU-CP-ConfigurationUpdateIEs E1AP-PROTOCOL-IES ::= {
    { ID id-TransactionID          CRITICALITY reject  TYPE TransactionID          PRESENCE mandatory }|
    { ID id-gNB-CU-CP-Name         CRITICALITY ignore  TYPE GNB-CU-CP-Name         PRESENCE optional }|
    { ID id-gNB-CU-CP-TNLA-To-Add-List  CRITICALITY ignore  TYPE GNB-CU-CP-TNLA-To-Add-List  PRESENCE optional }|
    { ID id-gNB-CU-CP-TNLA-To-Remove-List  CRITICALITY ignore  TYPE GNB-CU-CP-TNLA-To-Remove-List  PRESENCE optional }|
    { ID id-gNB-CU-CP-TNLA-To-Update-List  CRITICALITY ignore  TYPE GNB-CU-CP-TNLA-To-Update-List  PRESENCE optional }|
    { ID id-Transport-Layer-Address-Info  CRITICALITY ignore  TYPE Transport-Layer-Address-Info  PRESENCE optional }|
    { ID id-Extended-gNB-CU-CP-Name      CRITICALITY ignore  TYPE Extended-gNB-CU-CP-Name      PRESENCE optional },
    ...
}

GNB-CU-CP-TNLA-To-Add-List          ::= SEQUENCE (SIZE(1.. maxnoofTNLAAssociations)) OF GNB-CU-CP-TNLA-To-Add-Item
GNB-CU-CP-TNLA-To-Remove-List       ::= SEQUENCE (SIZE(1.. maxnoofTNLAAssociations)) OF GNB-CU-CP-TNLA-To-Remove-Item
GNB-CU-CP-TNLA-To-Update-List       ::= SEQUENCE (SIZE(1.. maxnoofTNLAAssociations)) OF GNB-CU-CP-TNLA-To-Update-Item

-- *****
--
-- GNB-CU-CP Configuration Update Acknowledge
--

```



```

-- *****
GNB-CU-CP-ConfigurationUpdateAcknowledge ::= SEQUENCE {
    protocolIEs          ProtocolIE-Container      { {GNB-CU-CP-ConfigurationUpdateAcknowledgeIEs} },
    ...
}

GNB-CU-CP-ConfigurationUpdateAcknowledgeIEs E1AP-PROTOCOL-IES ::= {
    { ID id-TransactionID          CRITICALITY reject  TYPE TransactionID          PRESENCE mandatory }|
    { ID id-CriticalityDiagnostics CRITICALITY ignore TYPE CriticalityDiagnostics PRESENCE optional }|
    { ID id-GNB-CU-CP-TNLA-Setup-List CRITICALITY ignore TYPE GNB-CU-CP-TNLA-Setup-List PRESENCE optional }|
    { ID id-GNB-CU-CP-TNLA-Failed-To-Setup-List CRITICALITY ignore TYPE GNB-CU-CP-TNLA-Failed-To-Setup-List PRESENCE optional }|
    { ID id-Transport-Layer-Address-Info CRITICALITY ignore TYPE Transport-Layer-Address-Info PRESENCE optional },
    ...
}

GNB-CU-CP-TNLA-Setup-List ::= SEQUENCE (SIZE(1.. maxnoofTNLAAssociations)) OF GNB-CU-CP-TNLA-Setup-Item
GNB-CU-CP-TNLA-Failed-To-Setup-List ::= SEQUENCE (SIZE(1.. maxnoofTNLAAssociations)) OF GNB-CU-CP-TNLA-Failed-To-Setup-Item

-- *****
--
-- GNB-CU-CP Configuration Update Failure
--
-- *****

GNB-CU-CP-ConfigurationUpdateFailure ::= SEQUENCE {
    protocolIEs          ProtocolIE-Container      { {GNB-CU-CP-ConfigurationUpdateFailureIEs} },
    ...
}

GNB-CU-CP-ConfigurationUpdateFailureIEs E1AP-PROTOCOL-IES ::= {
    { ID id-TransactionID          CRITICALITY reject  TYPE TransactionID          PRESENCE mandatory }|
    { 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 },
    ...
}

-- *****
--
-- E1 RELEASE
--
-- *****

-- *****
--
-- E1 Release Request
--
-- *****

E1ReleaseRequest ::= SEQUENCE {
    protocolIEs          ProtocolIE-Container      { {E1ReleaseRequestIEs} },
    ...
}

```

```

}

ElReleaseRequestIEs E1AP-PROTOCOL-IES ::= {
  { ID id-TransactionID          CRITICALITY reject  TYPE TransactionID          PRESENCE mandatory }|
  { ID id-Cause                  CRITICALITY ignore  TYPE Cause                          PRESENCE mandatory }|
  ...
}

-- *****
--
-- El Release Response
--
-- *****

ElReleaseResponse ::= SEQUENCE {
  protocolIEs          ProtocolIE-Container      { {ElReleaseResponseIEs} },
  ...
}

ElReleaseResponseIEs E1AP-PROTOCOL-IES ::= {
  { ID id-TransactionID          CRITICALITY reject  TYPE TransactionID          PRESENCE mandatory }|
  ...
}

-- *****
--
-- BEARER CONTEXT SETUP
--
-- *****

-- *****
--
-- Bearer Context Setup Request
--
-- *****

BearerContextSetupRequest ::= SEQUENCE {
  protocolIEs          ProtocolIE-Container      { {BearerContextSetupRequestIEs} },
  ...
}

BearerContextSetupRequestIEs E1AP-PROTOCOL-IES ::= {
  { ID id-gNB-CU-CP-UE-E1AP-ID          CRITICALITY reject  TYPE GNB-CU-CP-UE-E1AP-ID          PRESENCE mandatory }|
  { ID id-SecurityInformation            CRITICALITY reject  TYPE SecurityInformation            PRESENCE mandatory }|
  { ID id-UEDLAggregateMaximumBitRate    CRITICALITY reject  TYPE BitRate                        PRESENCE mandatory }|
  { ID id-UEDLMaximumIntegrityProtectedDataRate  CRITICALITY reject  TYPE BitRate                        PRESENCE optional }|
  { ID id-Serving-PLMN                   CRITICALITY ignore  TYPE PLMN-Identity                  PRESENCE mandatory }|
  { ID id-ActivityNotificationLevel       CRITICALITY reject  TYPE ActivityNotificationLevel      PRESENCE mandatory }|
  { ID id-UE-Inactivity-Timer            CRITICALITY reject  TYPE Inactivity-Timer               PRESENCE optional }|
  { ID id-BearerContextStatusChange       CRITICALITY reject  TYPE BearerContextStatusChange      PRESENCE optional }|
  { ID id-System-BearerContextSetupRequest  CRITICALITY reject  TYPE System-BearerContextSetupRequest  PRESENCE mandatory }|
  { ID id-RANUEID                         CRITICALITY ignore  TYPE RANUEID                        PRESENCE optional }|
  { ID id-GNB-DU-ID                       CRITICALITY ignore  TYPE GNB-DU-ID                      PRESENCE optional }|
  { ID id-TraceActivation                 CRITICALITY ignore  TYPE TraceActivation                 PRESENCE optional }|
}

```

```

    { ID id-NPNContextInfo          CRITICALITY reject TYPE NPNContextInfo          PRESENCE optional }|
    { ID id-ManagementBasedMDTPLMNList CRITICALITY ignore TYPE MDTPLMNList          PRESENCE optional }|
    { ID id-CHOInitiation           CRITICALITY reject TYPE CHOInitiation          PRESENCE optional }|
    { ID id-AdditionalHandoverInfo   CRITICALITY ignore TYPE AdditionalHandoverInfo PRESENCE optional }|
    { ID id-DirectForwardingPathAvailability CRITICALITY ignore TYPE DirectForwardingPathAvailability PRESENCE optional }|
    { ID id-gNB-CU-UP-UE-E1AP-ID     CRITICALITY ignore TYPE GNB-CU-UP-UE-E1AP-ID     PRESENCE optional },
    ...
}

System-BearerContextSetupRequest ::= CHOICE {
    e-UTRAN-BearerContextSetupRequest ProtocolIE-Container    {{EUTRAN-BearerContextSetupRequest}},
    nG-RAN-BearerContextSetupRequest  ProtocolIE-Container    {{NG-RAN-BearerContextSetupRequest}},
    choice-extension                   ProtocolIE-SingleContainer {{System-BearerContextSetupRequest-ExtIEs}}
}

System-BearerContextSetupRequest-ExtIEs E1AP-PROTOCOL-IES ::= {
    ...
}

EUTRAN-BearerContextSetupRequest E1AP-PROTOCOL-IES ::= {
    { ID id-DRB-To-Setup-List-EUTRAN          CRITICALITY reject TYPE DRB-To-Setup-List-EUTRAN PRESENCE mandatory }|
    { ID id-SubscriberProfileIDforRFP        CRITICALITY ignore TYPE SubscriberProfileIDforRFP PRESENCE optional }|
    { ID id-AdditionalRRMPriorityIndex        CRITICALITY ignore TYPE AdditionalRRMPriorityIndex PRESENCE optional },
    ...
}

NG-RAN-BearerContextSetupRequest E1AP-PROTOCOL-IES ::= {
    { ID id-PDU-Session-Resource-To-Setup-List CRITICALITY reject TYPE PDU-Session-Resource-To-Setup-List PRESENCE mandatory },
    ...
}

-- *****
--
-- Bearer Context Setup Response
--
-- *****

BearerContextSetupResponse ::= SEQUENCE {
    protocolIEs ProtocolIE-Container { { BearerContextSetupResponseIEs } },
    ...
}

BearerContextSetupResponseIEs E1AP-PROTOCOL-IES ::= {
    { ID id-gNB-CU-CP-UE-E1AP-ID          CRITICALITY reject TYPE GNB-CU-CP-UE-E1AP-ID          PRESENCE mandatory }|
    { ID id-gNB-CU-UP-UE-E1AP-ID          CRITICALITY reject TYPE GNB-CU-UP-UE-E1AP-ID          PRESENCE mandatory }|
    { ID id-System-BearerContextSetupResponse CRITICALITY ignore TYPE System-BearerContextSetupResponse PRESENCE mandatory },
    ...
}

System-BearerContextSetupResponse ::= CHOICE {
    e-UTRAN-BearerContextSetupResponse ProtocolIE-Container    {{EUTRAN-BearerContextSetupResponse}},

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    nG-RAN-BearerContextSetupResponse      ProtocolIE-Container      {{NG-RAN-BearerContextSetupResponse}},
    choice-extension                       ProtocolIE-SingleContainer  {{System-BearerContextSetupResponse-ExtIEs}}
}

System-BearerContextSetupResponse-ExtIEs  E1AP-PROTOCOL-IES ::= {
}

EUTRAN-BearerContextSetupResponse E1AP-PROTOCOL-IES ::= {
  { ID id-DRB-Setup-List-EUTRAN          CRITICALITY ignore  TYPE DRB-Setup-List-EUTRAN          PRESENCE mandatory }|
  { ID id-DRB-Failed-List-EUTRAN        CRITICALITY ignore  TYPE DRB-Failed-List-EUTRAN        PRESENCE optional  },
  ...
}

NG-RAN-BearerContextSetupResponse E1AP-PROTOCOL-IES ::= {
  { ID id-PDU-Session-Resource-Setup-List  CRITICALITY ignore  TYPE PDU-Session-Resource-Setup-List  PRESENCE mandatory }|
  { ID id-PDU-Session-Resource-Failed-List  CRITICALITY ignore  TYPE PDU-Session-Resource-Failed-List  PRESENCE optional  },
  ...
}

-- *****
--
-- Bearer Context Setup Failure
--
-- *****

BearerContextSetupFailure ::= SEQUENCE {
  protocolIEs          ProtocolIE-Container      { { BearerContextSetupFailureIEs } },
  ...
}

BearerContextSetupFailureIEs E1AP-PROTOCOL-IES ::= {
  { ID id-gNB-CU-CP-UE-E1AP-ID          CRITICALITY reject  TYPE GNB-CU-CP-UE-E1AP-ID          PRESENCE mandatory }|
  { ID id-gNB-CU-UP-UE-E1AP-ID          CRITICALITY ignore  TYPE GNB-CU-UP-UE-E1AP-ID          PRESENCE optional  }|
  { ID id-Cause                          CRITICALITY ignore  TYPE Cause                          PRESENCE mandatory }|
  { ID id-CriticalityDiagnostics         CRITICALITY ignore  TYPE CriticalityDiagnostics         PRESENCE optional  },
  ...
}

-- *****
--
-- BEARER CONTEXT MODIFICATION
--
-- *****

-- *****
--
-- Bearer Context Modification Request
--
-- *****

BearerContextModificationRequest ::= SEQUENCE {
  protocolIEs          ProtocolIE-Container      { { BearerContextModificationRequestIEs } },

```

```

}
...
}
BearerContextModificationRequestIES E1AP-PROTOCOL-IES ::= {
  { ID id-gNB-CU-CP-UE-E1AP-ID          CRITICALITY reject  TYPE GNB-CU-CP-UE-E1AP-ID          PRESENCE mandatory }|
  { ID id-gNB-CU-UP-UE-E1AP-ID          CRITICALITY reject  TYPE GNB-CU-UP-UE-E1AP-ID          PRESENCE mandatory }|
  { ID id-SecurityInformation            CRITICALITY reject  TYPE SecurityInformation            PRESENCE optional   }|
  { ID id-UEDLAggregateMaximumBitRate    CRITICALITY reject  TYPE BitRate                        PRESENCE optional   }|
  { ID id-UEDLMaximumIntegrityProtectedDataRate CRITICALITY reject  TYPE BitRate                        PRESENCE optional   }|
  { ID id-BearerContextStatusChange      CRITICALITY reject  TYPE BearerContextStatusChange      PRESENCE optional   }|
  { ID id-New-UL-TNL-Information-Required CRITICALITY reject  TYPE New-UL-TNL-Information-Required PRESENCE optional   }|
  { ID id-UE-Inactivity-Timer            CRITICALITY reject  TYPE Inactivity-Timer                PRESENCE optional   }|
  { ID id-DataDiscardRequired            CRITICALITY ignore  TYPE DataDiscardRequired            PRESENCE optional   }|
  { ID id-System-BearerContextModificationRequest CRITICALITY reject  TYPE System-BearerContextModificationRequest PRESENCE optional }|
  { ID id-RANUEID                        CRITICALITY ignore  TYPE RANUEID                        PRESENCE optional   }|
  { ID id-GNB-DU-ID                      CRITICALITY ignore  TYPE GNB-DU-ID                      PRESENCE optional   }|
  { ID id-ActivityNotificationLevel       CRITICALITY ignore  TYPE ActivityNotificationLevel       PRESENCE optional   },
  ...
}

System-BearerContextModificationRequest ::= CHOICE {
  e-UTRAN-BearerContextModificationRequest ProtocolIE-Container      {{EUTRAN-BearerContextModificationRequest}},
  ng-RAN-BearerContextModificationRequest ProtocolIE-Container      {{NG-RAN-BearerContextModificationRequest}},
  choice-extension                        ProtocolIE-SingleContainer {{System-BearerContextModificationRequest-ExtIEs}}
}

System-BearerContextModificationRequest-ExtIEs E1AP-PROTOCOL-IES ::= {
  ...
}

EUTRAN-BearerContextModificationRequest E1AP-PROTOCOL-IES ::= {
  { ID id-DRB-To-Setup-Mod-List-EUTRAN    CRITICALITY reject  TYPE DRB-To-Setup-Mod-List-EUTRAN    PRESENCE optional }|
  { ID id-DRB-To-Modify-List-EUTRAN       CRITICALITY reject  TYPE DRB-To-Modify-List-EUTRAN       PRESENCE optional }|
  { ID id-DRB-To-Remove-List-EUTRAN       CRITICALITY reject  TYPE DRB-To-Remove-List-EUTRAN       PRESENCE optional }|
  { ID id-SubscriberProfileIDforRFP       CRITICALITY ignore  TYPE SubscriberProfileIDforRFP       PRESENCE optional }|
  { ID id-AdditionalRRMPriorityIndex       CRITICALITY ignore  TYPE AdditionalRRMPriorityIndex       PRESENCE optional },
  ...
}

NG-RAN-BearerContextModificationRequest E1AP-PROTOCOL-IES ::= {
  { ID id-PDU-Session-Resource-To-Setup-Mod-List CRITICALITY reject  TYPE PDU-Session-Resource-To-Setup-Mod-List PRESENCE optional }|
  { ID id-PDU-Session-Resource-To-Modify-List   CRITICALITY reject  TYPE PDU-Session-Resource-To-Modify-List   PRESENCE optional }|
  { ID id-PDU-Session-Resource-To-Remove-List   CRITICALITY reject  TYPE PDU-Session-Resource-To-Remove-List   PRESENCE optional },
  ...
}

-- *****
--
-- Bearer Context Modification Response
--
-- *****

BearerContextModificationResponse ::= SEQUENCE {

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    protocolIEs          ProtocolIE-Container      { { BearerContextModificationResponseIEs } },
    ...
}

BearerContextModificationResponseIEs ELAP-PROTOCOL-IES ::= {
    { ID id-gNB-CU-CP-UE-E1AP-ID          CRITICALITY reject  TYPE GNB-CU-CP-UE-E1AP-ID          PRESENCE mandatory }|
    { ID id-gNB-CU-UP-UE-E1AP-ID          CRITICALITY reject  TYPE GNB-CU-UP-UE-E1AP-ID          PRESENCE mandatory }|
    { ID id-System-BearerContextModificationResponse  CRITICALITY ignore  TYPE System-BearerContextModificationResponse  PRESENCE optional }|
    ...
}

System-BearerContextModificationResponse ::= CHOICE {
    e-UTRAN-BearerContextModificationResponse  ProtocolIE-Container {{EUTRAN-BearerContextModificationResponse}},
    nG-RAN-BearerContextModificationResponse  ProtocolIE-Container {{NG-RAN-BearerContextModificationResponse}},
    choice-extension                          ProtocolIE-Container {{System-BearerContextModificationResponse-ExtIEs}}
}

System-BearerContextModificationResponse-ExtIEs ELAP-PROTOCOL-IES ::= {
    ...
}

EUTRAN-BearerContextModificationResponse ELAP-PROTOCOL-IES ::= {
    { ID id-DRB-Setup-Mod-List-EUTRAN          CRITICALITY ignore  TYPE DRB-Setup-Mod-List-EUTRAN          PRESENCE optional }|
    { ID id-DRB-Failed-Mod-List-EUTRAN         CRITICALITY ignore  TYPE DRB-Failed-Mod-List-EUTRAN         PRESENCE optional }|
    { ID id-DRB-Modified-List-EUTRAN          CRITICALITY ignore  TYPE DRB-Modified-List-EUTRAN          PRESENCE optional }|
    { ID id-DRB-Failed-To-Modify-List-EUTRAN   CRITICALITY ignore  TYPE DRB-Failed-To-Modify-List-EUTRAN   PRESENCE optional }|
    { ID id-RetainabilityMeasurementsInfo      CRITICALITY ignore  TYPE RetainabilityMeasurementsInfo      PRESENCE optional }|
    ...
}

NG-RAN-BearerContextModificationResponse ELAP-PROTOCOL-IES ::= {
    { ID id-PDU-Session-Resource-Setup-Mod-List  CRITICALITY reject  TYPE PDU-Session-Resource-Setup-Mod-List  PRESENCE optional }|
    { ID id-PDU-Session-Resource-Failed-Mod-List CRITICALITY reject  TYPE PDU-Session-Resource-Failed-Mod-List  PRESENCE optional }|
    { ID id-PDU-Session-Resource-Modified-List   CRITICALITY reject  TYPE PDU-Session-Resource-Modified-List   PRESENCE optional }|
    { ID id-PDU-Session-Resource-Failed-To-Modify-List CRITICALITY reject  TYPE PDU-Session-Resource-Failed-To-Modify-List PRESENCE optional }|
    { ID id-RetainabilityMeasurementsInfo        CRITICALITY ignore  TYPE RetainabilityMeasurementsInfo        PRESENCE optional }|
    ...
}

-- *****
--
-- Bearer Context Modification Failure
--
-- *****

BearerContextModificationFailure ::= SEQUENCE {
    protocolIEs          ProtocolIE-Container      { { BearerContextModificationFailureIEs } },
    ...
}

BearerContextModificationFailureIEs ELAP-PROTOCOL-IES ::= {
    { ID id-gNB-CU-CP-UE-E1AP-ID          CRITICALITY reject  TYPE GNB-CU-CP-UE-E1AP-ID          PRESENCE mandatory }|

```

```

    { ID id-gNB-CU-UP-UE-E1AP-ID          CRITICALITY reject  TYPE GNB-CU-UP-UE-E1AP-ID          PRESENCE mandatory }|
    { ID id-Cause                          CRITICALITY ignore  TYPE Cause                        PRESENCE mandatory }|
    { ID id-CriticalityDiagnostics          CRITICALITY ignore  TYPE CriticalityDiagnostics        PRESENCE optional  },
    ...
}

-- *****
--
-- BEARER CONTEXT MODIFICATION REQUIRED
--
-- *****
--
-- Bearer Context Modification Required
--
-- *****

BearerContextModificationRequired ::= SEQUENCE {
    protocolIEs          ProtocolIE-Container    { { BearerContextModificationRequiredIEs } },
    ...
}

BearerContextModificationRequiredIEs E1AP-PROTOCOL-IES ::= {
    { ID id-gNB-CU-CP-UE-E1AP-ID          CRITICALITY reject  TYPE GNB-CU-CP-UE-E1AP-ID          PRESENCE mandatory
    }|
    { ID id-gNB-CU-UP-UE-E1AP-ID          CRITICALITY reject  TYPE GNB-CU-UP-UE-E1AP-ID          PRESENCE mandatory
    }|
    { ID id-System-BearerContextModificationRequired  CRITICALITY reject  TYPE System-BearerContextModificationRequired  PRESENCE mandatory
    },
    ...
}

System-BearerContextModificationRequired ::= CHOICE {
    e-UTRAN-BearerContextModificationRequired  ProtocolIE-Container  {{EUTRAN-BearerContextModificationRequired}},
    nG-RAN-BearerContextModificationRequired    ProtocolIE-Container  {{NG-RAN-BearerContextModificationRequired}},
    choice-extension                             ProtocolIE-SingleContainer  {{System-BearerContextModificationRequired-ExtIEs}}
}

System-BearerContextModificationRequired-ExtIEs E1AP-PROTOCOL-IES ::= {
    ...
}

EUTRAN-BearerContextModificationRequired E1AP-PROTOCOL-IES ::= {
    { ID id-DRB-Required-To-Modify-List-EUTRAN  CRITICALITY reject  TYPE DRB-Required-To-Modify-List-EUTRAN  PRESENCE optional }|
    { ID id-DRB-Required-To-Remove-List-EUTRAN  CRITICALITY reject  TYPE DRB-Required-To-Remove-List-EUTRAN  PRESENCE optional },
    ...
}

NG-RAN-BearerContextModificationRequired E1AP-PROTOCOL-IES ::= {
    { ID id-PDU-Session-Resource-Required-To-Modify-List  CRITICALITY reject  TYPE PDU-Session-Resource-Required-To-Modify-List  PRESENCE optional }|
    { ID id-PDU-Session-Resource-To-Remove-List  CRITICALITY reject  TYPE PDU-Session-Resource-To-Remove-List  PRESENCE optional },
    ...
}

```

```

}

-- *****
--
-- Bearer Context Modification Confirm
--
-- *****

BearerContextModificationConfirm ::= SEQUENCE {
    protocolIEs          ProtocolIE-Container    { { BearerContextModificationConfirmIEs } },
    ...
}

BearerContextModificationConfirmIEs ELAP-PROTOCOL-IES ::= {
    { ID id-gNB-CU-CP-UE-ElAP-ID          CRITICALITY reject  TYPE GNB-CU-CP-UE-ElAP-ID          PRESENCE mandatory } |
    { ID id-gNB-CU-UP-UE-ElAP-ID          CRITICALITY reject  TYPE GNB-CU-UP-UE-ElAP-ID          PRESENCE mandatory } |
    { ID id-System-BearerContextModificationConfirm  CRITICALITY ignore  TYPE System-BearerContextModificationConfirm  PRESENCE optional },
    ...
}

System-BearerContextModificationConfirm ::= CHOICE {
    e-UTRAN-BearerContextModificationConfirm  ProtocolIE-Container  {{EUTRAN-BearerContextModificationConfirm}},
    nG-RAN-BearerContextModificationConfirm   ProtocolIE-Container  {{NG-RAN-BearerContextModificationConfirm}},
    choice-extension                          ProtocolIE-SingleContainer  {{System-BearerContextModificationConfirm-ExtIEs}}
}

System-BearerContextModificationConfirm-ExtIEs ELAP-PROTOCOL-IES ::= {
    ...
}

EUTRAN-BearerContextModificationConfirm ELAP-PROTOCOL-IES ::= {
    { ID id-DRB-Confirm-Modified-List-EUTRAN  CRITICALITY ignore  TYPE DRB-Confirm-Modified-List-EUTRAN PRESENCE optional },
    ...
}

NG-RAN-BearerContextModificationConfirm ELAP-PROTOCOL-IES ::= {
    { ID id-PDU-Session-Resource-Confirm-Modified-List  CRITICALITY ignore  TYPE PDU-Session-Resource-Confirm-Modified-List PRESENCE optional },
    ...
}

-- *****
--
-- BEARER CONTEXT RELEASE
--
-- *****

-- *****
--
-- Bearer Context Release Command
--
-- *****

```



```

BearerContextReleaseCommand ::= SEQUENCE {
    protocolIEs          ProtocolIE-Container    { { BearerContextReleaseCommandIEs } },
    ...
}

BearerContextReleaseCommandIEs E1AP-PROTOCOL-IES ::= {
    { ID id-gNB-CU-CP-UE-E1AP-ID          CRITICALITY reject TYPE GNB-CU-CP-UE-E1AP-ID          PRESENCE mandatory }|
    { ID id-gNB-CU-UP-UE-E1AP-ID          CRITICALITY reject TYPE GNB-CU-UP-UE-E1AP-ID          PRESENCE mandatory }|
    { ID id-Cause                          CRITICALITY ignore TYPE Cause                          PRESENCE mandatory },
    ...
}

-- *****
--
-- Bearer Context Release Complete
--
-- *****

BearerContextReleaseComplete ::= SEQUENCE {
    protocolIEs          ProtocolIE-Container    { { BearerContextReleaseCompleteIEs } },
    ...
}

BearerContextReleaseCompleteIEs E1AP-PROTOCOL-IES ::= {
    { ID id-gNB-CU-CP-UE-E1AP-ID          CRITICALITY reject TYPE GNB-CU-CP-UE-E1AP-ID          PRESENCE mandatory }|
    { ID id-gNB-CU-UP-UE-E1AP-ID          CRITICALITY reject TYPE GNB-CU-UP-UE-E1AP-ID          PRESENCE mandatory }|
    { ID id-CriticalityDiagnostics         CRITICALITY ignore TYPE CriticalityDiagnostics         PRESENCE optional }|
    { ID id-RetainabilityMeasurementsInfo  CRITICALITY ignore TYPE RetainabilityMeasurementsInfo  PRESENCE optional },
    ...
}

-- *****
--
-- BEARER CONTEXT RELEASE REQUEST
--
-- *****

-- *****
--
-- Bearer Context Release Request
--
-- *****

BearerContextReleaseRequest ::= SEQUENCE {
    protocolIEs          ProtocolIE-Container    { { BearerContextReleaseRequestIEs } },
    ...
}

BearerContextReleaseRequestIEs E1AP-PROTOCOL-IES ::= {
    { ID id-gNB-CU-CP-UE-E1AP-ID          CRITICALITY reject TYPE GNB-CU-CP-UE-E1AP-ID          PRESENCE mandatory }|
    { ID id-gNB-CU-UP-UE-E1AP-ID          CRITICALITY reject TYPE GNB-CU-UP-UE-E1AP-ID          PRESENCE mandatory }|
    { ID id-DRB-Status-List               CRITICALITY ignore TYPE DRB-Status-List               PRESENCE optional }|
}

```

```

    { ID id-Cause                CRITICALITY ignore  TYPE Cause                PRESENCE mandatory },
    ...
}

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

-- *****
--
-- BEARER CONTEXT INACTIVITY NOTIFICATION
--
-- *****

-- *****
--
-- Bearer Context Inactivity Notification
--
-- *****

BearerContextInactivityNotification ::= SEQUENCE {
    protocolIEs          ProtocolIE-Container      { { BearerContextInactivityNotificationIEs } },
    ...
}

BearerContextInactivityNotificationIEs ELAP-PROTOCOL-IES ::= {
    { ID id-gNB-CU-CP-UE-ElAP-ID          CRITICALITY reject  TYPE GNB-CU-CP-UE-ElAP-ID          PRESENCE mandatory } |
    { ID id-gNB-CU-UP-UE-ElAP-ID          CRITICALITY reject  TYPE GNB-CU-UP-UE-ElAP-ID          PRESENCE mandatory } |
    { ID id-ActivityInformation           CRITICALITY reject  TYPE ActivityInformation           PRESENCE mandatory },
    ...
}

-- *****
--
-- DL DATA NOTIFICATION
--
-- *****

-- *****
--
-- DL Data Notification
--
-- *****

DLDataNotification ::= SEQUENCE {
    protocolIEs          ProtocolIE-Container      { { DLDataNotificationIEs } },
    ...
}

DLDataNotificationIEs ELAP-PROTOCOL-IES ::= {
    { ID id-gNB-CU-CP-UE-ElAP-ID          CRITICALITY reject  TYPE GNB-CU-CP-UE-ElAP-ID          PRESENCE mandatory } |
    { ID id-gNB-CU-UP-UE-ElAP-ID          CRITICALITY reject  TYPE GNB-CU-UP-UE-ElAP-ID          PRESENCE mandatory } |
    { ID id-PPI                           CRITICALITY ignore  TYPE PPI                            PRESENCE optional } |
    { ID id-PDU-Session-To-Notify-List    CRITICALITY ignore  TYPE PDU-Session-To-Notify-List    PRESENCE optional },
}

```

```

}
...
-- *****
-- *****
--
-- UL Data Notification
--
-- *****

ULDataNotification ::= SEQUENCE {
    protocolIEs          ProtocolIE-Container      { { ULDataNotificationIEs } },
    ...
}

ULDataNotificationIEs ELAP-PROTOCOL-IES ::= {
    { ID id-gNB-CU-CP-UE-ElAP-ID          CRITICALITY reject TYPE GNB-CU-CP-UE-ElAP-ID          PRESENCE mandatory } |
    { ID id-gNB-CU-UP-UE-ElAP-ID          CRITICALITY reject TYPE GNB-CU-UP-UE-ElAP-ID          PRESENCE mandatory } |
    { ID id-PDU-Session-To-Notify-List    CRITICALITY reject TYPE PDU-Session-To-Notify-List PRESENCE mandatory },
    ...
}

-- *****
--
-- DATA USAGE REPORT
--
-- *****
--
-- Data Usage Report
--
-- *****

DataUsageReport ::= SEQUENCE {
    protocolIEs          ProtocolIE-Container      { { DataUsageReportIEs } },
    ...
}

DataUsageReportIEs ELAP-PROTOCOL-IES ::= {
    { ID id-gNB-CU-CP-UE-ElAP-ID          CRITICALITY reject TYPE GNB-CU-CP-UE-ElAP-ID          PRESENCE mandatory } |
    { ID id-gNB-CU-UP-UE-ElAP-ID          CRITICALITY reject TYPE GNB-CU-UP-UE-ElAP-ID          PRESENCE mandatory } |
    { ID id-Data-Usage-Report-List        CRITICALITY ignore TYPE Data-Usage-Report-List        PRESENCE mandatory },
    ...
}

-- *****
--
-- GNB-CU-UP COUNTER CHECK
--
-- *****

```

```

-- *****
--
-- gNB-CU-UP Counter Check Request
--
-- *****

GNB-CU-UP-CounterCheckRequest ::= SEQUENCE {
    protocolIEs          ProtocolIE-Container    { { GNB-CU-UP-CounterCheckRequestIEs } },
    ...
}

GNB-CU-UP-CounterCheckRequestIEs ELAP-PROTOCOL-IES ::= {
    { ID id-gNB-CU-CP-UE-EIAP-ID          CRITICALITY reject  TYPE GNB-CU-CP-UE-EIAP-ID          PRESENCE mandatory } |
    { ID id-gNB-CU-UP-UE-EIAP-ID          CRITICALITY reject  TYPE GNB-CU-UP-UE-EIAP-ID          PRESENCE mandatory } |
    { ID id-System-GNB-CU-UP-CounterCheckRequest  CRITICALITY reject  TYPE System-GNB-CU-UP-CounterCheckRequest  PRESENCE mandatory },
    ...
}

System-GNB-CU-UP-CounterCheckRequest ::= CHOICE {
    e-UTRAN-GNB-CU-UP-CounterCheckRequest  ProtocolIE-Container    { { EUTRAN-GNB-CU-UP-CounterCheckRequest } },
    nG-RAN-GNB-CU-UP-CounterCheckRequest  ProtocolIE-Container    { { NG-RAN-GNB-CU-UP-CounterCheckRequest } },
    choice-extension                        ProtocolIE-SingleContainer { { System-GNB-CU-UP-CounterCheckRequest-ExtIEs } }
}

System-GNB-CU-UP-CounterCheckRequest-ExtIEs ELAP-PROTOCOL-IES ::= {
    ...
}

EUTRAN-GNB-CU-UP-CounterCheckRequest ELAP-PROTOCOL-IES ::= {
    { ID id-DRBs-Subject-To-Counter-Check-List-EUTRAN  CRITICALITY ignore  TYPE DRBs-Subject-To-Counter-Check-List-EUTRAN  PRESENCE mandatory },
    ...
}

NG-RAN-GNB-CU-UP-CounterCheckRequest ELAP-PROTOCOL-IES ::= {
    { ID id-DRBs-Subject-To-Counter-Check-List-NG-RAN  CRITICALITY ignore  TYPE DRBs-Subject-To-Counter-Check-List-NG-RAN  PRESENCE mandatory },
    ...
}

-- *****
--
-- gNB-CU-UP STATUS INDICATION ELEMENTARY PROCEDURE
--
-- *****

-- *****
--
-- gNB-CU-UP Status Indication
--
-- *****

GNB-CU-UP-StatusIndication ::= SEQUENCE {
    protocolIEs          ProtocolIE-Container    { { GNB-CU-UP-StatusIndicationIEs } },

```

```

}
...
}

GNB-CU-UP-StatusIndicationIEs E1AP-PROTOCOL-IES ::= {
  { ID id-TransactionID          CRITICALITY reject  TYPE TransactionID          PRESENCE mandatory }|
  { ID id-GNB-CU-UP-OverloadInformation  CRITICALITY reject  TYPE GNB-CU-UP-OverloadInformation  PRESENCE mandatory },
  ...
}

-- *****
--
-- gNB-CU-CP MEASUREMENT RESULTS INFORMATION
--
-- *****

GNB-CU-CPMeasurementResultsInformation ::= SEQUENCE {
  protocolIEs      ProtocolIE-Container      { { GNB-CU-CPMeasurementResultsInformationIEs } },
  ...
}

GNB-CU-CPMeasurementResultsInformationIEs E1AP-PROTOCOL-IES ::= {
  { ID id-gNB-CU-CP-UE-E1AP-ID          CRITICALITY reject  TYPE GNB-CU-CP-UE-E1AP-ID          PRESENCE mandatory }|
  { ID id-gNB-CU-UP-UE-E1AP-ID          CRITICALITY reject  TYPE GNB-CU-UP-UE-E1AP-ID          PRESENCE mandatory }|
  { ID id-DRB-Measurement-Results-Information-List  CRITICALITY ignore  TYPE DRB-Measurement-Results-Information-List  PRESENCE mandatory},
  ...
}

-- *****
--
-- MR-DC DATA USAGE REPORT
--
-- *****

MRDC-DataUsageReport ::= SEQUENCE {
  protocolIEs      ProtocolIE-Container      { { MRDC-DataUsageReportIEs } },
  ...
}

MRDC-DataUsageReportIEs E1AP-PROTOCOL-IES ::= {
  { ID id-gNB-CU-CP-UE-E1AP-ID          CRITICALITY reject  TYPE GNB-CU-CP-UE-E1AP-ID          PRESENCE mandatory }|
  { ID id-gNB-CU-UP-UE-E1AP-ID          CRITICALITY reject  TYPE GNB-CU-UP-UE-E1AP-ID          PRESENCE mandatory }|
  { ID id-PDU-Session-Resource-Data-Usage-List  CRITICALITY ignore  TYPE PDU-Session-Resource-Data-Usage-List  PRESENCE mandatory},
  ...
}

-- *****
--
-- TRACE ELEMENTARY PROCEDURES
--
-- *****

```

```

--
-- TRACE START
--
-- *****

TraceStart ::= SEQUENCE {
    protocolIEs      ProtocolIE-Container      { {TraceStartIEs} },
    ...
}

TraceStartIEs E1AP-PROTOCOL-IES ::= {
    { ID id-gNB-CU-CP-UE-E1AP-ID          CRITICALITY reject  TYPE GNB-CU-CP-UE-E1AP-ID          PRESENCE mandatory }|
    { ID id-gNB-CU-UP-UE-E1AP-ID          CRITICALITY reject  TYPE GNB-CU-UP-UE-E1AP-ID          PRESENCE mandatory }|
    { ID id-TraceActivation                CRITICALITY ignore  TYPE TraceActivation              PRESENCE mandatory },
    ...
}

-- *****
--
-- DEACTIVATE TRACE
--
-- *****

DeactivateTrace ::= SEQUENCE {
    protocolIEs      ProtocolIE-Container      { {DeactivateTraceIEs} },
    ...
}

DeactivateTraceIEs E1AP-PROTOCOL-IES ::= {
    { ID id-gNB-CU-CP-UE-E1AP-ID          CRITICALITY reject  TYPE GNB-CU-CP-UE-E1AP-ID          PRESENCE mandatory }|
    { ID id-gNB-CU-UP-UE-E1AP-ID          CRITICALITY reject  TYPE GNB-CU-UP-UE-E1AP-ID          PRESENCE mandatory }|
    { ID id-TraceID                       CRITICALITY ignore  TYPE TraceID                       PRESENCE mandatory },
    ...
}

-- *****
--
-- CELL TRAFFIC TRACE
--
-- *****

CellTrafficTrace ::= SEQUENCE {
    protocolIEs      ProtocolIE-Container { { CellTrafficTraceIEs } },
    ...
}

CellTrafficTraceIEs E1AP-PROTOCOL-IES ::= {
    {ID id-gNB-CU-CP-UE-E1AP-ID          CRITICALITY reject  TYPE GNB-CU-CP-UE-E1AP-ID          PRESENCE mandatory }|
    {ID id-gNB-CU-UP-UE-E1AP-ID          CRITICALITY reject  TYPE GNB-CU-UP-UE-E1AP-ID          PRESENCE mandatory }|
    {ID id-TraceID                       CRITICALITY ignore  TYPE TraceID                       PRESENCE mandatory }|
    {ID id-TraceCollectionEntityIPAddress CRITICALITY ignore  TYPE TransportLayerAddress         PRESENCE mandatory }|
    {ID id-PrivacyIndicator              CRITICALITY ignore  TYPE PrivacyIndicator              PRESENCE optional }|
}

```

```

    {ID id-URIaddress          CRITICALITY ignore    TYPE URIaddress          PRESENCE optional},
    ...
}

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

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

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

-- *****
--
-- RESOURCE STATUS REQUEST
--
-- *****

ResourceStatusRequest ::= SEQUENCE {
    protocolIEs      ProtocolIE-Container      { { ResourceStatusRequestIEs } },
    ...
}

ResourceStatusRequestIEs ELAP-PROTOCOL-IES ::= {
    { ID id-TransactionID          CRITICALITY reject    TYPE TransactionID    PRESENCE mandatory}|
    { ID id-gNB-CU-CP-Measurement-ID    CRITICALITY reject    TYPE INTEGER (1..4095, ...)    PRESENCE mandatory}|
    { ID id-gNB-CU-UP-Measurement-ID    CRITICALITY ignore    TYPE INTEGER (1..4095, ...)    PRESENCE optional}|
    { ID id-RegistrationRequest        CRITICALITY reject    TYPE RegistrationRequest    PRESENCE mandatory}|
    { ID id-ReportCharacteristics      CRITICALITY reject    TYPE ReportCharacteristics    PRESENCE conditional}|
    { ID id-ReportingPeriodicity       CRITICALITY reject    TYPE ReportingPeriodicity    PRESENCE optional},
    ...
}

-- *****
--
-- RESOURCE STATUS RESPONSE
--
-- *****

ResourceStatusResponse ::= SEQUENCE {
    protocolIEs      ProtocolIE-Container      { { ResourceStatusResponseIEs } },
    ...
}

ResourceStatusResponseIEs ELAP-PROTOCOL-IES ::= {

```

```

        { ID id-TransactionID                CRITICALITY reject      TYPE TransactionID PRESENCE mandatory}|
        { ID id-gNB-CU-CP-Measurement-ID     CRITICALITY reject      TYPE INTEGER (1..4095, ...) PRESENCE mandatory}}|
        { ID id-gNB-CU-UP-Measurement-ID     CRITICALITY ignore     TYPE INTEGER (1..4095, ...) PRESENCE mandatory}}|
        { ID id-CriticalityDiagnostics       CRITICALITY ignore     TYPE CriticalityDiagnostics PRESENCE optional},
    ...
}

-- *****
--
-- RESOURCE STATUS FAILURE
--
-- *****

ResourceStatusFailure ::= SEQUENCE {
    protocolIEs      ProtocolIE-Container      { { ResourceStatusFailureIEs } },
    ...
}

ResourceStatusFailureIEs ELAP-PROTOCOL-IES ::= {
    { ID id-TransactionID                CRITICALITY reject      TYPE TransactionID PRESENCE mandatory}|
    { ID id-gNB-CU-CP-Measurement-ID     CRITICALITY reject      TYPE INTEGER (1..4095, ...) PRESENCE mandatory}}|
    { ID id-gNB-CU-UP-Measurement-ID     CRITICALITY ignore     TYPE INTEGER (1..4095, ...) PRESENCE optional}}|
    { ID id-Cause                        CRITICALITY ignore     TYPE Cause PRESENCE mandatory}|
    { ID id-CriticalityDiagnostics       CRITICALITY ignore     TYPE CriticalityDiagnostics PRESENCE optional},
    ...
}

-- *****
--
-- RESOURCE STATUS UPDATE
--
-- *****

ResourceStatusUpdate ::= SEQUENCE {
    protocolIEs      ProtocolIE-Container      { { ResourceStatusUpdateIEs } },
    ...
}

ResourceStatusUpdateIEs ELAP-PROTOCOL-IES ::= {
    { ID id-TransactionID                CRITICALITY reject      TYPE TransactionID PRESENCE mandatory}|
    { ID id-gNB-CU-CP-Measurement-ID     CRITICALITY reject      TYPE INTEGER (1..4095, ...) PRESENCE mandatory}}|
    { ID id-gNB-CU-UP-Measurement-ID     CRITICALITY ignore     TYPE INTEGER (1..4095, ...) PRESENCE optional}}|
    { ID id-TNL-AvailableCapacityIndicator CRITICALITY ignore     TYPE TNL-AvailableCapacityIndicator PRESENCE optional}}|
    { ID id-HW-CapacityIndicator         CRITICALITY ignore     TYPE HW-CapacityIndicator PRESENCE mandatory},
    ...
}

-- *****
--
-- IAB UP TNL ADDRESS UPDATE
--
-- *****

```



```

-- *****
-- *****
--
-- IAB UP TNL Address Update
--
-- *****

IAB-UPTNLAddressUpdate ::= SEQUENCE {
    protocolIES          ProtocolIE-Container    { { IAB-UPTNLAddressUpdateIEs} },
    ...
}

IAB-UPTNLAddressUpdateIEs E1AP-PROTOCOL-IES ::= {
    { ID id-TransactionID          CRITICALITY reject TYPE TransactionID          PRESENCE mandatory }|
    { ID id-DLUPTNLAddressToUpdateList CRITICALITY ignore TYPE DLUPTNLAddressToUpdateList PRESENCE optional },
    ...
}

DLUPTNLAddressToUpdateList ::= SEQUENCE (SIZE(1.. maxnoofTNLAddresses)) OF DLUPTNLAddressToUpdateItem

-- *****
--
-- IAB UP TNL Address Update Acknowledge
--
-- *****

IAB-UPTNLAddressUpdateAcknowledge ::= SEQUENCE {
    protocolIES          ProtocolIE-Container    { { IAB-UPTNLAddressUpdateAcknowledgeIEs} },
    ...
}

IAB-UPTNLAddressUpdateAcknowledgeIEs E1AP-PROTOCOL-IES ::= {
    { ID id-TransactionID          CRITICALITY reject TYPE TransactionID          PRESENCE mandatory }|
    { ID id-CriticalityDiagnostics CRITICALITY ignore TYPE CriticalityDiagnostics PRESENCE optional }|
    { ID id-ULUPTNLAddressToUpdateList CRITICALITY ignore TYPE ULUPTNLAddressToUpdateList PRESENCE optional },
    ...
}

ULUPTNLAddressToUpdateList ::= SEQUENCE (SIZE(1.. maxnoofTNLAddresses)) OF ULUPTNLAddressToUpdateItem

-- *****
--
-- IAB UP TNL Address Update Failure
--
-- *****

IAB-UPTNLAddressUpdateFailure ::= SEQUENCE {
    protocolIES          ProtocolIE-Container    { {IAB-UPTNLAddressUpdateFailureIEs} },
    ...
}

IAB-UPTNLAddressUpdateFailureIEs E1AP-PROTOCOL-IES ::= {

```

```

    { ID id-TransactionID          CRITICALITY reject TYPE TransactionID          PRESENCE mandatory }|
    { 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 },
    ...
}

-- *****
--
-- EARLY FORWARDING SN TRANSFER
--
-- *****

-- *****
--
-- Early Forwarding SN Transfer
--
-- *****

EarlyForwardingSNTransfer ::= SEQUENCE {
    protocolIEs          ProtocolIE-Container      { { EarlyForwardingSNTransferIEs } },
    ...
}

EarlyForwardingSNTransferIEs E1AP-PROTOCOL-IES ::= {
    { ID id-gNB-CU-CP-UE-E1AP-ID          CRITICALITY reject TYPE GNB-CU-CP-UE-E1AP-ID          PRESENCE mandatory }|
    { ID id-gNB-CU-UP-UE-E1AP-ID          CRITICALITY reject TYPE GNB-CU-UP-UE-E1AP-ID          PRESENCE mandatory }|
    { ID id-DRBs-Subject-To-Early-Forwarding-List CRITICALITY reject TYPE DRBs-Subject-To-Early-Forwarding-List PRESENCE mandatory },
    ...
}

-- *****
--
-- IAB PSK NOTIFICATION
--
-- *****

-- *****
--
-- IAB PSK Notification
--
-- *****

IABPSKNotification ::= SEQUENCE {
    protocolIEs          ProtocolIE-Container      { { IABPSKNotificationIEs } },
    ...
}

IABPSKNotificationIEs E1AP-PROTOCOL-IES ::= {
    { ID id-TransactionID          CRITICALITY reject TYPE TransactionID          PRESENCE mandatory }|
    { ID id-IAB-Donor-CU-UPPSKInfo CRITICALITY reject TYPE IAB-Donor-CU-UPPSKInfo PRESENCE mandatory },
    ...
}

```

```
IAB-Donor-CU-UPPSKInfo ::= SEQUENCE (SIZE(1.. maxnoofPSKs)) OF IAB-Donor-CU-UPPSKInfo-Item
END
-- ASN1STOP
```

9.4.5 Information Element Definitions

```
-- ASN1START
-- *****
--
-- Information Element Definitions
--
-- *****

ElAP-IEs {
itu-t (0) identified-organization (4) etsi (0) mobileDomain (0)
ngran-access (22) modules (3) elap (5) version1 (1) elap-IEs (2) }

DEFINITIONS AUTOMATIC TAGS ::=

BEGIN

IMPORTS

    id-CommonNetworkInstance,
    id-SNSSAI,
    id-OldQoSFlowMap-ULendmarkerexpected,
    id-DRB-QoS,
    id-endpoint-IP-Address-and-Port,
    id-NetworkInstance,
    id-QoSFlowMappingIndication,
    id-TNLAssociationTransportLayerAddressgNBCUUP,
    id-Cause,
    id-QoSMonitoringRequest,
    id-QoSMonitoringReportingFrequency,
    id-QoSMonitoringDisabled,
    id-PDCP-StatusReportIndication,
    id-RedundantCommonNetworkInstance,
    id-redundant-nG-UL-UP-TNL-Information,
    id-redundant-nG-DL-UP-TNL-Information,
    id-RedundantQoSFlowIndicator,
    id-TSCTrafficCharacteristics,
    id-ExtendedPacketDelayBudget,
    id-CNPacketDelayBudgetDownlink,
    id-CNPacketDelayBudgetUplink,
    id-AdditionalPDCPduplicationInformation,
    id-RedundantPDUSessionInformation,
    id-RedundantPDUSessionInformation-used,
    id-QoS-Mapping-Information,
    id-MDTConfiguration,
    id-TraceCollectionEntityURI,
    id-EHC-Parameters,
    id-DAPSRequestInfo,
```

```
id-EarlyForwardingCOUNTReq,
id-EarlyForwardingCOUNTInfo,
id-AlternativeQoSParaSetList,
id-MCG-OfferedGBRQoSFlowInfo,
id-Number-of-tunnels,
id-DataForwardingtoE-UTRANInformationList,
id-DataForwardingtoNG-RANQoSFlowInformationList,
id-MaxCIDEHCDL,
id-ignoreMappingRuleIndication,
id-EarlyDataForwardingIndicator,
id-QoSFlowsDRBRemapping,
id-SecurityIndicationModify,
id-DataForwardingSourceIPAddress,
maxnoofQoSParaSets,
maxnoofErrors,
maxnoofSliceItems,
maxnoofEUTRANQoSParameters,
maxnoofNGRANQoSParameters,
maxnoofDRBs,
maxnoofPDUSessionResource,
maxnoofQoSFlows,
maxnoofUPParameters,
maxnoofCellGroups,
maxnooftimeperiods,
maxnoofNR CGI,
maxnoofTLAs,
maxnoofGTPTLAs,
maxnoofSPLMNs,
maxnoofMDT PLMNs,
maxnoofExtSliceItems,
maxnoofDataForwardingTunneltoE-UTRAN,
maxnoofExtNR CGI

FROM ElAP-Constants

    Criticality,
    ProcedureCode,
    ProtocolIE-ID,
    TriggeringMessage

FROM ElAP-CommonDataTypes

    ProtocolExtensionContainer{},
    ProtocolIE-SingleContainer{},
    ELAP-PROTOCOL-EXTENSION,
    ELAP-PROTOCOL-IES

FROM ElAP-Containers;

-- A

ActivityInformation ::= CHOICE {
    dRB-Activity-List                DRB-Activity-List,
```

```

    pdu-Session-Resource-Activity-List      PDU-Session-Resource-Activity-List,
    ue-Activity                             UE-Activity,
    choice-extension                       ProtocolIE-SingleContainer  {{ActivityInformation-ExtIEs}}
}

ActivityInformation-ExtIEs ELAP-PROTOCOL-IES ::= {
    ...
}

ActivityNotificationLevel ::= ENUMERATED {
    drb,
    pdu-session,
    ue,
    ...
}

AdditionalHandoverInfo ::= ENUMERATED {
    discard-pdpc-SN,
    ...
}

AdditionalPDCPduplicationInformation ::= ENUMERATED {
    three,
    four,
    ...
}

AdditionalRRMPriorityIndex ::= BIT STRING (SIZE(32))

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

AlternativeQoSParaSetList ::= SEQUENCE (SIZE(1..maxnoofQoSParaSets)) OF AlternativeQoSParaSetItem

AlternativeQoSParaSetItem ::= SEQUENCE {
    alternativeQoSParameterIndex      INTEGER(1..8,...),
    guaranteedFlowBitRateDL           BitRate                OPTIONAL,
    guaranteedFlowBitRateUL           BitRate                OPTIONAL,
    packetDelayBudget                  PacketDelayBudget     OPTIONAL,
    packetErrorRate                    PacketErrorRate       OPTIONAL,
    iE-Extensions                     ProtocolExtensionContainer {{AlternativeQoSParaSetItem-ExtIEs}} OPTIONAL,
    ...
}

AlternativeQoSParaSetItem-ExtIEs ELAP-PROTOCOL-EXTENSION ::= {
    ...
}

-- B

BearerContextStatusChange ::= ENUMERATED {
    suspend,
    resume,
    ...
}

```

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

-- C

Cause ::= CHOICE {
    radioNetwork      CauseRadioNetwork,
    transport         CauseTransport,
    protocol          CauseProtocol,
    misc              CauseMisc,
    choice-extension  ProtocolIE-SingleContainer  {{Cause-ExtIEs}}
}

Cause-ExtIEs ELAP-PROTOCOL-IES ::= {
    ...
}

CauseMisc ::= ENUMERATED {
    control-processing-overload,
    not-enough-user-plane-processing-resources,
    hardware-failure,
    om-intervention,
    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,
    ...
}

CauseRadioNetwork ::= ENUMERATED {
    unspecified,
    unknown-or-already-allocated-gnb-cu-cp-ue-elap-id,
    unknown-or-already-allocated-gnb-cu-up-ue-elap-id,
    unknown-or-inconsistent-pair-of-ue-elap-id,
    interaction-with-other-procedure,
    pDCP-Count-wrap-around,
    not-supported-QCI-value,
    not-supported-5QI-value,
    encryption-algorithms-not-supported,
    integrity-protection-algorithms-not-supported,
    uP-integrity-protection-not-possible,
    uP-confidentiality-protection-not-possible,
    multiple-PDU-Session-ID-Instances,
    unknown-PDU-Session-ID,
    multiple-QoS-Flow-ID-Instances,
    unknown-QoS-Flow-ID,
}
```

```

multiple-DRB-ID-Instances,
unknown-DRB-ID,
invalid-QoS-combination,
procedure-cancelled,
normal-release,
no-radio-resources-available,
action-desirable-for-radio-reasons,
resources-not-available-for-the-slice,
pDCP-configuration-not-supported,
...,
ue-dl-max-IP-data-rate-reason,
uP-integrity-protection-failure,
release-due-to-pre-emption,
rsn-not-available-for-the-up,
nPN-not-supported,
report-characteristic-empty,
existing-measurement-ID,
measurement-temporarily-not-available,
measurement-not-supported-for-the-object
}

CauseTransport ::= ENUMERATED {
  unspecified,
  transport-resource-unavailable,
  ...,
  unknown-TNL-address-for-IAB
}

Cell-Group-Information ::= SEQUENCE (SIZE(1.. maxnoofCellGroups)) OF Cell-Group-Information-Item

Cell-Group-Information-Item ::= SEQUENCE {
  cell-Group-ID          Cell-Group-ID,
  uL-Configuration       UL-Configuration          OPTIONAL,
  dL-TX-Stop             DL-TX-Stop              OPTIONAL,
  rAT-Type               RAT-Type                 OPTIONAL,
  iE-Extensions          ProtocolExtensionContainer { { Cell-Group-Information-Item-ExtIEs } } OPTIONAL,
  ...
}

Cell-Group-Information-Item-ExtIEs      E1AP-PROTOCOL-EXTENSION ::= {
  { ID id-Number-of-tunnels  CRITICALITY ignore  EXTENSION Number-of-tunnels  PRESENCE optional},
  ...
}

Cell-Group-ID ::= INTEGER (0..3, ...)

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

Number-of-tunnels ::= INTEGER (1..4, ...)

CipheringAlgorithm ::= ENUMERATED {
  nEAO,
  c-128-NEA1,

```

```

    c-128-NEA2,
    c-128-NEA3,
    ...
}

CNSupport ::= ENUMERATED {
    c-epc,
    c-5gc,
    both,
    ...
}

CommonNetworkInstance ::= OCTET STRING

ConfidentialityProtectionIndication ::= ENUMERATED {
    required,
    preferred,
    not-needed,
    ...
}

ConfidentialityProtectionResult ::= ENUMERATED {
    performed,
    not-performed,
    ...
}

CP-TNL-Information ::= CHOICE {
    endpoint-IP-Address      TransportLayerAddress,
    choice-extension        ProtocolIE-SingleContainer  {{CP-TNL-Information-ExtIEs}}
}

CP-TNL-Information-ExtIEs E1AP-PROTOCOL-IES ::= {
    { ID id-endpoint-IP-Address-and-Port    CRITICALITY reject  TYPE Endpoint-IP-address-and-port  PRESENCE mandatory},
    ...
}

CriticalityDiagnostics ::= SEQUENCE {
    procedureCode           ProcedureCode                OPTIONAL,
    triggeringMessage       TriggeringMessage            OPTIONAL,
    procedureCriticality    Criticality                   OPTIONAL,
    transactionID          TransactionID                 OPTIONAL,
    iEsCriticalityDiagnostics CriticalityDiagnostics-IE-List  OPTIONAL,
    iE-Extensions          ProtocolExtensionContainer { {CriticalityDiagnostics-ExtIEs} }  OPTIONAL,
    ...
}

CriticalityDiagnostics-ExtIEs E1AP-PROTOCOL-EXTENSION ::= {
    ...
}

```



```

CriticalityDiagnostics-IE-List ::= SEQUENCE (SIZE (1..maxnoofErrors)) OF
  SEQUENCE {
    iECriticality          Criticality,
    iE-ID                  ProtocolIE-ID,
    typeOfError            TypeOfError,
    iE-Extensions          ProtocolExtensionContainer { {CriticalityDiagnostics-IE-List-ExtIEs} } OPTIONAL,
    ...
  }

CriticalityDiagnostics-IE-List-ExtIEs ELAP-PROTOCOL-EXTENSION ::= {
  ...
}

-- D

DAPSRequestInfo ::= SEQUENCE {
  dapsIndicator           ENUMERATED {daps-HO-required, ...},
  iE-Extensions           ProtocolExtensionContainer { {DAPSRequestInfo-ExtIEs} } OPTIONAL,
  ...
}

DAPSRequestInfo-ExtIEs ELAP-PROTOCOL-EXTENSION ::= {
  ...
}

Data-Forwarding-Information-Request ::= SEQUENCE {
  data-Forwarding-Request      Data-Forwarding-Request,
  qos-Flows-Forwarded-On-Fwd-Tunnels QoS-Flow-Mapping-List      OPTIONAL,
  iE-Extensions                ProtocolExtensionContainer { { Data-Forwarding-Information-Request-ExtIEs } } OPTIONAL,
  ...
}

Data-Forwarding-Information-Request-ExtIEs      ELAP-PROTOCOL-EXTENSION ::= {
  ...
}

Data-Forwarding-Information ::= SEQUENCE {
  uL-Data-Forwarding           UP-TNL-Information      OPTIONAL,
  dL-Data-Forwarding           UP-TNL-Information      OPTIONAL,
  iE-Extensions                ProtocolExtensionContainer { { Data-Forwarding-Information-ExtIEs } } OPTIONAL,
  ...
}

Data-Forwarding-Information-ExtIEs      ELAP-PROTOCOL-EXTENSION ::= {
  {ID id-DataForwardingtoNG-RANQoSFlowInformationList CRITICALITY ignore EXTENSION DataForwardingtoNG-RANQoSFlowInformationList PRESENCE optional},
  ...
}

Data-Forwarding-Request ::= ENUMERATED {
  uL,
  dL,
  both,
}

```

```

}
...
}
DataForwardingtoE-UTRANInformationList ::= SEQUENCE (SIZE(1.. maxnoofDataForwardingTunneltoE-UTRAN)) OF DataForwardingtoE-UTRANInformationListItem
DataForwardingtoE-UTRANInformationListItem ::= SEQUENCE {
    data-forwarding-tunnel-information          UP-TNL-Information,
    qos-Flows-to-be-forwarded-List             QoS-Flows-to-be-forwarded-List,
    iE-Extensions          ProtocolExtensionContainer { { DataForwardingtoE-UTRANInformationListItem-ExtIEs} } OPTIONAL,
    ...
}
DataForwardingtoE-UTRANInformationListItem-ExtIEs ELAP-PROTOCOL-EXTENSION ::= {
    ...
}
Data-Usage-per-PDU-Session-Report ::= SEQUENCE {
    secondaryRATType          ENUMERATED {nR, e-UTRA, ...},
    pdu-session-Timed-Report-List          SEQUENCE (SIZE(1..maxnooftimeperiods)) OF MRDC-Data-Usage-Report-Item,
    iE-Extensions          ProtocolExtensionContainer { { Data-Usage-per-PDU-Session-Report-ExtIEs} } OPTIONAL,
    ...
}
Data-Usage-per-PDU-Session-Report-ExtIEs ELAP-PROTOCOL-EXTENSION ::= {
    ...
}
Data-Usage-per-QoS-Flow-List ::= SEQUENCE (SIZE(1..maxnoofQoSFlows)) OF Data-Usage-per-QoS-Flow-Item
Data-Usage-per-QoS-Flow-Item ::= SEQUENCE {
    qos-Flow-Identifier          QoS-Flow-Identifier,
    secondaryRATType          ENUMERATED {nR, e-UTRA, ...},
    qos-Flow-Timed-Report-List          SEQUENCE (SIZE(1..maxnooftimeperiods)) OF MRDC-Data-Usage-Report-Item,
    iE-Extensions          ProtocolExtensionContainer { { Data-Usage-per-QoS-Flow-Item-ExtIEs} } OPTIONAL,
    ...
}
Data-Usage-per-QoS-Flow-Item-ExtIEs ELAP-PROTOCOL-EXTENSION ::= {
    ...
}
Data-Usage-Report-List ::= SEQUENCE (SIZE(1.. maxnoofDRBs)) OF Data-Usage-Report-Item
Data-Usage-Report-Item ::= SEQUENCE {
    drb-ID          DRB-ID,
    rat-Type          RAT-Type,
    drb-Usage-Report-List          DRB-Usage-Report-List,
    iE-Extensions          ProtocolExtensionContainer { { Data-Usage-Report-ItemExtIEs } } OPTIONAL,
    ...
}
Data-Usage-Report-ItemExtIEs          ELAP-PROTOCOL-EXTENSION ::= {
    ...
}

```

```

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

DirectForwardingPathAvailability ::= ENUMERATED {
    inter-system-direct-path-available,
    ...,
    intra-system-direct-path-available
}

DiscardTimer ::= ENUMERATED {ms10, ms20, ms30, ms40, ms50, ms60, ms75, ms100, ms150, ms200, ms250, ms300, ms500, ms750, ms1500, infinity}

DLDiscarding ::= SEQUENCE {
    dLDiscardingCountVal          PDCP-Count,
    iE-Extensions                 ProtocolExtensionContainer { { DLDiscarding-ExtIEs } } OPTIONAL
}

DLDiscarding-ExtIEs E1AP-PROTOCOL-EXTENSION ::= {
    ...
}

DLUPTNLAddressToUpdateItem ::= SEQUENCE {
    oldTNLAddress                TransportLayerAddress,
    newTNLAddress                TransportLayerAddress,
    iE-Extensions                ProtocolExtensionContainer { { DLUPTNLAddressToUpdateItemExtIEs } } OPTIONAL,
    ...
}

DLUPTNLAddressToUpdateItemExtIEs E1AP-PROTOCOL-EXTENSION ::= {
    ...
}

DL-TX-Stop ::= ENUMERATED {
    stop,
    resume,
    ...
}

DRB-Activity ::= ENUMERATED {
    active,
    not-active,
    ...
}

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

DRB-Activity-Item ::= SEQUENCE {
    dRB-ID                       DRB-ID,
    dRB-Activity                 DRB-Activity,
    iE-Extensions                ProtocolExtensionContainer { { DRB-Activity-ItemExtIEs } } OPTIONAL,
    ...
}

```

```

}
DRB-Activity-ItemExtIEs      E1AP-PROTOCOL-EXTENSION ::= {
  ...
}
DRB-Confirm-Modified-List-EUTRAN ::= SEQUENCE (SIZE(1.. maxnoofDRBs)) OF DRB-Confirm-Modified-Item-EUTRAN
DRB-Confirm-Modified-Item-EUTRAN ::= SEQUENCE {
  dRB-ID                DRB-ID,
  cell-Group-Information Cell-Group-Information OPTIONAL,
  iE-Extensions         ProtocolExtensionContainer { { DRB-Confirm-Modified-Item-EUTRAN-ExtIEs } } OPTIONAL,
  ...
}
DRB-Confirm-Modified-Item-EUTRAN-ExtIEs      E1AP-PROTOCOL-EXTENSION ::= {
  ...
}
DRB-Confirm-Modified-List-NG-RAN ::= SEQUENCE (SIZE(1.. maxnoofDRBs)) OF DRB-Confirm-Modified-Item-NG-RAN
DRB-Confirm-Modified-Item-NG-RAN ::= SEQUENCE {
  dRB-ID                DRB-ID,
  cell-Group-Information Cell-Group-Information OPTIONAL,
  iE-Extensions         ProtocolExtensionContainer { { DRB-Confirm-Modified-Item-NG-RAN-ExtIEs } } OPTIONAL,
  ...
}
DRB-Confirm-Modified-Item-NG-RAN-ExtIEs      E1AP-PROTOCOL-EXTENSION ::= {
  ...
}
DRB-Failed-List-EUTRAN ::= SEQUENCE (SIZE(1.. maxnoofDRBs)) OF DRB-Failed-Item-EUTRAN
DRB-Failed-Item-EUTRAN ::= SEQUENCE {
  dRB-ID                DRB-ID,
  cause                 Cause,
  iE-Extensions         ProtocolExtensionContainer { { DRB-Failed-Item-EUTRAN-ExtIEs } } OPTIONAL,
  ...
}
DRB-Failed-Item-EUTRAN-ExtIEs      E1AP-PROTOCOL-EXTENSION ::= {
  ...
}
DRB-Failed-Mod-List-EUTRAN ::= SEQUENCE (SIZE(1.. maxnoofDRBs)) OF DRB-Failed-Mod-Item-EUTRAN
DRB-Failed-Mod-Item-EUTRAN ::= SEQUENCE {
  dRB-ID                DRB-ID,
  cause                 Cause,
  iE-Extensions         ProtocolExtensionContainer { { DRB-Failed-Mod-Item-EUTRAN-ExtIEs } } OPTIONAL,
  ...
}

```

```

DRB-Failed-Mod-Item-EUTRAN-ExtIEs      E1AP-PROTOCOL-EXTENSION ::= {
  ...
}

DRB-Failed-List-NG-RAN ::= SEQUENCE (SIZE(1.. maxnoofDRBs)) OF DRB-Failed-Item-NG-RAN

DRB-Failed-Item-NG-RAN ::= SEQUENCE {
  dRB-ID          DRB-ID,
  cause           Cause,
  iE-Extensions  ProtocolExtensionContainer { { DRB-Failed-Item-NG-RAN-ExtIEs } } OPTIONAL,
  ...
}

DRB-Failed-Item-NG-RAN-ExtIEs        E1AP-PROTOCOL-EXTENSION ::= {
  ...
}

DRB-Failed-Mod-List-NG-RAN ::= SEQUENCE (SIZE(1.. maxnoofDRBs)) OF DRB-Failed-Mod-Item-NG-RAN

DRB-Failed-Mod-Item-NG-RAN ::= SEQUENCE {
  dRB-ID          DRB-ID,
  cause           Cause,
  iE-Extensions  ProtocolExtensionContainer { { DRB-Failed-Mod-Item-NG-RAN-ExtIEs } } OPTIONAL,
  ...
}

DRB-Failed-Mod-Item-NG-RAN-ExtIEs    E1AP-PROTOCOL-EXTENSION ::= {
  ...
}

DRB-Failed-To-Modify-List-EUTRAN ::= SEQUENCE (SIZE(1.. maxnoofDRBs)) OF DRB-Failed-To-Modify-Item-EUTRAN

DRB-Failed-To-Modify-Item-EUTRAN ::= SEQUENCE {
  dRB-ID          DRB-ID,
  cause           Cause,
  iE-Extensions  ProtocolExtensionContainer { { DRB-Failed-To-Modify-Item-EUTRAN-ExtIEs } } OPTIONAL,
  ...
}

DRB-Failed-To-Modify-Item-EUTRAN-ExtIEs E1AP-PROTOCOL-EXTENSION ::= {
  ...
}

DRB-Failed-To-Modify-List-NG-RAN ::= SEQUENCE (SIZE(1.. maxnoofDRBs)) OF DRB-Failed-To-Modify-Item-NG-RAN

DRB-Failed-To-Modify-Item-NG-RAN ::= SEQUENCE {
  dRB-ID          DRB-ID,
  cause           Cause,
  iE-Extensions  ProtocolExtensionContainer { { DRB-Failed-To-Modify-Item-NG-RAN-ExtIEs } } OPTIONAL,
  ...
}

DRB-Failed-To-Modify-Item-NG-RAN-ExtIEs E1AP-PROTOCOL-EXTENSION ::= {
  ...
}

```

```

}

DRB-ID ::= INTEGER (1..32, ...)
DRB-Measurement-Results-Information-List ::= SEQUENCE (SIZE(1.. maxnoofDRBs)) OF DRB-Measurement-Results-Information-Item
DRB-Measurement-Results-Information-Item ::= SEQUENCE {
  dRB-ID DRB-ID,
  uL-DL-Result INTEGER (0..10000, ...) OPTIONAL,
  iE-Extensions ProtocolExtensionContainer { { DRB-Measurement-Results-Information-Item-ExtIEs } } OPTIONAL,
  ...
}

DRB-Measurement-Results-Information-Item-ExtIEs E1AP-PROTOCOL-EXTENSION ::= {
  ...
}

DRB-Modified-List-EUTRAN ::= SEQUENCE (SIZE(1.. maxnoofDRBs)) OF DRB-Modified-Item-EUTRAN

DRB-Modified-Item-EUTRAN ::= SEQUENCE {
  dRB-ID DRB-ID,
  s1-DL-UP-TNL-Information UP-TNL-Information OPTIONAL,
  pDCP-SN-Status-Information PDCP-SN-Status-Information OPTIONAL,
  uL-UP-Transport-Parameters UP-Parameters OPTIONAL,
  iE-Extensions ProtocolExtensionContainer { { DRB-Modified-Item-EUTRAN-ExtIEs } } OPTIONAL,
  ...
}

DRB-Modified-Item-EUTRAN-ExtIEs E1AP-PROTOCOL-EXTENSION ::= {
  ...
}

DRB-Modified-List-NG-RAN ::= SEQUENCE (SIZE(1.. maxnoofDRBs)) OF DRB-Modified-Item-NG-RAN

DRB-Modified-Item-NG-RAN ::= SEQUENCE {
  dRB-ID DRB-ID,
  uL-UP-Transport-Parameters UP-Parameters OPTIONAL,
  pDCP-SN-Status-Information PDCP-SN-Status-Information OPTIONAL,
  flow-Setup-List QoS-Flow-List OPTIONAL,
  flow-Failed-List QoS-Flow-Failed-List OPTIONAL,
  iE-Extensions ProtocolExtensionContainer { { DRB-Modified-Item-NG-RAN-ExtIEs } } OPTIONAL,
  ...
}

DRB-Modified-Item-NG-RAN-ExtIEs E1AP-PROTOCOL-EXTENSION ::= {
  {ID id-EarlyForwardingCOUNTInfo CRITICALITY reject EXTENSION EarlyForwardingCOUNTInfo PRESENCE optional}|
  {ID id-OldQoSFlowMap-ULendmarkerexpected CRITICALITY ignore EXTENSION QoS-Flow-List PRESENCE optional},
  ...
}

DRB-Removed-Item ::= SEQUENCE {
  dRB-ID DRB-ID,
  dRB-Released-In-Session ENUMERATED {released-in-session, not-released-in-session, ...} OPTIONAL,
  dRB-Accumulated-Session-Time OCTET STRING (SIZE(5)) OPTIONAL,
  qoS-Flow-Removed-List SEQUENCE (SIZE(1.. maxnoofQoSFlows)) OF QoS-Flow-Removed-Item OPTIONAL,
  iE-Extensions ProtocolExtensionContainer { { DRB-Removed-Item-ExtIEs } } OPTIONAL,

```

```

}
...
DRB-Removed-Item-ExtIEs      E1AP-PROTOCOL-EXTENSION ::= {
...
}

DRB-Required-To-Modify-List-EUTRAN ::= SEQUENCE (SIZE(1.. maxnoofDRBs)) OF DRB-Required-To-Modify-Item-EUTRAN

DRB-Required-To-Modify-Item-EUTRAN ::= SEQUENCE {
  dRB-ID                      DRB-ID,
  s1-DL-UP-TNL-Information    UP-TNL-Information          OPTIONAL,
  gNB-CU-UP-CellGroupRelatedConfiguration GNB-CU-UP-CellGroupRelatedConfiguration OPTIONAL,
  cause                       Cause          OPTIONAL,
  iE-Extensions               ProtocolExtensionContainer { { DRB-Required-To-Modify-Item-EUTRAN-ExtIEs } } OPTIONAL,
  ...
}

DRB-Required-To-Modify-Item-EUTRAN-ExtIEs      E1AP-PROTOCOL-EXTENSION ::= {
...
}

DRB-Required-To-Modify-List-NG-RAN ::= SEQUENCE (SIZE(1.. maxnoofDRBs)) OF DRB-Required-To-Modify-Item-NG-RAN

DRB-Required-To-Modify-Item-NG-RAN ::= SEQUENCE {
  dRB-ID                      DRB-ID,
  gNB-CU-UP-CellGroupRelatedConfiguration GNB-CU-UP-CellGroupRelatedConfiguration OPTIONAL,
  flow-To-Remove              QoS-Flow-List          OPTIONAL,
  cause                       Cause          OPTIONAL,
  iE-Extensions               ProtocolExtensionContainer { { DRB-Required-To-Modify-Item-NG-RAN-ExtIEs } } OPTIONAL,
  ...
}

DRB-Required-To-Modify-Item-NG-RAN-ExtIEs      E1AP-PROTOCOL-EXTENSION ::= {
...
}

DRB-Setup-List-EUTRAN      ::= SEQUENCE (SIZE(1.. maxnoofDRBs)) OF DRB-Setup-Item-EUTRAN

DRB-Setup-Item-EUTRAN      ::= SEQUENCE {
  dRB-ID                      DRB-ID,
  s1-DL-UP-TNL-Information    UP-TNL-Information,
  data-Forwarding-Information Data-Forwarding-Information OPTIONAL,
  uL-UP-Transport-Parameters UP-Parameters,
  s1-DL-UP-Unchanged          ENUMERATED {true, ...} OPTIONAL,
  iE-Extensions               ProtocolExtensionContainer { { DRB-Setup-Item-EUTRAN-ExtIEs } } OPTIONAL,
  ...
}

DRB-Setup-Item-EUTRAN-ExtIEs      E1AP-PROTOCOL-EXTENSION ::= {
{ ID id-DataForwardingSourceIPAddress          CRITICALITY ignore EXTENSION TransportLayerAddress PRESENCE optional},
...
}

```

```

DRB-Setup-Mod-List-EUTRAN ::= SEQUENCE (SIZE(1.. maxnoofDRBs)) OF DRB-Setup-Mod-Item-EUTRAN

DRB-Setup-Mod-Item-EUTRAN ::= SEQUENCE {
    dRB-ID                               DRB-ID,
    s1-DL-UP-TNL-Information              UP-TNL-Information,
    data-Forwarding-Information-Response  Data-Forwarding-Information OPTIONAL,
    uL-UP-Transport-Parameters            UP-Parameters,
    iE-Extensions                          ProtocolExtensionContainer { { DRB-Setup-Mod-Item-EUTRAN-ExtIEs } } OPTIONAL,
    ...
}

DRB-Setup-Mod-Item-EUTRAN-ExtIEs        E1AP-PROTOCOL-EXTENSION ::= {
    ...
}

DRB-Setup-List-NG-RAN ::= SEQUENCE (SIZE(1.. maxnoofDRBs)) OF DRB-Setup-Item-NG-RAN

DRB-Setup-Item-NG-RAN ::= SEQUENCE {
    dRB-ID                               DRB-ID,
    dRB-data-Forwarding-Information-Response  Data-Forwarding-Information OPTIONAL,
    uL-UP-Transport-Parameters              UP-Parameters,
    flow-Setup-List                          QoS-Flow-List,
    flow-Failed-List                          QoS-Flow-Failed-List OPTIONAL,
    iE-Extensions                          ProtocolExtensionContainer { { DRB-Setup-Item-NG-RAN-ExtIEs } } OPTIONAL,
    ...
}

DRB-Setup-Item-NG-RAN-ExtIEs            E1AP-PROTOCOL-EXTENSION ::= {
    ...
}

DRB-Setup-Mod-List-NG-RAN ::= SEQUENCE (SIZE(1.. maxnoofDRBs)) OF DRB-Setup-Mod-Item-NG-RAN

DRB-Setup-Mod-Item-NG-RAN ::= SEQUENCE {
    dRB-ID                               DRB-ID,
    dRB-data-Forwarding-Information-Response  Data-Forwarding-Information OPTIONAL,
    uL-UP-Transport-Parameters              UP-Parameters,
    flow-Setup-List                          QoS-Flow-List,
    flow-Failed-List                          QoS-Flow-Failed-List OPTIONAL,
    iE-Extensions                          ProtocolExtensionContainer { { DRB-Setup-Mod-Item-NG-RAN-ExtIEs } } OPTIONAL,
    ...
}

DRB-Setup-Mod-Item-NG-RAN-ExtIEs        E1AP-PROTOCOL-EXTENSION ::= {
    ...
}

DRB-Status-Item ::= SEQUENCE {
    dRB-ID                               DRB-ID,
    pDCP-DL-Count                          PDCP-Count OPTIONAL,
    pDCP-UL-Count                          PDCP-Count OPTIONAL,
    iE-Extensions                          ProtocolExtensionContainer { { DRB-Status-ItemExtIEs } } OPTIONAL,
    ...
}

```



```

}
DRB-Status-ItemExtIEs    E1AP-PROTOCOL-EXTENSION ::= {
    ...
}
DRBs-Subject-To-Counter-Check-List-EUTRAN    ::= SEQUENCE (SIZE(1.. maxnoofDRBs)) OF DRBs-Subject-To-Counter-Check-Item-EUTRAN
DRBs-Subject-To-Counter-Check-Item-EUTRAN    ::= SEQUENCE {
    dRB-ID                DRB-ID,
    pDCP-UL-Count         PDCP-Count,
    pDCP-DL-Count         PDCP-Count,
    iE-Extensions         ProtocolExtensionContainer { { DRBs-Subject-To-Counter-Check-Item-EUTRAN-ExtIEs } } OPTIONAL,
    ...
}
DRBs-Subject-To-Counter-Check-Item-EUTRAN-ExtIEs    E1AP-PROTOCOL-EXTENSION ::= {
    ...
}
DRBs-Subject-To-Counter-Check-List-NG-RAN    ::= SEQUENCE (SIZE(1.. maxnoofDRBs)) OF DRBs-Subject-To-Counter-Check-Item-NG-RAN
DRBs-Subject-To-Counter-Check-Item-NG-RAN    ::= SEQUENCE {
    pDU-Session-ID        PDU-Session-ID,
    dRB-ID                DRB-ID,
    pDCP-UL-Count         PDCP-Count,
    pDCP-DL-Count         PDCP-Count,
    iE-Extensions         ProtocolExtensionContainer { { DRBs-Subject-To-Counter-Check-Item-NG-RAN-ExtIEs } } OPTIONAL,
    ...
}
DRBs-Subject-To-Counter-Check-Item-NG-RAN-ExtIEs    E1AP-PROTOCOL-EXTENSION ::= {
    ...
}
DRBs-Subject-To-Early-Forwarding-List    ::= SEQUENCE (SIZE(1.. maxnoofDRBs)) OF DRBs-Subject-To-Early-Forwarding-Item
DRBs-Subject-To-Early-Forwarding-Item    ::= SEQUENCE {
    dRB-ID                DRB-ID,
    dLCountValue          PDCP-Count,
    iE-Extensions         ProtocolExtensionContainer { { DRBs-Subject-To-Early-Forwarding-Item-ExtIEs } } OPTIONAL,
    ...
}
DRBs-Subject-To-Early-Forwarding-Item-ExtIEs    E1AP-PROTOCOL-EXTENSION ::= {
    ...
}
DRB-To-Modify-List-EUTRAN    ::= SEQUENCE (SIZE(1.. maxnoofDRBs)) OF DRB-To-Modify-Item-EUTRAN
DRB-To-Modify-Item-EUTRAN    ::= SEQUENCE {
    dRB-ID                DRB-ID,
    pDCP-Configuration    PDCP-Configuration                OPTIONAL,
    eUTRAN-QoS            EUTRAN-QoS                        OPTIONAL,
}

```

```

s1-UL-UP-TNL-Information          UP-TNL-Information          OPTIONAL,          OPTIONAL,
data-Forwarding-Information      Data-Forwarding-Information OPTIONAL,
pDCP-SN-Status-Request          PDCP-SN-Status-Request    OPTIONAL,
pDCP-SN-Status-Information      PDCP-SN-Status-Information OPTIONAL,
dL-UP-Parameters                UP-Parameters              OPTIONAL,
cell-Group-To-Add               Cell-Group-Information     OPTIONAL,
cell-Group-To-Modify            Cell-Group-Information     OPTIONAL,
cell-Group-To-Remove            Cell-Group-Information     OPTIONAL,
dRB-Inactivity-Timer            Inactivity-Timer           OPTIONAL,
iE-Extensions                    ProtocolExtensionContainer { { DRB-To-Modify-Item-EUTRAN-ExtIEs } } OPTIONAL,
...
}

DRB-To-Modify-Item-EUTRAN-ExtIEs  E1AP-PROTOCOL-EXTENSION ::= {
...
}

DRB-To-Modify-List-NG-RAN ::= SEQUENCE (SIZE(1.. maxnoofDRBs)) OF DRB-To-Modify-Item-NG-RAN

DRB-To-Modify-Item-NG-RAN ::= SEQUENCE {
dRB-ID                          DRB-ID,
sDAP-Configuration              SDAP-Configuration        OPTIONAL,
pDCP-Configuration              PDCP-Configuration        OPTIONAL,
dRB-Data-Forwarding-Information Data-Forwarding-Information OPTIONAL,
pDCP-SN-Status-Request          PDCP-SN-Status-Request    OPTIONAL,
pdcp-SN-Status-Information      PDCP-SN-Status-Information OPTIONAL,
dL-UP-Parameters                UP-Parameters              OPTIONAL,
cell-Group-To-Add               Cell-Group-Information     OPTIONAL,
cell-Group-To-Modify            Cell-Group-Information     OPTIONAL,
cell-Group-To-Remove            Cell-Group-Information     OPTIONAL,
flow-Mapping-Information        QoS-Flow-QoS-Parameter-List OPTIONAL,
dRB-Inactivity-Timer            Inactivity-Timer           OPTIONAL,
iE-Extensions                    ProtocolExtensionContainer { { DRB-To-Modify-Item-NG-RAN-ExtIEs } } OPTIONAL,
...
}

DRB-To-Modify-Item-NG-RAN-ExtIEs  E1AP-PROTOCOL-EXTENSION ::= {
{ID id-OldQoSFlowMap-ULendmarkerexpected CRITICALITY reject EXTENSION QoS-Flow-List PRESENCE optional}|
{ID id-DRB-QoS                      CRITICALITY ignore EXTENSION QoSFlowLevelQoSParameters PRESENCE optional}|
{ID id-EarlyForwardingCOUNTReq     CRITICALITY reject EXTENSION EarlyForwardingCOUNTReq PRESENCE optional}|
{ID id-EarlyForwardingCOUNTInfo    CRITICALITY reject EXTENSION EarlyForwardingCOUNTInfo PRESENCE optional}|
{ID id-DAPSRequestInfo              CRITICALITY ignore EXTENSION DAPSRequestInfo PRESENCE optional}|
{ID id-EarlyDataForwardingIndicator CRITICALITY ignore EXTENSION EarlyDataForwardingIndicator PRESENCE optional},
...
}

DRB-To-Remove-List-EUTRAN ::= SEQUENCE (SIZE(1.. maxnoofDRBs)) OF DRB-To-Remove-Item-EUTRAN

DRB-To-Remove-Item-EUTRAN ::= SEQUENCE {
dRB-ID                          DRB-ID,
iE-Extensions                    ProtocolExtensionContainer { { DRB-To-Remove-Item-EUTRAN-ExtIEs } } OPTIONAL,
...
}

```

```

DRB-To-Remove-Item-EUTRAN-ExtIEs      ELAP-PROTOCOL-EXTENSION ::= {
  ...
}

DRB-Required-To-Remove-List-EUTRAN ::= SEQUENCE (SIZE(1.. maxnoofDRBs)) OF DRB-Required-To-Remove-Item-EUTRAN

DRB-Required-To-Remove-Item-EUTRAN ::= SEQUENCE {
  dRB-ID                DRB-ID,
  cause                 Cause,
  iE-Extensions         ProtocolExtensionContainer { { DRB-Required-To-Remove-Item-EUTRAN-ExtIEs } } OPTIONAL,
  ...
}

DRB-Required-To-Remove-Item-EUTRAN-ExtIEs      ELAP-PROTOCOL-EXTENSION ::= {
  ...
}

DRB-To-Remove-List-NG-RAN ::= SEQUENCE (SIZE(1.. maxnoofDRBs)) OF DRB-To-Remove-Item-NG-RAN

DRB-To-Remove-Item-NG-RAN ::= SEQUENCE {
  dRB-ID                DRB-ID,
  iE-Extensions         ProtocolExtensionContainer { { DRB-To-Remove-Item-NG-RAN-ExtIEs } } OPTIONAL,
  ...
}

DRB-To-Remove-Item-NG-RAN-ExtIEs      ELAP-PROTOCOL-EXTENSION ::= {
  ...
}

DRB-Required-To-Remove-List-NG-RAN ::= SEQUENCE (SIZE(1.. maxnoofDRBs)) OF DRB-Required-To-Remove-Item-NG-RAN

DRB-Required-To-Remove-Item-NG-RAN ::= SEQUENCE {
  dRB-ID                DRB-ID,
  cause                 Cause,
  iE-Extensions         ProtocolExtensionContainer { { DRB-Required-To-Remove-Item-NG-RAN-ExtIEs } } OPTIONAL,
  ...
}

DRB-Required-To-Remove-Item-NG-RAN-ExtIEs      ELAP-PROTOCOL-EXTENSION ::= {
  ...
}

DRB-To-Setup-List-EUTRAN ::= SEQUENCE (SIZE(1.. maxnoofDRBs)) OF DRB-To-Setup-Item-EUTRAN

DRB-To-Setup-Item-EUTRAN ::= SEQUENCE {
  dRB-ID                DRB-ID,
  pDCP-Configuration    PDCP-Configuration,
  eUTRAN-QoS            EUTRAN-QoS,
  s1-UL-UP-TNL-Information  UP-TNL-Information,
  data-Forwarding-Information-Request  Data-Forwarding-Information-Request      OPTIONAL,
  cell-Group-Information  Cell-Group-Information,
  dL-UP-Parameters        UP-Parameters                        OPTIONAL,
  dRB-Inactivity-Timer     Inactivity-Timer                OPTIONAL,
  existing-Allocated-S1-DL-UP-TNL-Info  UP-TNL-Information                OPTIONAL,
}

```

```

    iE-Extensions          ProtocolExtensionContainer { { DRB-To-Setup-Item-EUTRAN-ExtIEs } } OPTIONAL,
    ...
}

DRB-To-Setup-Item-EUTRAN-ExtIEs  E1AP-PROTOCOL-EXTENSION ::= {
{ ID id-DataForwardingSourceIPAddress      CRITICALITY ignore  EXTENSION TransportLayerAddress  PRESENCE optional},
    ...
}

DRB-To-Setup-Mod-List-EUTRAN ::= SEQUENCE (SIZE(1.. maxnoofDRBs)) OF DRB-To-Setup-Mod-Item-EUTRAN

DRB-To-Setup-Mod-Item-EUTRAN ::= SEQUENCE {
    dRB-ID                DRB-ID,
    pDCP-Configuration    PDCP-Configuration,
    eUTRAN-QoS            EUTRAN-QoS,
    s1-UL-UP-TNL-Information  UP-TNL-Information,
    data-Forwarding-Information-Request    Data-Forwarding-Information-Request    OPTIONAL,
    cell-Group-Information  Cell-Group-Information,
    dL-UP-Parameters        UP-Parameters                OPTIONAL,
    dRB-Inactivity-Timer     Inactivity-Timer                OPTIONAL,
    iE-Extensions          ProtocolExtensionContainer { { DRB-To-Setup-Mod-Item-EUTRAN-ExtIEs } } OPTIONAL,
    ...
}

DRB-To-Setup-Mod-Item-EUTRAN-ExtIEs  E1AP-PROTOCOL-EXTENSION ::= {
    ...
}

DRB-To-Setup-List-NG-RAN ::= SEQUENCE (SIZE(1.. maxnoofDRBs)) OF DRB-To-Setup-Item-NG-RAN

DRB-To-Setup-Item-NG-RAN ::= SEQUENCE {
    dRB-ID                DRB-ID,
    sDAP-Configuration    SDAP-Configuration,
    pDCP-Configuration    PDCP-Configuration,
    cell-Group-Information  Cell-Group-Information,
    qos-flow-Information-To-Be-Setup      QoS-Flow-QoS-Parameter-List,
    dRB-Data-Forwarding-Information-Request    Data-Forwarding-Information-Request    OPTIONAL,
    dRB-Inactivity-Timer     Inactivity-Timer                OPTIONAL,
    pDCP-SN-Status-Information    PDCP-SN-Status-Information                OPTIONAL,
    iE-Extensions          ProtocolExtensionContainer { { DRB-To-Setup-Item-NG-RAN-ExtIEs } } OPTIONAL,
    ...
}

DRB-To-Setup-Item-NG-RAN-ExtIEs  E1AP-PROTOCOL-EXTENSION ::= {
    {ID id-DRB-QoS          CRITICALITY ignore  EXTENSION QoSFlowLevelQoSParameters  PRESENCE optional}|
    {ID id-DAPSRequestInfo  CRITICALITY ignore  EXTENSION DAPSRequestInfo          PRESENCE optional}|
    {ID id-ignoreMappingRuleIndication  CRITICALITY reject  EXTENSION IgnoreMappingRuleIndication  PRESENCE optional}|
    {ID id-QoSFlowsDRBRemapping  CRITICALITY reject  EXTENSION QoS-Flows-DRB-Remapping          PRESENCE optional},
    ...
}

DRB-To-Setup-Mod-List-NG-RAN ::= SEQUENCE (SIZE(1.. maxnoofDRBs)) OF DRB-To-Setup-Mod-Item-NG-RAN

DRB-To-Setup-Mod-Item-NG-RAN ::= SEQUENCE {

```

```

    dRB-ID                DRB-ID,
    sDAP-Configuration    SDAP-Configuration,
    pDCP-Configuration    PDCP-Configuration,
    cell-Group-Information Cell-Group-Information,
    flow-Mapping-Information QoS-Flow-QoS-Parameter-List,
    dRB-Data-Forwarding-Information-Request Data-Forwarding-Information-Request OPTIONAL,
    dRB-Inactivity-Timer    Inactivity-Timer OPTIONAL,
    pDCP-SN-Status-Information PDCP-SN-Status-Information OPTIONAL,
    iE-Extensions          ProtocolExtensionContainer { { DRB-To-Setup-Mod-Item-NG-RAN-ExtIEs } } OPTIONAL,
    ...
}

DRB-To-Setup-Mod-Item-NG-RAN-ExtIEs E1AP-PROTOCOL-EXTENSION ::= {
  { ID id-DRB-QoS CRITICALITY ignore EXTENSION QoSFlowLevelQoSParameters PRESENCE optional } |
  { ID id-ignoreMappingRuleIndication CRITICALITY reject EXTENSION IgnoreMappingRuleIndication PRESENCE optional } |
  { ID id-DAPSRequestInfo CRITICALITY ignore EXTENSION DAPSRequestInfo PRESENCE optional },
  ...
}

DRB-Usage-Report-List ::= SEQUENCE (SIZE(1..maxnooftimeperiods)) OF DRB-Usage-Report-Item

DRB-Usage-Report-Item ::= SEQUENCE {
  startTimeStamp OCTET STRING (SIZE(4)),
  endTimeStamp OCTET STRING (SIZE(4)),
  usageCountUL INTEGER (0..18446744073709551615),
  usageCountDL INTEGER (0..18446744073709551615),
  iE-Extensions ProtocolExtensionContainer { { DRB-Usage-Report-Item-ExtIEs } } OPTIONAL,
  ...
}

DRB-Usage-Report-Item-ExtIEs E1AP-PROTOCOL-EXTENSION ::= {
  ...
}

Duplication-Activation ::= ENUMERATED {
  active,
  inactive,
  ...
}

Dynamic5QIDescriptor ::= SEQUENCE {
  qoSPriorityLevel QoSPriorityLevel,
  packetDelayBudget PacketDelayBudget,
  packetErrorRate PacketErrorRate,
  fiveQI INTEGER (0..255, ...) OPTIONAL,
  delayCritical ENUMERATED {delay-critical, non-delay-critical} OPTIONAL,
  averagingWindow AveragingWindow OPTIONAL,
  maxDataBurstVolume MaxDataBurstVolume OPTIONAL,
  iE-Extensions ProtocolExtensionContainer { { Dynamic5QIDescriptor-ExtIEs } } OPTIONAL
}

Dynamic5QIDescriptor-ExtIEs E1AP-PROTOCOL-EXTENSION ::= {
  { ID id-ExtendedPacketDelayBudget CRITICALITY ignore EXTENSION ExtendedPacketDelayBudget PRESENCE optional } |

```

```

    { ID id-CNPacketDelayBudgetDownlink          CRITICALITY ignore EXTENSION ExtendedPacketDelayBudget PRESENCE optional }|
    { ID id-CNPacketDelayBudgetUplink            CRITICALITY ignore EXTENSION ExtendedPacketDelayBudget PRESENCE optional },
    ...
}

DataDiscardRequired ::= ENUMERATED {
    required,
    ...
}

-- E

EarlyDataForwardingIndicator ::= ENUMERATED {stop, ...}

EarlyForwardingCOUNTInfo ::= CHOICE {
    firstDLCount          FirstDLCount,
    dlDiscardingCount     DLDiscarding,
    choice-Extension      ProtocolIE-SingleContainer { { EarlyForwardingCOUNTInfo-ExtIEs } }
}

EarlyForwardingCOUNTInfo-ExtIEs E1AP-PROTOCOL-IES ::= {
    ...
}

EarlyForwardingCOUNTReq ::= ENUMERATED { first-dl-count, dl-discarding, ...}

EHC-Common-Parameters ::= SEQUENCE {
    ehc-CID-Length          ENUMERATED { bits7, bits15, ...},
    iE-Extensions          ProtocolExtensionContainer { { EHC-Common-Parameters-ExtIEs } }
}
OPTIONAL

EHC-Common-Parameters-ExtIEs E1AP-PROTOCOL-EXTENSION ::= {
    ...
}

EHC-Downlink-Parameters ::= SEQUENCE {
    drb-ContinueEHC-DL     ENUMERATED { true, ...},
    iE-Extensions          ProtocolExtensionContainer { { EHC-Downlink-Parameters-ExtIEs } }
}
OPTIONAL

EHC-Downlink-Parameters-ExtIEs E1AP-PROTOCOL-EXTENSION ::= {
    {ID id-MaxCIDEHCDDL          CRITICALITY ignore EXTENSION MaxCIDEHCDDL          PRESENCE optional },
    ...
}

EHC-Uplink-Parameters ::= SEQUENCE {
    drb-ContinueEHC-UL     ENUMERATED { true, ...},
    iE-Extensions          ProtocolExtensionContainer { { EHC-Uplink-Parameters-ExtIEs } }
}
OPTIONAL

EHC-Uplink-Parameters-ExtIEs E1AP-PROTOCOL-EXTENSION ::= {
    ...
}

```

```

EHC-Parameters ::= SEQUENCE {
    ehc-Common          EHC-Common-Parameters,
    ehc-Downlink        EHC-Downlink-Parameters          OPTIONAL,
    ehc-Uplink          EHC-Uplink-Parameters            OPTIONAL,
    iE-Extensions       ProtocolExtensionContainer { { EHC-Parameters-ExtIEs } }  OPTIONAL
}

EHC-Parameters-ExtIEs E1AP-PROTOCOL-EXTENSION ::= {
    ...
}

EncryptionKey ::= OCTET STRING

Endpoint-IP-address-and-port ::= SEQUENCE {
    endpoint-IP-Address TransportLayerAddress,
    portNumber           PortNumber,
    iE-Extensions       ProtocolExtensionContainer { { Endpoint-IP-address-and-port-ExtIEs } } OPTIONAL
}

Endpoint-IP-address-and-port-ExtIEs E1AP-PROTOCOL-EXTENSION ::= {
    ...
}

EUTRANAllocationAndRetentionPriority ::= SEQUENCE {
    priorityLevel        PriorityLevel,
    pre-emptionCapability Pre-emptionCapability,
    pre-emptionVulnerability Pre-emptionVulnerability,
    iE-Extensions       ProtocolExtensionContainer { { EUTRANAllocationAndRetentionPriority-ExtIEs } } OPTIONAL,
    ...
}

ExtendedPacketDelayBudget ::= INTEGER (1..65535, ...)

EUTRANAllocationAndRetentionPriority-ExtIEs E1AP-PROTOCOL-EXTENSION ::= {
    ...
}

EUTRAN-QoS-Support-List ::= SEQUENCE (SIZE(1.. maxnoofEUTRANQoSParameters)) OF EUTRAN-QoS-Support-Item

EUTRAN-QoS-Support-Item ::= SEQUENCE {
    eUTRAN-QoS EUTRAN-QoS,
    iE-Extensions ProtocolExtensionContainer { { EUTRAN-QoS-Support-Item-ExtIEs } }  OPTIONAL
}

EUTRAN-QoS-Support-Item-ExtIEs E1AP-PROTOCOL-EXTENSION ::= {
    ...
}

EUTRAN-QoS ::= SEQUENCE {
    qCI          QCI,
    eUTRANAllocationAndRetentionPriority EUTRANAllocationAndRetentionPriority,
    gbrQoSInformation GBR-QoSInformation          OPTIONAL,
    iE-Extensions ProtocolExtensionContainer { { EUTRAN-QoS-ExtIEs } }  OPTIONAL,
}

```

```

    ...
}
EUTRAN-QoS-ExtIEs E1AP-PROTOCOL-EXTENSION ::= {
    ...
}
ExtendedSliceSupportList ::= SEQUENCE (SIZE(1.. maxnoofExtSliceItems)) OF Slice-Support-Item
-- F
FirstDLCount ::= SEQUENCE {
    firstDLCountVal          PDCP-Count,
    iE-Extensions           ProtocolExtensionContainer { { FirstDLCount-ExtIEs } } OPTIONAL
}
FirstDLCount-ExtIEs E1AP-PROTOCOL-EXTENSION ::= {
    ...
}
-- G
GNB-CU-CP-Name           ::= PrintableString(SIZE(1..150,...))
Extended-GNB-CU-CP-Name ::= SEQUENCE {
    gNB-CU-CP-NameVisibleString      GNB-CU-CP-NameVisibleString          OPTIONAL,
    gNB-CU-CP-NameUTF8String         GNB-CU-CP-NameUTF8String          OPTIONAL,
    iE-Extensions                    ProtocolExtensionContainer { { Extended-GNB-CU-CP-Name-ExtIEs } } OPTIONAL,
    ...
}
Extended-GNB-CU-CP-Name-ExtIEs E1AP-PROTOCOL-EXTENSION ::= {
    ...
}
GNB-CU-CP-NameVisibleString ::= VisibleString(SIZE(1..150,...))
GNB-CU-CP-NameUTF8String ::= UTF8String(SIZE(1..150,...))
GNB-CU-CP-UE-E1AP-ID       ::= INTEGER (0..4294967295)
GNB-CU-UP-Capacity         ::= INTEGER (0..255)
GNB-CU-UP-CellGroupRelatedConfiguration ::= SEQUENCE (SIZE(1.. maxnoofUPParameters)) OF GNB-CU-UP-CellGroupRelatedConfiguration-Item
GNB-CU-UP-CellGroupRelatedConfiguration-Item ::= SEQUENCE {
    cell-Group-ID           Cell-Group-ID,
    uP-TNL-Information      UP-TNL-Information,
    uL-Configuration        UL-Configuration          OPTIONAL,
    iE-Extensions           ProtocolExtensionContainer { { GNB-CU-UP-CellGroupRelatedConfiguration-Item-ExtIEs } } OPTIONAL
}
GNB-CU-UP-CellGroupRelatedConfiguration-Item-ExtIEs E1AP-PROTOCOL-EXTENSION ::= {

```



```

}
...
GNB-CU-UP-ID ::= INTEGER (0..68719476735)
GNB-CU-UP-Name ::= PrintableString(SIZE(1..150,...))
Extended-GNB-CU-UP-Name ::= SEQUENCE {
    gNB-CU-UP-NameVisibleString GNB-CU-UP-NameVisibleString OPTIONAL,
    gNB-CU-UP-NameUTF8String GNB-CU-UP-NameUTF8String OPTIONAL,
    iE-Extensions ProtocolExtensionContainer { { Extended-GNB-CU-UP-Name-ExtIEs } } OPTIONAL,
    ...
}
Extended-GNB-CU-UP-Name-ExtIEs E1AP-PROTOCOL-EXTENSION ::= {
    ...
}
GNB-CU-UP-NameVisibleString ::= VisibleString(SIZE(1..150,...))
GNB-CU-UP-NameUTF8String ::= UTF8String(SIZE(1..150,...))
GNB-CU-UP-UE-E1AP-ID ::= INTEGER (0..4294967295)
GNB-CU-CP-TNLA-Setup-Item ::= SEQUENCE {
    tNLAssociationTransportLayerAddress CP-TNL-Information,
    iE-Extensions ProtocolExtensionContainer { { GNB-CU-CP-TNLA-Setup-Item-ExtIEs } } OPTIONAL,
    ...
}
GNB-CU-CP-TNLA-Setup-Item-ExtIEs E1AP-PROTOCOL-EXTENSION ::= {
    ...
}
GNB-CU-CP-TNLA-Failed-To-Setup-Item ::= SEQUENCE {
    tNLAssociationTransportLayerAddress CP-TNL-Information,
    cause Cause,
    iE-Extensions ProtocolExtensionContainer { { GNB-CU-CP-TNLA-Failed-To-Setup-Item-ExtIEs } } OPTIONAL
}
GNB-CU-CP-TNLA-Failed-To-Setup-Item-ExtIEs E1AP-PROTOCOL-EXTENSION ::= {
    ...
}
GNB-CU-CP-TNLA-To-Add-Item ::= SEQUENCE {
    tNLAssociationTransportLayerAddress CP-TNL-Information,
    tNLAssociationUsage TNLAssociationUsage,
    iE-Extensions ProtocolExtensionContainer { { GNB-CU-CP-TNLA-To-Add-Item-ExtIEs } } OPTIONAL
}
GNB-CU-CP-TNLA-To-Add-Item-ExtIEs E1AP-PROTOCOL-EXTENSION ::= {
    ...
}

```

```

GNB-CU-CP-TNLA-To-Remove-Item ::= SEQUENCE {
    tNLAssociationTransportLayerAddress CP-TNL-Information,
    iE-Extensions ProtocolExtensionContainer { { GNB-CU-CP-TNLA-To-Remove-Item-ExtIEs } } OPTIONAL
}

GNB-CU-CP-TNLA-To-Remove-Item-ExtIEs ELAP-PROTOCOL-EXTENSION ::= {
    { ID id-TNLAssociationTransportLayerAddressgNBCUUP CRITICALITY reject EXTENSION CP-TNL-Information PRESENCE optional},
    ...
}

GNB-CU-CP-TNLA-To-Update-Item ::= SEQUENCE {
    tNLAssociationTransportLayerAddress CP-TNL-Information,
    tNLAssociationUsage TNLAssociationUsage OPTIONAL,
    iE-Extensions ProtocolExtensionContainer { { GNB-CU-CP-TNLA-To-Update-Item-ExtIEs } } OPTIONAL
}

GNB-CU-CP-TNLA-To-Update-Item-ExtIEs ELAP-PROTOCOL-EXTENSION ::= {
    ...
}

GNB-CU-UP-TNLA-To-Remove-Item ::= SEQUENCE {
    tNLAssociationTransportLayerAddress CP-TNL-Information,
    tNLAssociationTransportLayerAddressgNBCUUP CP-TNL-Information OPTIONAL,
    iE-Extensions ProtocolExtensionContainer { { GNB-CU-UP-TNLA-To-Remove-Item-ExtIEs } } OPTIONAL
}

GNB-CU-UP-TNLA-To-Remove-Item-ExtIEs ELAP-PROTOCOL-EXTENSION ::= {
    ...
}

GBR-QosInformation ::= SEQUENCE {
    e-RAB-MaximumBitrateDL BitRate,
    e-RAB-MaximumBitrateUL BitRate,
    e-RAB-GuaranteedBitrateDL BitRate,
    e-RAB-GuaranteedBitrateUL BitRate,
    iE-Extensions ProtocolExtensionContainer { { GBR-QosInformation-ExtIEs } } OPTIONAL,
    ...
}

GBR-QosInformation-ExtIEs ELAP-PROTOCOL-EXTENSION ::= {
    ...
}

GBR-QoSFlowInformation ::= SEQUENCE {
    maxFlowBitRateDownlink BitRate,
    maxFlowBitRateUplink BitRate,
    guaranteedFlowBitRateDownlink BitRate,
    guaranteedFlowBitRateUplink BitRate,
    maxPacketLossRateDownlink MaxPacketLossRate OPTIONAL,
    maxPacketLossRateUplink MaxPacketLossRate OPTIONAL,
    iE-Extensions ProtocolExtensionContainer { { GBR-QoSFlowInformation-ExtIEs } } OPTIONAL,
    ...
}

```

```

GBR-QoSFlowInformation-ExtIEs E1AP-PROTOCOL-EXTENSION ::= {
  {ID id-AlternativeQoSParaSetList    CRITICALITY ignore  EXTENSION AlternativeQoSParaSetList PRESENCE optional},
  ...
}

GTP-TEID                ::= OCTET STRING (SIZE (4))

GTPTLAs ::= SEQUENCE (SIZE(1.. maxnoofGTPTLAs)) OF  GTPTLA-Item

GTPTLA-Item ::= SEQUENCE {
  gTPTransportLayerAddresses      TransportLayerAddress,
  iE-Extensions  ProtocolExtensionContainer { { GTPTLA-Item-ExtIEs } }      OPTIONAL,
  ...
}

GTPTLA-Item-ExtIEs E1AP-PROTOCOL-EXTENSION ::= {
  ...
}

GTPTunnel                ::= SEQUENCE {
  transportLayerAddress      TransportLayerAddress,
  gTP-TEID                  GTP-TEID,
  iE-Extensions             ProtocolExtensionContainer { { GTPTunnel-ExtIEs} } OPTIONAL,
  ...
}

GTPTunnel-ExtIEs E1AP-PROTOCOL-EXTENSION ::= {
  ...
}

GNB-CU-UP-OverloadInformation ::= ENUMERATED {overloaded, not-overloaded}

GNB-DU-ID                ::= INTEGER (0..68719476735)

-- H

HFN                ::=      INTEGER (0..4294967295)

HW-CapacityIndicator ::= SEQUENCE {
  offeredThroughput      INTEGER (1..16777216, ...),
  availableThroughput    INTEGER (0..100, ...),
  iE-Extensions          ProtocolExtensionContainer { { HW-CapacityIndicator-ExtIEs } },
  ...
}

HW-CapacityIndicator-ExtIEs E1AP-PROTOCOL-EXTENSION ::= {
  ...
}

-- I

IgnoreMappingRuleIndication ::= ENUMERATED {
  true,

```

```

}
...
}

IntegrityProtectionIndication ::= ENUMERATED {
    required,
    preferred,
    not-needed,
    ...
}

IntegrityProtectionAlgorithm ::= ENUMERATED {
    nIA0,
    i-128-NIA1,
    i-128-NIA2,
    i-128-NIA3,
    ...
}

IntegrityProtectionKey ::= OCTET STRING

IntegrityProtectionResult ::= ENUMERATED {
    performed,
    not-performed,
    ...
}

Inactivity-Timer ::= INTEGER (1..7200, ...)

InterfacesToTrace ::= BIT STRING (SIZE(8))

ImmediateMDT ::= SEQUENCE {
    measurementsToActivate      MeasurementsToActivate,
    measurementFour            M4Configuration      OPTIONAL,
    measurementSix              M6Configuration      OPTIONAL,
    measurementSeven            M7Configuration      OPTIONAL,
    iE-Extensions               ProtocolExtensionContainer { { ImmediateMDT-ExtIEs } } OPTIONAL,
    ...
}

ImmediateMDT-ExtIEs E1AP-PROTOCOL-EXTENSION ::= {
    ...
}

IAB-Donor-CU-UPPSKInfo-Item ::= SEQUENCE {
    iAB-donor-CU-UPPSK          IAB-donor-CU-UPPSK,
    iAB-donor-CU-UPIPAAddress    TransportLayerAddress,
    iAB-DUIPAAddress            TransportLayerAddress,
    iE-Extensions               ProtocolExtensionContainer { { IAB-donor-CU-UPPSKInfoItemExtIEs } } OPTIONAL,
    ...
}

IAB-donor-CU-UPPSKInfoItemExtIEs E1AP-PROTOCOL-EXTENSION ::= {
    ...
}

```

```

IAB-donor-CU-UPPSK ::= OCTET STRING

-- J

-- K

-- L

Links-to-log ::= ENUMERATED {
    uplink,
    downlink,
    both-uplink-and-downlink,
    ...
}

-- M

MaxDataBurstVolume ::= INTEGER (0..4095, ..., 4096.. 2000000)

MaximumIPdatarate ::= SEQUENCE {
    maxIPrate          MaxIPrate,
    IE-Extensions      ProtocolExtensionContainer { {MaximumIPdatarate-ExtIEs} } OPTIONAL,
    ...
}

MaximumIPdatarate-ExtIEs E1AP-PROTOCOL-EXTENSION ::= {
    ...
}

MaxIPrate ::= ENUMERATED {
    bitrate64kbs,
    max-UErate,
    ...
}

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

MaxCIDEHCDL ::= INTEGER (1..32767, ...)

MRDC-Data-Usage-Report-Item ::= SEQUENCE {
    startTimeStamp      OCTET STRING (SIZE(4)),
    endTimeStamp        OCTET STRING (SIZE(4)),
    usageCountUL        INTEGER (0..18446744073709551615),
    usageCountDL        INTEGER (0..18446744073709551615),
    IE-Extensions       ProtocolExtensionContainer { { MRDC-Data-Usage-Report-Item-ExtIEs } } OPTIONAL,
    ...
}

MRDC-Data-Usage-Report-Item-ExtIEs E1AP-PROTOCOL-EXTENSION ::= {
    ...
}

MRDC-Usage-Information ::= SEQUENCE {
    data-Usage-per-PDU-Session-Report      Data-Usage-per-PDU-Session-Report      OPTIONAL,

```

```

    data-Usage-per-QoS-Flow-List      Data-Usage-per-QoS-Flow-List      OPTIONAL,
    iE-Extensions                      ProtocolExtensionContainer { { MRDC-Usage-Information-ExtIEs } } OPTIONAL,
    ...
}

MRDC-Usage-Information-ExtIEs ELAP-PROTOCOL-EXTENSION ::= {
    ...
}

M4Configuration ::= SEQUENCE {
    m4period                M4period,
    m4-links-to-log         Links-to-log,
    iE-Extensions           ProtocolExtensionContainer { { M4Configuration-ExtIEs } } OPTIONAL,
    ...
}

M4Configuration-ExtIEs ELAP-PROTOCOL-EXTENSION ::= {
    ...
}

M4period ::= ENUMERATED { ms1024, ms2048, ms5120, ms10240, min1, ... }

M6Configuration ::= SEQUENCE {
    m6report-Interval       M6report-Interval,
    m6-links-to-log         Links-to-log,
    iE-Extensions           ProtocolExtensionContainer { { M6Configuration-ExtIEs } } OPTIONAL,
    ...
}

M6Configuration-ExtIEs ELAP-PROTOCOL-EXTENSION ::= {
    ...
}

M6report-Interval ::= ENUMERATED { ms120, ms240, ms480, ms640, ms1024, ms2048, ms5120, ms10240, ms20480 ,ms40960, min1, min6, min12, min30, ... }

M7Configuration ::= SEQUENCE {
    m7period                M7period,
    m7-links-to-log         Links-to-log,
    iE-Extensions           ProtocolExtensionContainer { { M7Configuration-ExtIEs } } OPTIONAL,
    ...
}

M7Configuration-ExtIEs ELAP-PROTOCOL-EXTENSION ::= {
    ...
}

M7period ::= INTEGER(1..60, ...)

MDT-Activation ::= ENUMERATED {
    immediate-MDT-only,
    immediate-MDT-and-Trace,
    ...
}

```

```

MDT-Configuration ::= SEQUENCE {
    mdt-Activation          MDT-Activation,
    mDTMode                MDTMode,
    iE-Extensions          ProtocolExtensionContainer { { MDT-Configuration-ExtIEs } } OPTIONAL,
    ...
}
MDT-Configuration-ExtIEs ELAP-PROTOCOL-EXTENSION ::= {
    ...
}
MDTMode ::= CHOICE {
    immediateMDT           ImmediateMDT,
    choice-extension      ProtocolIE-SingleContainer { {MDTMode-ExtIEs} }
}
MDTMode-ExtIEs ELAP-PROTOCOL-IES ::= {
    ...
}
MeasurementsToActivate ::= BIT STRING (SIZE (8))
MDTPLMNList ::= SEQUENCE (SIZE(1..maxnoofMDTPLMNs)) OF PLMN-Identity
-- N
NetworkInstance ::= INTEGER (1..256, ...)
New-UL-TNL-Information-Required ::= ENUMERATED {
    required,
    ...
}
NGRANAllocationAndRetentionPriority ::= SEQUENCE {
    priorityLevel          PriorityLevel,
    pre-emptionCapability  Pre-emptionCapability,
    pre-emptionVulnerability Pre-emptionVulnerability,
    iE-Extensions          ProtocolExtensionContainer { {NGRANAllocationAndRetentionPriority-ExtIEs} } OPTIONAL
}
NGRANAllocationAndRetentionPriority-ExtIEs ELAP-PROTOCOL-EXTENSION ::= {
    ...
}
NG-RAN-QoS-Support-List ::= SEQUENCE (SIZE(1.. maxnoofNGRANQoSParameters)) OF NG-RAN-QoS-Support-Item
NG-RAN-QoS-Support-Item ::= SEQUENCE {
    non-Dynamic5QIDescriptor Non-Dynamic5QIDescriptor,
    iE-Extensions          ProtocolExtensionContainer { { NG-RAN-QoS-Support-Item-ExtIEs } } OPTIONAL
}
NG-RAN-QoS-Support-Item-ExtIEs ELAP-PROTOCOL-EXTENSION ::= {
    ...
}
NID ::= BIT STRING (SIZE (44))

```

```

Non-Dynamic5QIDescriptor ::= SEQUENCE {
    fiveQI                INTEGER (0..255, ...),
    qosPriorityLevel       QoSPriorityLevel           OPTIONAL,
    averagingWindow        AveragingWindow          OPTIONAL,
    maxDataBurstVolume     MaxDataBurstVolume       OPTIONAL,
    iE-Extensions          ProtocolExtensionContainer { { Non-Dynamic5QIDescriptor-ExtIEs } } OPTIONAL
}

Non-Dynamic5QIDescriptor-ExtIEs ELAP-PROTOCOL-EXTENSION ::= {
    { ID id-CNPacketDelayBudgetDownlink          CRITICALITY ignore EXTENSION ExtendedPacketDelayBudget PRESENCE optional } |
    { ID id-CNPacketDelayBudgetUplink            CRITICALITY ignore EXTENSION ExtendedPacketDelayBudget PRESENCE optional },
    ...
}

NPNSupportInfo ::= CHOICE {
    sNPN                NPNSupportInfo-SNPN,
    choice-extension    ProtocolIE-SingleContainer { {NPNSupportInfo-ExtIEs} }
}

NPNSupportInfo-ExtIEs ELAP-PROTOCOL-IES ::= {
    ...
}

NPNSupportInfo-SNPN ::= SEQUENCE {
    nID                NID,
    iE-Extensions      ProtocolExtensionContainer { { NPNSupportInfo-SNPN-ExtIEs } } OPTIONAL
}

NPNSupportInfo-SNPN-ExtIEs ELAP-PROTOCOL-EXTENSION ::= {
    ...
}

NPNContextInfo ::= CHOICE {
    sNPN                NPNContextInfo-SNPN,
    choice-extension    ProtocolIE-SingleContainer { {NPNContextInfo-ExtIEs} }
}

NPNContextInfo-ExtIEs ELAP-PROTOCOL-IES ::= {
    ...
}

NPNContextInfo-SNPN ::= SEQUENCE {
    nID                NID,
    iE-Extensions      ProtocolExtensionContainer { {NPNContextInfo-SNPN-ExtIEs } } OPTIONAL
}

NPNContextInfo-SNPN-ExtIEs ELAP-PROTOCOL-EXTENSION ::= {
    ...
}

NR-Cell-Identity ::= BIT STRING (SIZE(36))

```



```

NR-CGI ::= SEQUENCE {
    pLMN-Identity      PLMN-Identity,
    nR-Cell-Identity   NR-Cell-Identity,
    iE-Extensions      ProtocolExtensionContainer { { NR-CGI-ExtIEs } } OPTIONAL
}

NR-CGI-ExtIEs  E1AP-PROTOCOL-EXTENSION ::= {
    ...
}

NR-CGI-Support-List ::= SEQUENCE (SIZE(1.. maxnoofNR CGI)) OF NR-CGI-Support-Item

NR-CGI-Support-Item ::= SEQUENCE {
    nR-CGI  NR-CGI,
    iE-Extensions      ProtocolExtensionContainer { { NR-CGI-Support-Item-ExtIEs } } OPTIONAL
}

NR-CGI-Support-Item-ExtIEs  E1AP-PROTOCOL-EXTENSION ::= {
    ...
}

Extended-NR-CGI-Support-List ::= SEQUENCE (SIZE(1.. maxnoofExtNR CGI)) OF Extended-NR-CGI-Support-Item

Extended-NR-CGI-Support-Item ::= SEQUENCE {
    nR-CGI  NR-CGI,
    iE-Extensions      ProtocolExtensionContainer { { Extended-NR-CGI-Support-Item-ExtIEs } } OPTIONAL
}

Extended-NR-CGI-Support-Item-ExtIEs  E1AP-PROTOCOL-EXTENSION ::= {
    ...
}

-- O

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

-- P

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

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

PacketErrorRate-ExtIEs  E1AP-PROTOCOL-EXTENSION ::= {
    ...
}

```

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

PDCP-Configuration ::= SEQUENCE {

pDCP-SN-Size-UL	PDCP-SN-Size,	
pDCP-SN-Size-DL	PDCP-SN-Size,	
rLC-Mode	RLC-Mode,	
rOHC-Parameters	ROHC-Parameters	OPTIONAL,
t-ReorderingTimer	T-ReorderingTimer	OPTIONAL,
discardTimer	DiscardTimer	OPTIONAL,
uLDataSplitThreshold	ULDataSplitThreshold	OPTIONAL,
pDCP-Duplication	PDCP-Duplication	OPTIONAL,
pDCP-Reestablishment	PDCP-Reestablishment	OPTIONAL,
pDCP-DataRecovery	PDCP-DataRecovery	OPTIONAL,
duplication-Activation	Duplication-Activation	OPTIONAL,
outOfOrderDelivery	OutOfOrderDelivery	OPTIONAL,
iE-Extensions	ProtocolExtensionContainer	{ { PDCP-Configuration-ExtIEs } } OPTIONAL,

...

}

PDCP-Configuration-ExtIEs ELAP-PROTOCOL-EXTENSION ::= {
 { ID id-PDCP-StatusReportIndication CRITICALITY ignore EXTENSION PDCP-StatusReportIndication PRESENCE optional } |
 { ID id-AdditionalPDCPduplicationInformation CRITICALITY ignore EXTENSION AdditionalPDCPduplicationInformation PRESENCE optional } |
 { ID id-EHC-Parameters CRITICALITY ignore EXTENSION EHC-Parameters PRESENCE optional },
 ...
 }

PDCP-Count ::= SEQUENCE {

pDCP-SN	PDCP-SN,
hFN	HFN,
iE-Extensions	ProtocolExtensionContainer { { PDCP-Count-ExtIEs } } OPTIONAL,

...

}

PDCP-Count-ExtIEs ELAP-PROTOCOL-EXTENSION ::= {

...

}

PDCP-SN-Status-Request ::= ENUMERATED {

requested,

...

}

PDCP-DataRecovery ::= ENUMERATED {

true,

...

}

PDCP-Duplication ::= ENUMERATED {

true,

...

}

```

PDCP-Reestablishment ::= ENUMERATED {
    true,
    ...
}

PDU-Session-Resource-Data-Usage-List ::= SEQUENCE (SIZE(1.. maxnoofPDUSessionResource)) OF PDU-Session-Resource-Data-Usage-Item

PDU-Session-Resource-Data-Usage-Item ::= SEQUENCE {
    pduSessionID          PDU-Session-ID,
    mRDC-Usage-Information MRDC-Usage-Information,
    iE-Extensions         ProtocolExtensionContainer { { PDU-Session-Resource-Data-Usage-Item-ExtIEs } } OPTIONAL,
    ...
}

PDU-Session-Resource-Data-Usage-Item-ExtIEs ELAP-PROTOCOL-EXTENSION ::= {
    ...
}

PDCP-SN ::= INTEGER (0..262143)

PDCP-SN-Size ::= ENUMERATED {
    s-12,
    s-18,
    ...
}

PDCP-SN-Status-Information ::= SEQUENCE {
    pdcpStatusTransfer-UL DRBBStatusTransfer,
    pdcpStatusTransfer-DL PDCP-Count,
    iE-Extension          ProtocolExtensionContainer { { PDCP-SN-Status-Information-ExtIEs } } OPTIONAL,
    ...
}

PDCP-StatusReportIndication ::= ENUMERATED {
    downlink,
    uplink,
    both,
    ...
}

PDCP-SN-Status-Information-ExtIEs ELAP-PROTOCOL-EXTENSION ::= {
    ...
}

DRBBStatusTransfer ::= SEQUENCE {
    receiveStatusofPDCPSDU BIT STRING (SIZE(1..131072)) OPTIONAL,
    countValue              PDCP-Count,
    iE-Extension            ProtocolExtensionContainer { {DRBBStatusTransfer-ExtIEs} } OPTIONAL,
    ...
}

DRBBStatusTransfer-ExtIEs ELAP-PROTOCOL-EXTENSION ::= {
    ...
}

```

```

}
PDU-Session-ID ::= INTEGER (0..255)
PDU-Session-Resource-Activity ::= ENUMERATED {
  active,
  not-active,
  ...
}
PDU-Session-Resource-Activity-List ::= SEQUENCE (SIZE(1.. maxnoofPDUSessionResource)) OF PDU-Session-Resource-Activity-Item
PDU-Session-Resource-Activity-Item ::= SEQUENCE {
  pDU-Session-ID                PDU-Session-ID,
  pDU-Session-Resource-Activity PDU-Session-Resource-Activity,
  iE-Extensions ProtocolExtensionContainer { { PDU-Session-Resource-Activity-ItemExtIEs } } OPTIONAL,
  ...
}
PDU-Session-Resource-Activity-ItemExtIEs    ELAP-PROTOCOL-EXTENSION ::= {
  ...
}

PDU-Session-Resource-Confirm-Modified-List ::= SEQUENCE (SIZE(1.. maxnoofPDUSessionResource)) OF PDU-Session-Resource-Confirm-Modified-Item
PDU-Session-Resource-Confirm-Modified-Item ::= SEQUENCE {
  pDU-Session-ID                PDU-Session-ID,
  dRB-Confirm-Modified-List-NG-RAN DRB-Confirm-Modified-List-NG-RAN OPTIONAL,
  iE-Extensions ProtocolExtensionContainer { { PDU-Session-Resource-Confirm-Modified-Item-ExtIEs } } OPTIONAL,
  ...
}
PDU-Session-Resource-Confirm-Modified-Item-ExtIEs    ELAP-PROTOCOL-EXTENSION ::= {
  ...
}

PDU-Session-Resource-Failed-List ::= SEQUENCE (SIZE(1.. maxnoofPDUSessionResource)) OF PDU-Session-Resource-Failed-Item
PDU-Session-Resource-Failed-Item ::= SEQUENCE {
  pDU-Session-ID                PDU-Session-ID,
  cause                          Cause,
  iE-Extensions ProtocolExtensionContainer { { PDU-Session-Resource-Failed-Item-ExtIEs } } OPTIONAL,
  ...
}
PDU-Session-Resource-Failed-Item-ExtIEs    ELAP-PROTOCOL-EXTENSION ::= {
  ...
}

PDU-Session-Resource-Failed-Mod-List ::= SEQUENCE (SIZE(1.. maxnoofPDUSessionResource)) OF PDU-Session-Resource-Failed-Mod-Item
PDU-Session-Resource-Failed-Mod-Item ::= SEQUENCE {
  pDU-Session-ID                PDU-Session-ID,

```

```

    cause                Cause,
    iE-Extensions        ProtocolExtensionContainer { { PDU-Session-Resource-Failed-Mod-Item-ExtIEs } } OPTIONAL,
    ...
}

PDU-Session-Resource-Failed-Mod-Item-ExtIEs    ELAP-PROTOCOL-EXTENSION ::= {
    ...
}

PDU-Session-Resource-Failed-To-Modify-List ::= SEQUENCE (SIZE(1.. maxnoofPDUSessionResource)) OF PDU-Session-Resource-Failed-To-Modify-Item

PDU-Session-Resource-Failed-To-Modify-Item ::= SEQUENCE {
    pDU-Session-ID        PDU-Session-ID,
    cause                Cause,
    iE-Extensions        ProtocolExtensionContainer { { PDU-Session-Resource-Failed-To-Modify-Item-ExtIEs } } OPTIONAL,
    ...
}

PDU-Session-Resource-Failed-To-Modify-Item-ExtIEs    ELAP-PROTOCOL-EXTENSION ::= {
    ...
}

PDU-Session-Resource-Modified-List ::= SEQUENCE (SIZE(1.. maxnoofPDUSessionResource)) OF PDU-Session-Resource-Modified-Item

PDU-Session-Resource-Modified-Item ::= SEQUENCE {
    pDU-Session-ID        PDU-Session-ID,
    nG-DL-UP-TNL-Information    UP-TNL-Information                OPTIONAL,
    securityResult        SecurityResult                OPTIONAL,
    pDU-Session-Data-Forwarding-Information-Response    Data-Forwarding-Information    OPTIONAL,
    dRB-Setup-List-NG-RAN    DRB-Setup-List-NG-RAN                OPTIONAL,
    dRB-Failed-List-NG-RAN    DRB-Failed-List-NG-RAN                OPTIONAL,
    dRB-Modified-List-NG-RAN    DRB-Modified-List-NG-RAN            OPTIONAL,
    dRB-Failed-To-Modify-List-NG-RAN    DRB-Failed-To-Modify-List-NG-RAN    OPTIONAL,
    iE-Extensions        ProtocolExtensionContainer { { PDU-Session-Resource-Modified-Item-ExtIEs } } OPTIONAL,
    ...
}

PDU-Session-Resource-Modified-Item-ExtIEs    ELAP-PROTOCOL-EXTENSION ::= {
    { ID id-redundant-nG-DL-UP-TNL-Information    CRITICALITY ignore EXTENSION    UP-TNL-Information PRESENCE optional },
    ...
}

PDU-Session-Resource-Required-To-Modify-List ::= SEQUENCE (SIZE(1.. maxnoofPDUSessionResource)) OF PDU-Session-Resource-Required-To-Modify-Item

PDU-Session-Resource-Required-To-Modify-Item ::= SEQUENCE {
    pDU-Session-ID        PDU-Session-ID,
    nG-DL-UP-TNL-Information    UP-TNL-Information                OPTIONAL,
    dRB-Required-To-Modify-List-NG-RAN    DRB-Required-To-Modify-List-NG-RAN    OPTIONAL,
    dRB-Required-To-Remove-List-NG-RAN    DRB-Required-To-Remove-List-NG-RAN    OPTIONAL,
    iE-Extensions        ProtocolExtensionContainer { { PDU-Session-Resource-Required-To-Modify-Item-ExtIEs } } OPTIONAL,
    ...
}

PDU-Session-Resource-Required-To-Modify-Item-ExtIEs    ELAP-PROTOCOL-EXTENSION ::= {

```

```

    { ID id-redundant-nG-DL-UP-TNL-Information      CRITICALITY ignore EXTENSION  UP-TNL-Information PRESENCE optional },
    ...
}

PDU-Session-Resource-Setup-List ::= SEQUENCE (SIZE(1.. maxnoofPDUSessionResource)) OF PDU-Session-Resource-Setup-Item

PDU-Session-Resource-Setup-Item ::= SEQUENCE {
    pDU-Session-ID                PDU-Session-ID,
    securityResult                 SecurityResult                OPTIONAL,
    nG-DL-UP-TNL-Information       UP-TNL-Information,
    pDU-Session-Data-Forwarding-Information-Response  Data-Forwarding-Information  OPTIONAL,
    nG-DL-UP-Unchanged             ENUMERATED {true, ...}        OPTIONAL,
    dRB-Setup-List-NG-RAN          DRB-Setup-List-NG-RAN,
    dRB-Failed-List-NG-RAN        DRB-Failed-List-NG-RAN  OPTIONAL,
    iE-Extensions                  ProtocolExtensionContainer { { PDU-Session-Resource-Setup-Item-ExtIEs } } OPTIONAL,
    ...
}

PDU-Session-Resource-Setup-Item-ExtIEs      ELAP-PROTOCOL-EXTENSION ::= {
    { ID id-redundant-nG-DL-UP-TNL-Information      CRITICALITY ignore EXTENSION  UP-TNL-Information PRESENCE optional }|
    { ID id-RedundantPDUSessionInformation-used     CRITICALITY ignore EXTENSION  RedundantPDUSessionInformation PRESENCE optional },
    ...
}

PDU-Session-Resource-Setup-Mod-List ::= SEQUENCE (SIZE(1.. maxnoofPDUSessionResource)) OF PDU-Session-Resource-Setup-Mod-Item

PDU-Session-Resource-Setup-Mod-Item ::= SEQUENCE {
    pDU-Session-ID                PDU-Session-ID,
    securityResult                 SecurityResult                OPTIONAL,
    nG-DL-UP-TNL-Information       UP-TNL-Information,
    pDU-Session-Data-Forwarding-Information-Response  Data-Forwarding-Information  OPTIONAL,
    dRB-Setup-Mod-List-NG-RAN      DRB-Setup-Mod-List-NG-RAN,
    dRB-Failed-Mod-List-NG-RAN     DRB-Failed-Mod-List-NG-RAN  OPTIONAL,
    iE-Extensions                  ProtocolExtensionContainer { { PDU-Session-Resource-Setup-Mod-Item-ExtIEs } }
    OPTIONAL,
    ...
}

PDU-Session-Resource-Setup-Mod-Item-ExtIEs  ELAP-PROTOCOL-EXTENSION ::= {
    { ID id-redundant-nG-DL-UP-TNL-Information      CRITICALITY ignore EXTENSION  UP-TNL-Information PRESENCE optional },
    ...
}

PDU-Session-Resource-To-Modify-List ::= SEQUENCE (SIZE(1.. maxnoofPDUSessionResource)) OF PDU-Session-Resource-To-Modify-Item

PDU-Session-Resource-To-Modify-Item ::= SEQUENCE {
    pDU-Session-ID                PDU-Session-ID,
    securityIndication             SecurityIndication            OPTIONAL,
    pDU-Session-Resource-DL-AMBR   BitRate                      OPTIONAL,
    nG-UL-UP-TNL-Information       UP-TNL-Information          OPTIONAL,
    pDU-Session-Data-Forwarding-Information-Request  Data-Forwarding-Information-Request  OPTIONAL,
    pDU-Session-Data-Forwarding-Information          Data-Forwarding-Information  OPTIONAL,
    pDU-Session-Inactivity-Timer   Inactivity-Timer            OPTIONAL,
    networkInstance                NetworkInstance              OPTIONAL,
}

```

```

dRB-To-Setup-List-NG-RAN          DRB-To-Setup-List-NG-RAN          OPTIONAL,
dRB-To-Modify-List-NG-RAN        DRB-To-Modify-List-NG-RAN          OPTIONAL,
dRB-To-Remove-List-NG-RAN        DRB-To-Remove-List-NG-RAN         OPTIONAL,
iE-Extensions                     ProtocolExtensionContainer { { PDU-Session-Resource-To-Modify-Item-ExtIEs } } OPTIONAL,
...
}

PDU-Session-Resource-To-Modify-Item-ExtIEs  ELAP-PROTOCOL-EXTENSION ::= {
  { ID id-SNSSAI          CRITICALITY reject  EXTENSION  SNSSAI          PRESENCE optional } |
  { ID id-CommonNetworkInstance  CRITICALITY ignore  EXTENSION  CommonNetworkInstance  PRESENCE optional } |
  { ID id-redundant-nG-UL-UP-TNL-Information  CRITICALITY ignore  EXTENSION  UP-TNL-Information     PRESENCE optional } |
  { ID id-RedundantCommonNetworkInstance  CRITICALITY ignore  EXTENSION  CommonNetworkInstance  PRESENCE optional } |
  { ID id-DataForwardingtoE-UTRANInformationList  CRITICALITY ignore  EXTENSION  DataForwardingtoE-UTRANInformationList  PRESENCE optional } |
  { ID id-SecurityIndicationModify  CRITICALITY ignore  EXTENSION  SecurityIndication     PRESENCE optional } |
  ...
}

PDU-Session-Resource-To-Remove-List ::= SEQUENCE (SIZE(1.. maxnoofPDUSessionResource)) OF PDU-Session-Resource-To-Remove-Item

PDU-Session-Resource-To-Remove-Item ::= SEQUENCE {
  pDU-Session-ID          PDU-Session-ID,
  iE-Extensions           ProtocolExtensionContainer { { PDU-Session-Resource-To-Remove-Item-ExtIEs } } OPTIONAL,
  ...
}

PDU-Session-Resource-To-Remove-Item-ExtIEs  ELAP-PROTOCOL-EXTENSION ::= {
  { ID id-Cause          CRITICALITY ignore  EXTENSION  Cause          PRESENCE optional },
  ...
}

PDU-Session-Resource-To-Setup-List ::= SEQUENCE (SIZE(1.. maxnoofPDUSessionResource)) OF PDU-Session-Resource-To-Setup-Item

PDU-Session-Resource-To-Setup-Item ::= SEQUENCE {
  pDU-Session-ID          PDU-Session-ID,
  pDU-Session-Type        PDU-Session-Type,
  sNSSAI                  SNSSAI,
  securityIndication       SecurityIndication,
  pDU-Session-Resource-DL-AMBR  BitRate          OPTIONAL,
  nG-UL-UP-TNL-Information  UP-TNL-Information,
  pDU-Session-Data-Forwarding-Information-Request  Data-Forwarding-Information-Request  OPTIONAL,
  pDU-Session-Inactivity-Timer  Inactivity-Timer  OPTIONAL,
  existing-Allocated-NG-DL-UP-TNL-Info  UP-TNL-Information  OPTIONAL,
  networkInstance          NetworkInstance  OPTIONAL,
  dRB-To-Setup-List-NG-RAN  DRB-To-Setup-List-NG-RAN,
  iE-Extensions           ProtocolExtensionContainer { { PDU-Session-Resource-To-Setup-Item-ExtIEs } } OPTIONAL,
  ...
}

PDU-Session-Resource-To-Setup-Item-ExtIEs  ELAP-PROTOCOL-EXTENSION ::= {
  { ID id-CommonNetworkInstance  CRITICALITY ignore  EXTENSION  CommonNetworkInstance  PRESENCE optional } |
  { ID id-redundant-nG-UL-UP-TNL-Information  CRITICALITY ignore  EXTENSION  UP-TNL-Information     PRESENCE optional } |
  { ID id-RedundantCommonNetworkInstance  CRITICALITY ignore  EXTENSION  CommonNetworkInstance  PRESENCE optional } |
  { ID id-RedundantPDUSessionInformation  CRITICALITY ignore  EXTENSION  RedundantPDUSessionInformation  PRESENCE optional } |
}

```

```

}
...
PDU-Session-Resource-To-Setup-Mod-List ::= SEQUENCE (SIZE(1.. maxnoofPDU-Session-Resource)) OF PDU-Session-Resource-To-Setup-Mod-Item

PDU-Session-Resource-To-Setup-Mod-Item ::= SEQUENCE {
    pDU-Session-ID                PDU-Session-ID,
    pDU-Session-Type              PDU-Session-Type,
    sNSSAI                        SNSSAI,
    securityIndication            SecurityIndication,
    pDU-Session-Resource-AMBR     BitRate OPTIONAL,
    nG-UL-UP-TNL-Information      UP-TNL-Information,
    pDU-Session-Data-Forwarding-Information-Request Data-Forwarding-Information-Request OPTIONAL,
    pDU-Session-Inactivity-Timer  Inactivity-Timer OPTIONAL,
    drB-To-Setup-Mod-List-NG-RAN DRB-To-Setup-Mod-List-NG-RAN,
    iE-Extensions                 ProtocolExtensionContainer { { PDU-Session-Resource-To-Setup-Mod-Item-ExtIEs } }
    OPTIONAL,
    ...
}

PDU-Session-Resource-To-Setup-Mod-Item-ExtIEs      ELAP-PROTOCOL-EXTENSION ::= {
    {ID id-NetworkInstance      CRITICALITY ignore EXTENSION NetworkInstance      PRESENCE optional}|
    {ID id-CommonNetworkInstance CRITICALITY ignore EXTENSION CommonNetworkInstance PRESENCE optional}|
    {ID id-redundant-nG-UL-UP-TNL-Information CRITICALITY ignore EXTENSION UP-TNL-Information PRESENCE optional}|
    {ID id-RedundantCommonNetworkInstance CRITICALITY ignore EXTENSION CommonNetworkInstance PRESENCE optional},
    ...
}

PDU-Session-To-Notify-List ::= SEQUENCE (SIZE(1.. maxnoofPDU-Session-Resource)) OF PDU-Session-To-Notify-Item

PDU-Session-To-Notify-Item ::= SEQUENCE {
    pDU-Session-ID                PDU-Session-ID,
    qoS-Flow-List                 QoS-Flow-List,
    iE-Extensions                 ProtocolExtensionContainer { { PDU-Session-To-Notify-Item-ExtIEs } } OPTIONAL,
    ...
}

PDU-Session-To-Notify-Item-ExtIEs      ELAP-PROTOCOL-EXTENSION ::= {
    ...
}

PDU-Session-Type ::= ENUMERATED {
    ipv4,
    ipv6,
    ipv4v6,
    ethernet,
    unstructured,
    ...
}

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

PortNumber ::= BIT STRING (SIZE(16))

```



```

PPI ::= INTEGER (0..7, ...)

PriorityLevel ::= INTEGER { spare (0), highest (1), lowest (14), no-priority (15) } (0..15)

Pre-emptionCapability ::= ENUMERATED {
    shall-not-trigger-pre-emption,
    may-trigger-pre-emption
}

Pre-emptionVulnerability ::= ENUMERATED {
    not-pre-emptable,
    pre-emptable
}

PrivacyIndicator ::= ENUMERATED {
    immediate-MDT,
    logged-MDT,
    ...
}

-- Q

QCI ::= INTEGER (0..255)

QoS-Characteristics ::= CHOICE {
    non-Dynamic-5QI          Non-Dynamic5QIDescriptor,
    dynamic-5QI              Dynamic5QIDescriptor,
    choice-extension         ProtocolIE-SingleContainer  {{QoS-Characteristics-ExtIEs}}
}

QoS-Characteristics-ExtIEs E1AP-PROTOCOL-IES ::= {
    ...
}

QoS-Flow-Identifier ::= INTEGER (0..63)

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

QoS-Flow-Item ::= SEQUENCE {
    qoS-Flow-Identifier          QoS-Flow-Identifier,
    iE-Extensions                ProtocolExtensionContainer  { { QoS-Flow-Item-ExtIEs } } OPTIONAL,
    ...
}

QoS-Flow-Item-ExtIEs E1AP-PROTOCOL-EXTENSION ::= {
    {ID id-QoSFlowMappingIndication          CRITICALITY ignore EXTENSION QoS-Flow-Mapping-Indication PRESENCE optional}|
    {ID id-DataForwardingSourceIPAddress     CRITICALITY ignore EXTENSION TransportLayerAddress PRESENCE optional},
    ...
}

QoS-Flow-Failed-List ::= SEQUENCE (SIZE(1.. maxnoofQoSFlows)) OF QoS-Flow-Failed-Item

QoS-Flow-Failed-Item ::= SEQUENCE {
    qoS-Flow-Identifier          QoS-Flow-Identifier,

```

```

    cause                Cause,
    iE-Extensions        ProtocolExtensionContainer { { QoS-Flow-Failed-Item-ExtIEs } } OPTIONAL,
    ...
}

QoS-Flow-Failed-Item-ExtIEs    E1AP-PROTOCOL-EXTENSION ::= {
    ...
}

QoS-Flow-Mapping-List    ::= SEQUENCE (SIZE(1.. maxnoofQoSFlows)) OF QoS-Flow-Mapping-Item

QoS-Flow-Mapping-Item    ::= SEQUENCE {
    qos-Flow-Identifier    QoS-Flow-Identifier,
    qosFlowMappingIndication    QoS-Flow-Mapping-Indication    OPTIONAL,
    iE-Extensions        ProtocolExtensionContainer { { QoS-Flow-Mapping-Item-ExtIEs } } OPTIONAL,
    ...
}

QoS-Flow-Mapping-Item-ExtIEs    E1AP-PROTOCOL-EXTENSION ::= {
    ...
}

QoS-Flow-Mapping-Indication ::= ENUMERATED {ul, dl, ...}

QoS-Flows-DRB-Remapping ::= ENUMERATED {update, source-configuration, ...}

QoS-Parameters-Support-List ::= SEQUENCE {
    eUTRAN-QoS-Support-List    EUTRAN-QoS-Support-List    OPTIONAL,
    nG-RAN-QoS-Support-List    NG-RAN-QoS-Support-List    OPTIONAL,
    iE-Extensions        ProtocolExtensionContainer { { QoS-Parameters-Support-List-ItemExtIEs } } OPTIONAL,
    ...
}

QoS-Parameters-Support-List-ItemExtIEs    E1AP-PROTOCOL-EXTENSION ::= {
    ...
}

QoSPriorityLevel ::= INTEGER (0..127, ...)

QoS-Flow-QoS-Parameter-List ::= SEQUENCE (SIZE(1.. maxnoofQoSFlows)) OF QoS-Flow-QoS-Parameter-Item

QoS-Flow-QoS-Parameter-Item ::= SEQUENCE {
    qos-Flow-Identifier    QoS-Flow-Identifier,
    qosFlowLevelQoSParameters    QoSFlowLevelQoSParameters,
    qosFlowMappingIndication    QoS-Flow-Mapping-Indication    OPTIONAL,
    iE-Extensions        ProtocolExtensionContainer { { QoS-Flow-QoS-Parameter-Item-ExtIEs } } OPTIONAL,
    ...
}

QoS-Flow-QoS-Parameter-Item-ExtIEs    E1AP-PROTOCOL-EXTENSION ::= {
    {ID id-RedundantQoSFlowIndicator    CRITICALITY ignore    EXTENSION RedundantQoSFlowIndicator    PRESENCE optional}|
    {ID id-TSCTrafficCharacteristics    CRITICALITY ignore    EXTENSION TSCTrafficCharacteristics    PRESENCE optional},
    ...
}

```

```

}

QoSFlowLevelQoSParameters ::= SEQUENCE {
    qos-Characteristics          QoS-Characteristics,
    ngranAllocationRetentionPriority  NGRANAllocationAndRetentionPriority,
    gbr-QoS-Flow-Information      GBR-QoSFlowInformation                OPTIONAL,
    reflective-QoS-Attribute      ENUMERATED {subject-to, ...}          OPTIONAL,
    additional-QoS-Information    ENUMERATED {more-likely, ...}        OPTIONAL,
    paging-Policy-Indicator       INTEGER (1..8, ...)                OPTIONAL,
    reflective-QoS-Indicator      ENUMERATED {enabled, ...}            OPTIONAL,
    iE-Extensions                 ProtocolExtensionContainer { { QoSFlowLevelQoSParameters-ExtIEs } } OPTIONAL
}

QoSFlowLevelQoSParameters-ExtIEs  E1AP-PROTOCOL-EXTENSION ::= {
    {ID id-QoSMonitoringRequest      CRITICALITY ignore EXTENSION QoSMonitoringRequest      PRESENCE optional}|
    {ID id-MCG-OfferedGBRQoSFlowInfo CRITICALITY ignore EXTENSION GBR-QoSFlowInformation    PRESENCE optional}|
    {ID id-QoSMonitoringReportingFrequency CRITICALITY ignore EXTENSION QoSMonitoringReportingFrequency PRESENCE optional}|
    {ID id-QoSMonitoringDisabled     CRITICALITY ignore EXTENSION QoSMonitoringDisabled     PRESENCE optional}|
    {ID id-DataForwardingSourceIPAddress CRITICALITY ignore EXTENSION TransportLayerAddress     PRESENCE optional},
    ...
}

QoSMonitoringRequest ::= ENUMERATED {ul, dl, both}

QoSMonitoringReportingFrequency ::= INTEGER (1..1800, ...)

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

QoS-Flow-Removed-Item ::= SEQUENCE {
    qos-Flow-Identifier          QoS-Flow-Identifier,
    qos-Flow-Released-In-Session ENUMERATED {released-in-session, not-released-in-session, ...} OPTIONAL,
    qos-Flow-Accumulated-Session-Time OCTET STRING (SIZE(5))          OPTIONAL,
    iE-Extensions                 ProtocolExtensionContainer { { QoS-Flow-Removed-Item-ExtIEs } } OPTIONAL,
    ...
}

QoS-Flow-Removed-Item-ExtIEs  E1AP-PROTOCOL-EXTENSION ::= {
    ...
}

QoS-Flows-to-be-forwarded-List ::= SEQUENCE (SIZE(1.. maxnoofQoSFlows)) OF QoS-Flows-to-be-forwarded-Item

QoS-Flows-to-be-forwarded-Item ::= SEQUENCE {
    qos-Flow-Identifier          QoS-Flow-Identifier,
    iE-Extensions                 ProtocolExtensionContainer { { QoS-Flows-to-be-forwarded-Item-ExtIEs } } OPTIONAL,
    ...
}

QoS-Flows-to-be-forwarded-Item-ExtIEs E1AP-PROTOCOL-EXTENSION ::= {
    ...
}

QoS-Mapping-Information ::= SEQUENCE {
    dscp                          BIT STRING (SIZE(6))          OPTIONAL,

```

```
flow-label          BIT STRING (SIZE(20))  OPTIONAL,
...
}

DataForwardingtoNG-RANQoSFlowInformationList ::= SEQUENCE (SIZE(1.. maxnoofQoSFlows)) OF DataForwardingtoNG-RANQoSFlowInformationList-Item

DataForwardingtoNG-RANQoSFlowInformationList-Item ::= SEQUENCE {
    qos-Flow-Identifier      QoS-Flow-Identifier,
    iE-Extensions           ProtocolExtensionContainer { { DataForwardingtoNG-RANQoSFlowInformationList-Item-ExtIEs } } OPTIONAL,
    ...
}

DataForwardingtoNG-RANQoSFlowInformationList-Item-ExtIEs ELAP-PROTOCOL-EXTENSION ::= {
    ...
}

-- R

RANUEID ::= OCTET STRING (SIZE (8))

RAT-Type ::= ENUMERATED {
    e-UTRA,
    nR,
    ...
}

RedundantQoSFlowIndicator ::= ENUMERATED {true,false}

RedundantPDUSessionInformation ::= SEQUENCE {
    rSN          RSN,
    iE-Extensions ProtocolExtensionContainer { {RedundantPDUSessionInformation-ExtIEs} } OPTIONAL,
    ...
}

RedundantPDUSessionInformation-ExtIEs ELAP-PROTOCOL-EXTENSION ::= {
    ...
}

RSN ::= ENUMERATED {v1, v2, ...}

RetainabilityMeasurementsInfo ::= SEQUENCE (SIZE(1.. maxnoofDRBs)) OF DRB-Removed-Item

RegistrationRequest ::= ENUMERATED {
    start,
    stop,
    ...
}

ReportCharacteristics ::= BIT STRING (SIZE(36))

ReportingPeriodicity ::= ENUMERATED {
    ms500, ms1000, ms2000, ms5000, ms10000, ms20000, ms30000, ms40000, ms50000, ms60000, ms70000, ms80000, ms90000, ms100000, ms110000, ms120000,
    ...
}
```

```

}

RLC-Mode ::= ENUMERATED {
    rlc-tm,
    rlc-am,
    rlc-um-bidirectional,
    rlc-um-unidirectional-ul,
    rlc-um-unidirectional-dl,
    ...
}

ROHC-Parameters ::= CHOICE {
    rOHC ROHC,
    uPlinkOnlyROHC UplinkOnlyROHC,
    choice-Extension ProtocolIE-SingleContainer { { ROHC-Parameters-ExtIEs } }
}

ROHC-Parameters-ExtIEs ELAP-PROTOCOL-IES ::= {
    ...
}

ROHC ::= SEQUENCE {
    maxCID INTEGER (0..16383, ...),
    rOHC-Profiles INTEGER (0..511, ...),
    continueROHC ENUMERATED {true, ...} OPTIONAL,
    iE-Extensions ProtocolExtensionContainer { { ROHC-ExtIEs } } OPTIONAL
}

ROHC-ExtIEs ELAP-PROTOCOL-EXTENSION ::= {
    ...
}

-- S

SecurityAlgorithm ::= SEQUENCE {
    cipheringAlgorithm CipheringAlgorithm,
    integrityProtectionAlgorithm IntegrityProtectionAlgorithm OPTIONAL,
    iE-Extensions ProtocolExtensionContainer { { SecurityAlgorithm-ExtIEs } } OPTIONAL,
    ...
}

SecurityAlgorithm-ExtIEs ELAP-PROTOCOL-EXTENSION ::= {
    ...
}

SecurityIndication ::= SEQUENCE {
    integrityProtectionIndication IntegrityProtectionIndication,
    confidentialityProtectionIndication ConfidentialityProtectionIndication,
    maximumIPdataRate MaximumIPdataRate OPTIONAL,
    iE-Extensions ProtocolExtensionContainer { {SecurityIndication-ExtIEs} } OPTIONAL,
    ...
}

```

```

SecurityIndication-ExtIEs E1AP-PROTOCOL-EXTENSION ::= {
  ...
}

SecurityInformation ::= SEQUENCE {
  securityAlgorithm      SecurityAlgorithm,
  uPSecuritykey          UPSecuritykey,
  iE-Extensions          ProtocolExtensionContainer { { SecurityInformation-ExtIEs } } OPTIONAL,
  ...
}

SecurityInformation-ExtIEs E1AP-PROTOCOL-EXTENSION ::= {
  ...
}

SecurityResult ::= SEQUENCE {
  integrityProtectionResult      IntegrityProtectionResult,
  confidentialityProtectionResult ConfidentialityProtectionResult,
  iE-Extensions                  ProtocolExtensionContainer { {SecurityResult-ExtIEs} } OPTIONAL,
  ...
}

SecurityResult-ExtIEs E1AP-PROTOCOL-EXTENSION ::= {
  ...
}

Slice-Support-List ::= SEQUENCE (SIZE(1.. maxnoofSliceItems)) OF Slice-Support-Item

Slice-Support-Item ::= SEQUENCE {
  sNSSAI      SNSSAI,
  iE-Extensions          ProtocolExtensionContainer { { Slice-Support-Item-ExtIEs } } OPTIONAL
}

Slice-Support-Item-ExtIEs E1AP-PROTOCOL-EXTENSION ::= {
  ...
}

SNSSAI ::= SEQUENCE {
  sST      OCTET STRING (SIZE(1)),
  sD      OCTET STRING (SIZE(3)) OPTIONAL,
  iE-Extensions          ProtocolExtensionContainer { { SNSSAI-ExtIEs } } OPTIONAL,
  ...
}

SNSSAI-ExtIEs E1AP-PROTOCOL-EXTENSION ::= {
  ...
}

SDAP-Configuration ::= SEQUENCE {
  defaultDRB      DefaultDRB,
  sDAP-Header-UL  SDAP-Header-UL,
  sDAP-Header-DL  SDAP-Header-DL,
  iE-Extensions          ProtocolExtensionContainer { { SDAP-Configuration-ExtIEs } } OPTIONAL,
}

```

```

}
...
SDAP-Configuration-ExtIEs    E1AP-PROTOCOL-EXTENSION ::= {
}
...
SDAP-Header-DL ::= ENUMERATED {
    present,
    absent,
    ...
}
SDAP-Header-UL ::= ENUMERATED {
    present,
    absent,
    ...
}
SubscriberProfileIDforRFP ::= INTEGER (1..256, ...)

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

TNLAssociationUsage ::= ENUMERATED {
    ue,
    non-ue,
    both,
    ...
}
TNL-AvailableCapacityIndicator ::= SEQUENCE {
    dL-TNL-OfferedCapacity      INTEGER (0..16777216, ...),
    dL-TNL-AvailableCapacity    INTEGER (0..100, ...),
    uL-TNL-OfferedCapacity      INTEGER (0..16777216, ...),
    uL-TNL-AvailableCapacity    INTEGER (0..100, ...),
    iE-Extensions              ProtocolExtensionContainer { { TNL-AvailableCapacityIndicator-ExtIEs } },
    ...
}
TNL-AvailableCapacityIndicator-ExtIEs    E1AP-PROTOCOL-EXTENSION ::= {
}
...
TSCTrafficCharacteristics ::= SEQUENCE {
    tSCTrafficCharacteristicsUL          TSCTrafficInformation          OPTIONAL,
    tSCTrafficCharacteristicsDL          TSCTrafficInformation          OPTIONAL,
    iE-Extensions                        ProtocolExtensionContainer { { TSCTrafficCharacteristics-ExtIEs } } OPTIONAL
}
TSCTrafficCharacteristics-ExtIEs    E1AP-PROTOCOL-EXTENSION ::= {
}
...
}

```

```

TSTrafficInformation ::= SEQUENCE {
    periodicity                Periodicity,
    burstArrivalTime           BurstArrivalTime OPTIONAL,
    iE-Extensions              ProtocolExtensionContainer { { TSTrafficInformation-ExtIEs } } OPTIONAL
}

TSTrafficInformation-ExtIEs ELAP-PROTOCOL-EXTENSION ::= {
    ...
}

Periodicity ::= INTEGER (1..640000, ...)

BurstArrivalTime ::= OCTET STRING

TraceActivation ::= SEQUENCE {
    traceID                    TraceID,
    interfacesToTrace          InterfacesToTrace,
    traceDepth                 TraceDepth,
    traceCollectionEntityIPAddress TransportLayerAddress,
    iE-Extensions              ProtocolExtensionContainer { {TraceActivation-ExtIEs} } OPTIONAL,
    ...
}

TraceActivation-ExtIEs ELAP-PROTOCOL-EXTENSION ::= {
    { ID id-MDTConfiguration CRITICALITY ignore EXTENSION MDT-Configuration PRESENCE optional }|
    { ID id-TraceCollectionEntityURI CRITICALITY ignore EXTENSION URIaddress PRESENCE optional},
    ...
}

TraceDepth ::= ENUMERATED {
    minimum,
    medium,
    maximum,
    minimumWithoutVendorSpecificExtension,
    mediumWithoutVendorSpecificExtension,
    maximumWithoutVendorSpecificExtension,
    ...
}

TraceID ::= OCTET STRING (SIZE(8))

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

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

T-Reordering ::= ENUMERATED {ms0, ms1, ms2, ms4, ms5, ms8, ms10, ms15, ms20, ms30, ms40, ms50, ms60, ms80, ms100, ms120, ms140, ms160, ms180,
ms200, ms220, ms240, ms260, ms280, ms300, ms500, ms750, ms1000, ms1250, ms1500, ms1750, ms2000, ms2250, ms2500, ms2750, ms3000, ...}

T-ReorderingTimer ::= SEQUENCE {
    t-Reordering              T-Reordering,
    iE-Extensions              ProtocolExtensionContainer { { T-ReorderingTimer-ExtIEs } } OPTIONAL,
    ...
}

```



```

T-ReorderingTimer-ExtIEs    ELAP-PROTOCOL-EXTENSION ::= {
    ...
}

TypeOfError ::= ENUMERATED {
    not-understood,
    missing,
    ...
}

Transport-Layer-Address-Info ::= SEQUENCE {
    transport-UP-Layer-Addresses-Info-To-Add-List    Transport-UP-Layer-Addresses-Info-To-Add-List OPTIONAL,
    transport-UP-Layer-Addresses-Info-To-Remove-List Transport-UP-Layer-Addresses-Info-To-Remove-List OPTIONAL,
    iE-Extensions          ProtocolExtensionContainer { { Transport-Layer-Address-Info-ExtIEs } } OPTIONAL,
    ...
}

Transport-Layer-Address-Info-ExtIEs ELAP-PROTOCOL-EXTENSION ::= {
    ...
}

Transport-UP-Layer-Addresses-Info-To-Add-List ::= SEQUENCE (SIZE(1.. maxnoofTLAs)) OF Transport-UP-Layer-Addresses-Info-To-Add-Item

Transport-UP-Layer-Addresses-Info-To-Add-Item ::= SEQUENCE {
    iP-SecTransportLayerAddress    TransportLayerAddress,
    gTPTransportLayerAddressesToAdd    GTPTLAs                OPTIONAL,
    iE-Extensions          ProtocolExtensionContainer { { Transport-UP-Layer-Addresses-Info-To-Add-ItemExtIEs } } OPTIONAL,
    ...
}

Transport-UP-Layer-Addresses-Info-To-Add-ItemExtIEs ELAP-PROTOCOL-EXTENSION ::= {
    ...
}

Transport-UP-Layer-Addresses-Info-To-Remove-List ::= SEQUENCE (SIZE(1.. maxnoofTLAs)) OF Transport-UP-Layer-Addresses-Info-To-Remove-Item

Transport-UP-Layer-Addresses-Info-To-Remove-Item ::= SEQUENCE {
    iP-SecTransportLayerAddress    TransportLayerAddress,
    gTPTransportLayerAddressesToRemove    GTPTLAs                OPTIONAL,
    iE-Extensions          ProtocolExtensionContainer { { Transport-UP-Layer-Addresses-Info-To-Remove-ItemExtIEs } } OPTIONAL,
    ...
}

Transport-UP-Layer-Addresses-Info-To-Remove-ItemExtIEs ELAP-PROTOCOL-EXTENSION ::= {
    ...
}
-- U

UE-Activity ::= ENUMERATED {
    active,
    not-active,
    ...
}

```

```

UE-associatedLogicalE1-ConnectionItem ::= SEQUENCE {
    gNB-CU-CP-UE-E1AP-ID          GNB-CU-CP-UE-E1AP-ID          OPTIONAL,
    gNB-CU-UP-UE-E1AP-ID          GNB-CU-UP-UE-E1AP-ID          OPTIONAL,
    iE-Extensions                  ProtocolExtensionContainer { { UE-associatedLogicalE1-ConnectionItemExtIEs } } OPTIONAL,
    ...
}

UE-associatedLogicalE1-ConnectionItemExtIEs E1AP-PROTOCOL-EXTENSION ::= {
    ...
}

UL-Configuration ::= ENUMERATED {
    no-data,
    shared,
    only,
    ...
}

ULUPTNLAddressToUpdateItem ::= SEQUENCE {
    oldTNLAddress                  TransportLayerAddress,
    newTNLAddress                  TransportLayerAddress,
    iE-Extensions                  ProtocolExtensionContainer { { ULUPTNLAddressToUpdateItemExtIEs } } OPTIONAL,
    ...
}

ULUPTNLAddressToUpdateItemExtIEs E1AP-PROTOCOL-EXTENSION ::= {
    ...
}

ULDataSplitThreshold ::= ENUMERATED {b0, b100, b200, b400, b800, b1600, b3200, b6400, b12800, b25600, b51200, b102400, b204800, b409600,
b819200, b1228800, b1638400, b2457600, b3276800, b4096000, b4915200, b5734400, b6553600, infinity, ...}

UP-Parameters ::= SEQUENCE (SIZE(1.. maxnoofUPParameters)) OF UP-Parameters-Item

UP-Parameters-Item ::= SEQUENCE {
    uP-TNL-Information             UP-TNL-Information,
    cell-Group-ID                 Cell-Group-ID,
    iE-Extensions                  ProtocolExtensionContainer { { UP-Parameters-Item-ExtIEs } } OPTIONAL,
    ...
}

UP-Parameters-Item-ExtIEs E1AP-PROTOCOL-EXTENSION ::= {
    {ID id-QoS-Mapping-Information CRITICALITY reject EXTENSION QoS-Mapping-Information PRESENCE optional},
    ...
}

UPSecuritykey ::= SEQUENCE {
    encryptionKey                  EncryptionKey,
    integrityProtectionKey         IntegrityProtectionKey          OPTIONAL,
    iE-Extensions                  ProtocolExtensionContainer { { UPSecuritykey-ExtIEs } } OPTIONAL,
    ...
}

```

```

UPSecuritykey-ExtIEs    ElAP-PROTOCOL-EXTENSION ::= {
  ...
}

UP-TNL-Information      ::=    CHOICE {
  gTPTunnel             GTP Tunnel,
  choice-extension      ProtocolIE-SingleContainer  {{UP-TNL-Information-ExtIEs}}
}

UP-TNL-Information-ExtIEs ElAP-PROTOCOL-IES ::= {
  ...
}

UplinkOnlyROHC ::= SEQUENCE {
  maxCID                INTEGER (0..16383, ...),
  rOHC-Profiles         INTEGER (0..511, ...),
  continueROHC          ENUMERATED {true, ...} OPTIONAL,
  iE-Extensions         ProtocolExtensionContainer { { UplinkOnlyROHC-ExtIEs } }    OPTIONAL
}

UplinkOnlyROHC-ExtIEs ElAP-PROTOCOL-EXTENSION ::= {
  ...
}

URIaddress ::= VisibleString

-- V

-- W

-- X

-- Y

-- Z

END
-- ASN1STOP

```

9.4.6 Common Definitions

```

-- ASN1START
-- *****
--
-- Common definitions
--
-- *****

ElAP-CommonDataTypes {
itu-t (0) identified-organization (4) etsi (0) mobileDomain (0)
ngran-access (22) modules (3) elap (5) version1 (1) elap-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)

ProtocolExtensionID ::= INTEGER (0..maxProtocolExtensions)

ProtocolIE-ID    ::= INTEGER (0..maxProtocolIEs)

TriggeringMessage ::= ENUMERATED { initiating-message, successful-outcome, unsuccessful-outcome}

END
-- ASN1STOP

```

9.4.7 Constant Definitions

```

-- ASN1START
-- *****
--
-- Constant definitions
--
-- *****

Elap-Constants {
itu-t (0) identified-organization (4) etsi (0) mobileDomain (0)
ngran-access (22) modules (3) elap (5) version1 (1) elap-Constants (4) }

```

DEFINITIONS AUTOMATIC TAGS ::=

BEGIN

IMPORTS

 ProcedureCode,
 ProtocolIE-ID

FROM ElAP-CommonDataTypes;

-- *****

--

-- Elementary Procedures

--

-- *****

id-reset	ProcedureCode ::= 0
id-errorIndication	ProcedureCode ::= 1
id-privateMessage	ProcedureCode ::= 2
id-gNB-CU-UP-ElSetup	ProcedureCode ::= 3
id-gNB-CU-CP-ElSetup	ProcedureCode ::= 4
id-gNB-CU-UP-ConfigurationUpdate	ProcedureCode ::= 5
id-gNB-CU-CP-ConfigurationUpdate	ProcedureCode ::= 6
id-elRelease	ProcedureCode ::= 7
id-bearerContextSetup	ProcedureCode ::= 8
id-bearerContextModification	ProcedureCode ::= 9
id-bearerContextModificationRequired	ProcedureCode ::= 10
id-bearerContextRelease	ProcedureCode ::= 11
id-bearerContextReleaseRequest	ProcedureCode ::= 12
id-bearerContextInactivityNotification	ProcedureCode ::= 13
id-dLDataNotification	ProcedureCode ::= 14
id-dataUsageReport	ProcedureCode ::= 15
id-gNB-CU-UP-CounterCheck	ProcedureCode ::= 16
id-gNB-CU-UP-StatusIndication	ProcedureCode ::= 17
id-uLDataNotification	ProcedureCode ::= 18
id-mRDC-DataUsageReport	ProcedureCode ::= 19
id-TraceStart	ProcedureCode ::= 20
id-DeactivateTrace	ProcedureCode ::= 21
id-resourceStatusReportingInitiation	ProcedureCode ::= 22
id-resourceStatusReporting	ProcedureCode ::= 23
id-iAB-UPTNLAddressUpdate	ProcedureCode ::= 24
id-CellTrafficTrace	ProcedureCode ::= 25
id-earlyForwardingSNTransfer	ProcedureCode ::= 26
id-gNB-CU-CPMeasurementResultsInformation	ProcedureCode ::= 27
id-iABPSKNotification	ProcedureCode ::= 28

-- *****

--

-- Lists

--

-- *****

maxnoofErrors	INTEGER ::= 256
maxnoofSPLMNs	INTEGER ::= 12
maxnoofSliceItems	INTEGER ::= 1024
maxnoofIndividualE1ConnectionsToReset	INTEGER ::= 65536
maxnoofEUTRANQoSParameters	INTEGER ::= 256
maxnoofNGRANQoSParameters	INTEGER ::= 256
maxnoofDRBs	INTEGER ::= 32
maxnoofNR CGI	INTEGER ::= 512
maxnoofPDUSessionResource	INTEGER ::= 256
maxnoofQoSFlows	INTEGER ::= 64
maxnoofUPParameters	INTEGER ::= 8
maxnoofCellGroups	INTEGER ::= 4
maxnooftimeperiods	INTEGER ::= 2
maxnoofTNLAssociations	INTEGER ::= 32
maxnoofTLAs	INTEGER ::= 16
maxnoofGTPTLAs	INTEGER ::= 16
maxnoofTNLAddresses	INTEGER ::= 8
maxnoofMDTPLMNs	INTEGER ::= 16
maxnoofQoSParaSets	INTEGER ::= 8
maxnoofExtSliceItems	INTEGER ::= 65535
maxnoofDataForwardingTunneltoE-UTRAN	INTEGER ::= 256
maxnoofExtNR CGI	INTEGER ::= 16384
maxnoofPSKs	INTEGER ::= 256

```
-- *****
--
-- IEs
--
-- *****
```

id-Cause	ProtocolIE-ID ::= 0
id-CriticalityDiagnostics	ProtocolIE-ID ::= 1
id-gNB-CU-CP-UE-E1AP-ID	ProtocolIE-ID ::= 2
id-gNB-CU-UP-UE-E1AP-ID	ProtocolIE-ID ::= 3
id-ResetType	ProtocolIE-ID ::= 4
id-UE-associatedLogicalE1-ConnectionItem	ProtocolIE-ID ::= 5
id-UE-associatedLogicalE1-ConnectionListResAck	ProtocolIE-ID ::= 6
id-gNB-CU-UP-ID	ProtocolIE-ID ::= 7
id-gNB-CU-UP-Name	ProtocolIE-ID ::= 8
id-gNB-CU-CP-Name	ProtocolIE-ID ::= 9
id-CNSupport	ProtocolIE-ID ::= 10
id-SupportedPLMNs	ProtocolIE-ID ::= 11
id-TimeToWait	ProtocolIE-ID ::= 12
id-SecurityInformation	ProtocolIE-ID ::= 13
id-UEDLAggregateMaximumBitRate	ProtocolIE-ID ::= 14
id-System-BearerContextSetupRequest	ProtocolIE-ID ::= 15
id-System-BearerContextSetupResponse	ProtocolIE-ID ::= 16
id-BearerContextStatusChange	ProtocolIE-ID ::= 17
id-System-BearerContextModificationRequest	ProtocolIE-ID ::= 18
id-System-BearerContextModificationResponse	ProtocolIE-ID ::= 19
id-System-BearerContextModificationConfirm	ProtocolIE-ID ::= 20
id-System-BearerContextModificationRequired	ProtocolIE-ID ::= 21

id-DRB-Status-List	ProtocolIE-ID ::= 22
id-ActivityNotificationLevel	ProtocolIE-ID ::= 23
id-ActivityInformation	ProtocolIE-ID ::= 24
id-Data-Usage-Report-List	ProtocolIE-ID ::= 25
id-New-UL-TNL-Information-Required	ProtocolIE-ID ::= 26
id-GNB-CU-CP-TNLA-To-Add-List	ProtocolIE-ID ::= 27
id-GNB-CU-CP-TNLA-To-Remove-List	ProtocolIE-ID ::= 28
id-GNB-CU-CP-TNLA-To-Update-List	ProtocolIE-ID ::= 29
id-GNB-CU-CP-TNLA-Setup-List	ProtocolIE-ID ::= 30
id-GNB-CU-CP-TNLA-Failed-To-Setup-List	ProtocolIE-ID ::= 31
id-DRB-To-Setup-List-EUTRAN	ProtocolIE-ID ::= 32
id-DRB-To-Modify-List-EUTRAN	ProtocolIE-ID ::= 33
id-DRB-To-Remove-List-EUTRAN	ProtocolIE-ID ::= 34
id-DRB-Required-To-Modify-List-EUTRAN	ProtocolIE-ID ::= 35
id-DRB-Required-To-Remove-List-EUTRAN	ProtocolIE-ID ::= 36
id-DRB-Setup-List-EUTRAN	ProtocolIE-ID ::= 37
id-DRB-Failed-List-EUTRAN	ProtocolIE-ID ::= 38
id-DRB-Modified-List-EUTRAN	ProtocolIE-ID ::= 39
id-DRB-Failed-To-Modify-List-EUTRAN	ProtocolIE-ID ::= 40
id-DRB-Confirm-Modified-List-EUTRAN	ProtocolIE-ID ::= 41
id-PDU-Session-Resource-To-Setup-List	ProtocolIE-ID ::= 42
id-PDU-Session-Resource-To-Modify-List	ProtocolIE-ID ::= 43
id-PDU-Session-Resource-To-Remove-List	ProtocolIE-ID ::= 44
id-PDU-Session-Resource-Required-To-Modify-List	ProtocolIE-ID ::= 45
id-PDU-Session-Resource-Setup-List	ProtocolIE-ID ::= 46
id-PDU-Session-Resource-Failed-List	ProtocolIE-ID ::= 47
id-PDU-Session-Resource-Modified-List	ProtocolIE-ID ::= 48
id-PDU-Session-Resource-Failed-To-Modify-List	ProtocolIE-ID ::= 49
id-PDU-Session-Resource-Confirm-Modified-List	ProtocolIE-ID ::= 50
id-DRB-To-Setup-Mod-List-EUTRAN	ProtocolIE-ID ::= 51
id-DRB-Setup-Mod-List-EUTRAN	ProtocolIE-ID ::= 52
id-DRB-Failed-Mod-List-EUTRAN	ProtocolIE-ID ::= 53
id-PDU-Session-Resource-Setup-Mod-List	ProtocolIE-ID ::= 54
id-PDU-Session-Resource-Failed-Mod-List	ProtocolIE-ID ::= 55
id-PDU-Session-Resource-To-Setup-Mod-List	ProtocolIE-ID ::= 56
id-TransactionID	ProtocolIE-ID ::= 57
id-Serving-PLMN	ProtocolIE-ID ::= 58
id-UE-Inactivity-Timer	ProtocolIE-ID ::= 59
id-System-GNB-CU-UP-CounterCheckRequest	ProtocolIE-ID ::= 60
id-DRBs-Subject-To-Counter-Check-List-EUTRAN	ProtocolIE-ID ::= 61
id-DRBs-Subject-To-Counter-Check-List-NG-RAN	ProtocolIE-ID ::= 62
id-PPI	ProtocolIE-ID ::= 63
id-gNB-CU-UP-Capacity	ProtocolIE-ID ::= 64
id-GNB-CU-UP-OverloadInformation	ProtocolIE-ID ::= 65
id-UEDLMaximumIntegrityProtectedDataRate	ProtocolIE-ID ::= 66
id-PDU-Session-To-Notify-List	ProtocolIE-ID ::= 67
id-PDU-Session-Resource-Data-Usage-List	ProtocolIE-ID ::= 68
id-SNSSAI	ProtocolIE-ID ::= 69
id-DataDiscardRequired	ProtocolIE-ID ::= 70
id-OldQoSFlowMap-ULendmarkerexpected	ProtocolIE-ID ::= 71
id-DRB-QoS	ProtocolIE-ID ::= 72
id-GNB-CU-UP-TNLA-To-Remove-List	ProtocolIE-ID ::= 73
id-endpoint-IP-Address-and-Port	ProtocolIE-ID ::= 74
id-TNLAssociationTransportLayerAddressgNBCUUP	ProtocolIE-ID ::= 75

id-RANUEID	ProtocolIE-ID ::= 76
id-GNB-DU-ID	ProtocolIE-ID ::= 77
id-CommonNetworkInstance	ProtocolIE-ID ::= 78
id-NetworkInstance	ProtocolIE-ID ::= 79
id-QoSFlowMappingIndication	ProtocolIE-ID ::= 80
id-TraceActivation	ProtocolIE-ID ::= 81
id-TraceID	ProtocolIE-ID ::= 82
id-SubscriberProfileIDforRFP	ProtocolIE-ID ::= 83
id-AdditionalRRMPriorityIndex	ProtocolIE-ID ::= 84
id-RetainabilityMeasurementsInfo	ProtocolIE-ID ::= 85
id-Transport-Layer-Address-Info	ProtocolIE-ID ::= 86
id-QoSMonitoringRequest	ProtocolIE-ID ::= 87
id-PDCP-StatusReportIndication	ProtocolIE-ID ::= 88
id-gNB-CU-CP-Measurement-ID	ProtocolIE-ID ::= 89
id-gNB-CU-UP-Measurement-ID	ProtocolIE-ID ::= 90
id-RegistrationRequest	ProtocolIE-ID ::= 91
id-ReportCharacteristics	ProtocolIE-ID ::= 92
id-ReportingPeriodicity	ProtocolIE-ID ::= 93
id-TNL-AvailableCapacityIndicator	ProtocolIE-ID ::= 94
id-HW-CapacityIndicator	ProtocolIE-ID ::= 95
id-RedundantCommonNetworkInstance	ProtocolIE-ID ::= 96
id-redundant-nG-UL-UP-TNL-Information	ProtocolIE-ID ::= 97
id-redundant-nG-DL-UP-TNL-Information	ProtocolIE-ID ::= 98
id-RedundantQoSFlowIndicator	ProtocolIE-ID ::= 99
id-TSCTrafficCharacteristics	ProtocolIE-ID ::= 100
id-CNPacketDelayBudgetDownlink	ProtocolIE-ID ::= 101
id-CNPacketDelayBudgetUplink	ProtocolIE-ID ::= 102
id-ExtendedPacketDelayBudget	ProtocolIE-ID ::= 103
id-AdditionalPDCPduplicationInformation	ProtocolIE-ID ::= 104
id-RedundantPDUSessionInformation	ProtocolIE-ID ::= 105
id-RedundantPDUSessionInformation-used	ProtocolIE-ID ::= 106
id-QoS-Mapping-Information	ProtocolIE-ID ::= 107
id-DLUPTNLAddressToUpdateList	ProtocolIE-ID ::= 108
id-ULUPTNLAddressToUpdateList	ProtocolIE-ID ::= 109
id-NPNSupportInfo	ProtocolIE-ID ::= 110
id-NPNContextInfo	ProtocolIE-ID ::= 111
id-MDTConfiguration	ProtocolIE-ID ::= 112
id-ManagementBasedMDTPLMNList	ProtocolIE-ID ::= 113
id-TraceCollectionEntityIPAddress	ProtocolIE-ID ::= 114
id-PrivacyIndicator	ProtocolIE-ID ::= 115
id-TraceCollectionEntityURI	ProtocolIE-ID ::= 116
id-URAddress	ProtocolIE-ID ::= 117
id-EHC-Parameters	ProtocolIE-ID ::= 118
id-DRBs-Subject-To-Early-Forwarding-List	ProtocolIE-ID ::= 119
id-DAPSRequestInfo	ProtocolIE-ID ::= 120
id-CHOInitiation	ProtocolIE-ID ::= 121
id-EarlyForwardingCOUNTRReq	ProtocolIE-ID ::= 122
id-EarlyForwardingCOUNTInfo	ProtocolIE-ID ::= 123
id-AlternativeQoSParaSetList	ProtocolIE-ID ::= 124
id-ExtendedSliceSupportList	ProtocolIE-ID ::= 125
id-MCG-OfferedGBRQoSFlowInfo	ProtocolIE-ID ::= 126
id-Number-of-tunnels	ProtocolIE-ID ::= 127
id-DRB-Measurement-Results-Information-List	ProtocolIE-ID ::= 128
id-Extended-GNB-CU-CP-Name	ProtocolIE-ID ::= 129


```

id-Extended-GNB-CU-UP-Name                ProtocolIE-ID ::= 130
id-DataForwardingtoE-UTRANInformationList  ProtocolIE-ID ::= 131
id-QoSMonitoringReportingFrequency        ProtocolIE-ID ::= 132
id-QoSMonitoringDisabled                  ProtocolIE-ID ::= 133
id-AdditionalHandoverInfo                 ProtocolIE-ID ::= 134
id-Extended-NR-CGI-Support-List          ProtocolIE-ID ::= 135
id-DataForwardingtoNG-RANQoSFlowInformationList ProtocolIE-ID ::= 136
id-MaxCIDEHCDL                            ProtocolIE-ID ::= 137
id-ignoreMappingRuleIndication            ProtocolIE-ID ::= 138
id-DirectForwardingPathAvailability       ProtocolIE-ID ::= 139
id-EarlyDataForwardingIndicator           ProtocolIE-ID ::= 140
id-QoSFlowsDRBRemapping                   ProtocolIE-ID ::= 141
id-DataForwardingSourceIPAddress         ProtocolIE-ID ::= 142
id-SecurityIndicationModify               ProtocolIE-ID ::= 143
id-IAB-Donor-CU-UPPSKInfo                 ProtocolIE-ID ::= 144

END
-- ASN1STOP

```

9.4.8 Container Definitions

```

-- ASN1START
-- *****
--
-- Container definitions
--
-- *****

ElAP-Containers {
itu-t (0) identified-organization (4) etsi (0) mobileDomain (0)
ngran-access (22) modules (3) elap (5) version1 (1) elap-Containers (5) }

DEFINITIONS AUTOMATIC TAGS ::=

BEGIN

-- *****
--
-- IE parameter types from other modules.
--
-- *****

IMPORTS
    maxPrivateIEs,
    maxProtocolExtensions,
    maxProtocolIEs,
    Criticality,
    Presence,

```

```

    PrivateIE-ID,
    ProtocolIE-ID

FROM ElAP-CommonDataTypes;

-- *****
--
-- Class Definition for Protocol IEs
--
-- *****

ElAP-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 Extensions
--
-- *****

ElAP-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
--
-- *****

ElAP-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 { ElAP-PROTOCOL-IES : IESSetParam} ::=
    SEQUENCE (SIZE (0..maxProtocolIEs)) OF
    ProtocolIE-Field {{IESSetParam}}

ProtocolIE-SingleContainer { ElAP-PROTOCOL-IES : IESSetParam} ::=
    ProtocolIE-Field {{IESSetParam}}

ProtocolIE-Field { ElAP-PROTOCOL-IES : IESSetParam} ::= SEQUENCE {
    id                ElAP-PROTOCOL-IES.&id                ({IESSetParam}),
    criticality       ElAP-PROTOCOL-IES.&criticality        ({IESSetParam}@id)},
    value            ElAP-PROTOCOL-IES.&Value              ({IESSetParam}@id)}
}

-- *****
--
-- Container Lists for Protocol IE Containers
--
-- *****

ProtocolIE-ContainerList {INTEGER : lowerBound, INTEGER : upperBound, ElAP-PROTOCOL-IES : IESSetParam} ::=
    SEQUENCE (SIZE (lowerBound..upperBound)) OF
    ProtocolIE-Container {{IESSetParam}}

-- *****
--
-- Container for Protocol Extensions
--
-- *****

ProtocolExtensionContainer { ElAP-PROTOCOL-EXTENSION : ExtensionSetParam} ::=
    SEQUENCE (SIZE (1..maxProtocolExtensions)) OF
    ProtocolExtensionField {{ExtensionSetParam}}

ProtocolExtensionField { ElAP-PROTOCOL-EXTENSION : ExtensionSetParam} ::= SEQUENCE {
    id                ElAP-PROTOCOL-EXTENSION.&id          ({ExtensionSetParam}),
    criticality       ElAP-PROTOCOL-EXTENSION.&criticality  ({ExtensionSetParam}@id)},
    extensionValue    ElAP-PROTOCOL-EXTENSION.&Extension    ({ExtensionSetParam}@id)}
}

-- *****

```

```
--  
-- Container for Private IEs  
--  
-- *****  
  
PrivateIE-Container { ElAP-PRIVATE-IES : IEsSetParam} ::=  
  SEQUENCE (SIZE (1..maxPrivateIEs)) OF  
  PrivateIE-Field {{IEsSetParam}}  
  
PrivateIE-Field { ElAP-PRIVATE-IES : IEsSetParam} ::= SEQUENCE {  
  id          ElAP-PRIVATE-IES.&id          ({IEsSetParam}),  
  criticality ElAP-PRIVATE-IES.&criticality  ({IEsSetParam}@id),  
  value       ElAP-PRIVATE-IES.&Value      ({IEsSetParam}@id)  
}  
  
END  
-- ASN1STOP
```

9.5 Message Transfer Syntax

E1AP shall use the ASN.1 Basic Packed Encoding Rules (BASIC-PER) Aligned Variant as transfer syntax, as specified in ITU-T Recommendation X.691 [7].

9.6 Timers

10 Handling of unknown, unforeseen and erroneous protocol data

Section 10 of TS 38.413 [6] is applicable for the purposes of the present document, with the following additions for non-UE-associated procedures:

- In case of Abstract Syntax Error, when reporting the *Criticality Diagnostics* IE for not comprehended IE/IEgroups or missing IE/IE groups, the *Transaction ID* IE shall also be included;
- In case of Logical Error, when reporting the *Criticality Diagnostics* IE, the *Transaction ID* IE shall also be included;
- In case of Logical Error in a response message of a Class 1 procedure, or failure to comprehend *Transaction ID* IE from a received message, the procedure shall be considered as unsuccessfully terminated or not terminated (e.g., transaction ID unknown in response message), and local error handling shall be initiated.

Annex A (informative): Change History

Change history							
Date	Meeting	TDoc	CR	Rev	Cat	Subject/Comment	New version
2018-02	R3 #99	R3-181309	-	-	-	Endorsed skeleton	0.0.0
2018-03	R3 #99	R3-181597	-	-	-	New version capturing agreements from RAN3#99	0.1.0
2018-04	R3 #99b	R3-182531	-	-	-	New version capturing agreements from RAN3#99b	0.2.0
2018-05	R3 #100	R3-183601	-	-	-	New version capturing agreements from RAN3#100	0.3.0
2018-06	RAN#80	RP-181154				Submitted to 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-181925	0001	3	F	BL CR for TS 38.463 covering agreements from RAN3-AH-1807 and R3-101 Note: CR not based on latest version of the spec. Changes to clause 8.3.2.2 in the CR were implemented in clause 8.3.2.3 in the spec.	15.1.0
2018-12	RAN#82	RP-182451	0002	2	F	NR Corrections (TS 38.463 Baseline CR covering RAN3-101Bis and RAN3-102 agreements)	15.2.0
2019-03	RAN#83	RP-190560	0004	2	F	Correction to Data Forwarding Information IE	15.3.0
2019-03	RAN#83	RP-190555	0005	1	F	Corrections related to Integrity Protection handling at the gNB-CU-UP	15.3.0
2019-03	RAN#83	RP-190554	0007	2	F	Corrections on gNB-CU-UP/gNB-DU-CP Configuration Update	15.3.0
2019-03	RAN#83	RP-190556	0008	2	F	Correction of QoS Flow Mapping Indication	15.3.0
2019-03	RAN#83	RP-190560	0009	1	F	Paging Failure	15.3.0
2019-03	RAN#83	RP-190560	0011	1	F	Release due to pre-emption	15.3.0
2019-03	RAN#83	RP-190560	0013	-	F	Transaction ID in Error Indication procedure	15.3.0
2019-03	RAN#83	RP-190560	0017	1	F	CR to TS 38.463 on inactivity timer over E1	15.3.0
2019-03	RAN#83	RP-190560	0020	1	F	Data volume reporting for MR-DC with 5GC	15.3.0
2019-03	RAN#83	RP-190560	0029	1	F	TS 38.463 ASN.1 corrections	15.3.0
2019-03	RAN#83	RP-190560	0030	-	F	Rapporteur corrections for TS 38.463	15.3.0
2019-03	RAN#83	RP-190611	0035	3	F	S-NSSAI update during EPS to 5GS handover	15.3.0
2019-07	RP#84	RP-191399	0023	2	F	Support of ongoing re-mapping on source side during SDAP mobility	15.4.0
2019-07	RP#84	RP-191399	0028	1	F	TS 38.463 Tabular clean up for Bearer Context messages	15.4.0
2019-07	RP-84	RP-191396	0044	2	F	Correction to DRB 5QI on E1	15.4.0
2019-07	RP-84	RP-191399	0049	2	F	Multiple SCTP associations over E1	15.4.0
2019-07	RP-84	RP-191399	0050	2	F	Rapporteur's editorial corrections for TS 38.463	15.4.0
2019-07	RP-84	RP-191399	0051	-	F	E1AP failure messages correction	15.4.0
2019-07	RP-84	RP-191399	0052	1	F	New UL TNL Information clarification	15.4.0
2019-07	RP-84	RP-191399	0053	4	F	UE Identification over E1	15.4.0
2019-07	RP-84	RP-191394	0057	2	F	CR to 38.463 on deconfiguring PDCP duplication	15.4.0
2019-07	RP-84	RP-191399	0062	2	F	Clarification on security indication in the modification procedure over E1 interface	15.4.0
2019-07	RP-84	RP-191399	0064	2	F	Clarification on counter check procedure	15.4.0
2019-07	RP-84	RP-191397	0065		F	Correction of Network Instance	15.4.0
2019-07	RP-84	RP-191399	0073	1	F	Activity Notification Level in Bearer Context Modification Request E1AP	15.4.0
2019-07	RP-84	RP-191394	0075	1	F	PDCP SN length and RLC mode related clean-up over To Be Modified structure in Bearer Context Modification procedure	15.4.0
2019-07	RP-84	RP-191399	0084	-	F	Bearer Context Release Request Cause	15.4.0
2019-07	RP-84	RP-191399	0085	-	F	Clarification on Bearer Context Setup and Bearer Context Modification failures	15.4.0
2019-07	RP-84	RP-191396	0086	1	F	PDU session split for E1	15.4.0
2019-07	RP-84	RP-191399	0091	-	F	Rapporteur's editorial corrections for TS 38.463	15.4.0
2019-07	RP-84	RP-191399	0092	1	F	Rapporteur's ASN.1 corrections for TS 38.463	15.4.0
2019-07	RP-84	RP-191399	0095	1	F	CR to 38.463 on adding Cause when remove DRB and PDU Session	15.4.0
2019-07	RP-84	RP-191399	0097	-	F	Rapporteur's ASN.1 corrections for TS 38.463	15.4.0
2019-09	RP-85	RP-192168	0094	2	F	CR to 38.463 on Security Indication	15.5.0
2019-09	RP-85	RP-192166	0098	1	F	Correction of security indication	15.5.0
2019-09	RP-85	RP-192166	0111	1	F	Clarification for TNLA removal	15.5.0
2019-09	RP-85	RP-192168	0122	2	F	Correction of semantic descriptions in TS 38.463 (rapporteur)	15.5.0
2019-12	RP-86	RP-192915	0158	1	F	Correction of S-NSSAI coding	15.6.0
2019-12	RP-86	RP-192915	0174	2	F	UL Data Split Threshold correction	15.6.0
2019-12	RP-86	RP-192915	0476	1	F	Correction to DRB to Setup	15.6.0
2019-12	RP-86	RP-192913	0033	7	F	Trace function support for E1AP	16.0.0
2019-12	RP-86	RP-192913	0089	4	B	Introduction of Additional RRM Policy Index (ARPI)	16.0.0
2019-12	RP-86	RP-192913	0096	3	B	Retainability measurements for DRBs and QoS flows	16.0.0
2019-12	RP-86	RP-192913	0163	1	C	Extending the MDBV Range	16.0.0
2019-12	RP-86	RP-193212	0473	4	F	Support for setting up IPsec a priori in E1	16.0.0
2020-03	RP-87-e	RP-200477	0481	4	B	E2E delay measurement for Qos monitoring for URLLC	16.1.0
2020-03	RP-87-e	RP-200425	0487	-	F	E1AP correction of F1 Support for IPsec Setup	16.1.0
2020-03	RP-87-e	RP-200425	0488	-	F	Rapporteur's corrections for TS 38.463	16.1.0
2020-03	RP-87-e	RP-200425	0489	-	D	Rapporteur's editorial corrections for TS 38.463	16.1.0

2020-04						Editorial correction to the ASN.1	16.1.1
2020-07	RP-88-e	RP-201082	0142	12	B	Addition of SON features	16.2.0
2020-07	RP-88-e	RP-201079	0154	11	B	Introduction of NR_IOT support to TS 38.463	16.2.0
2020-07	RP-88-e	RP-201077	0162	6	B	BL CR to 38.463: Support for IAB	16.2.0
2020-07	RP-88-e	RP-201080	0468	7	B	Introduction of Non-Public Networks for TS38.463	16.2.0
2020-07	RP-88-e	RP-201082	0477	6	B	Addition of MDT features	16.2.0
2020-07	RP-88-e	RP-201079	0478	4	B	Support of Ethernet Header Compression	16.2.0
2020-07	RP-88-e	RP-201075	0490	5	B	Baseline CR for introducing Rel-16 NR mobility enhancement	16.2.0
2020-07	RP-88-e	RP-201085	0498	-	D	Rapporteur's editorial corrections for TS 38.463	16.2.0
2020-07	RP-88-e	RP-201091	0500	2	A	Correction of the Old QoS Flow List update during HO	16.2.0
2020-07	RP-88-e	RP-201092	0502	2	A	PDCP Status Report indication in PDCP-Configuration	16.2.0
2020-07	RP-88-e	RP-201074	0511	-	B	Introducing alternative QoS profiles to E1AP	16.2.0
2020-07	RP-88-e	RP-201090	0512	4	F	Correction of S-NSSAI range	16.2.0
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2021-09	RP-93-e	RP-211873	0632	1	F	Data forwarding address allocation for handover	16.7.0
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History

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