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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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- For a non-specific reference, the latest version applies. In the case of a reference to a 3GPP document (including a GSM document), a non-specific reference implicitly refers to the latest version of that document *in the same Release as the present document*.

- [1] 3GPP TR 21.905: "Vocabulary for 3GPP Specifications".
- [2] 3GPP TS 38.401: "NG-RAN; Architecture Description".
- [3] 3GPP TS 38.460: "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) Tunnelling 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".

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 Italic font 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 |

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

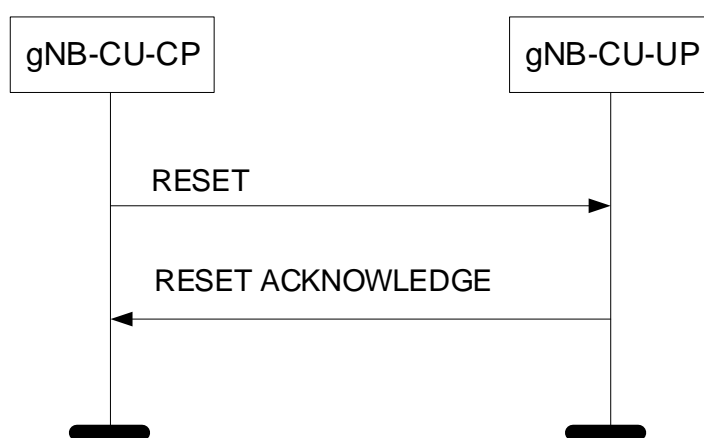


Figure 8.2.1.2.1-1: Reset procedure initiated from the gNB-CU-CP. Successful operation.

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

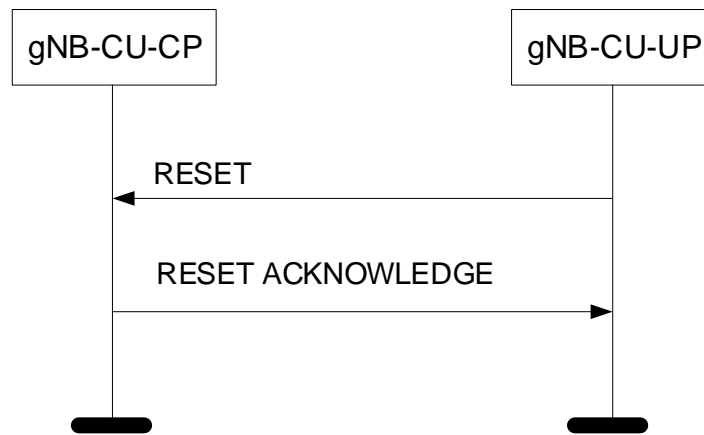


Figure 8.2.1.2.2-1: Reset procedure initiated from the gNB-CU-UP. Successful operation.

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

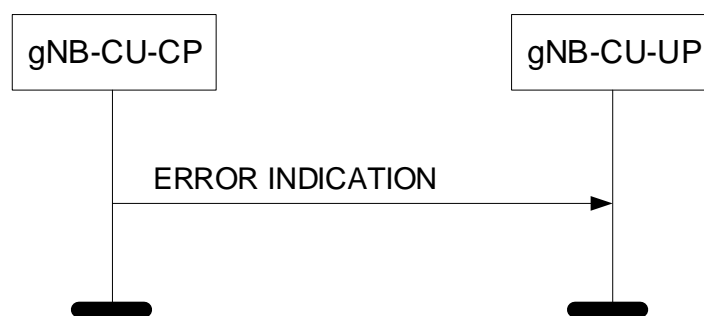


Figure 8.2.2.2-1: Error Indication procedure, gNB-CU-CP originated. Successful operation.



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

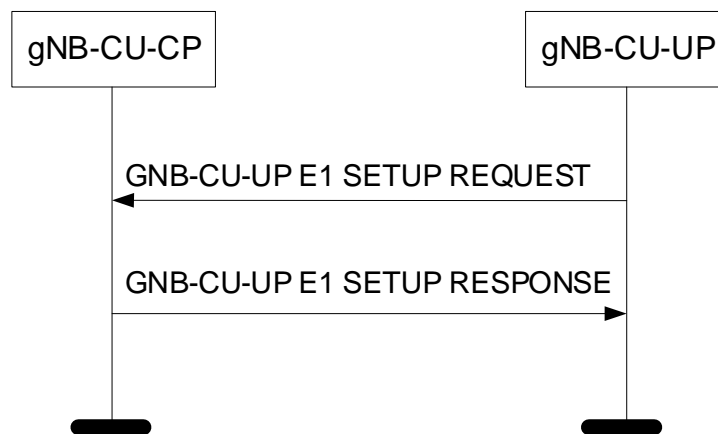


Figure 8.2.3.2-1: gNB-CU-UP E1 Setup procedure: Successful Operation.

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

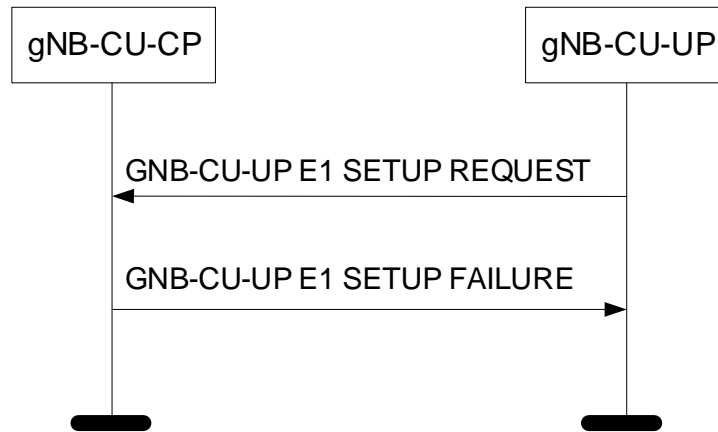


Figure 8.2.3.3-1: gNB-CU-UP E1 Setup procedure: Unsuccessful Operation.

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

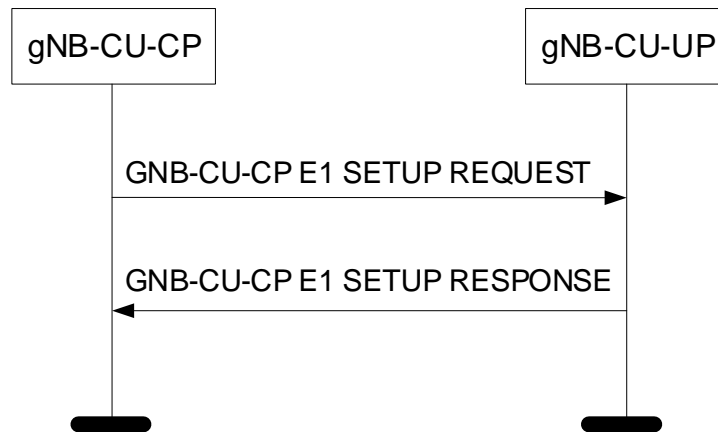


Figure 8.2.4.2-1: gNB-CU-CP E1 Setup procedure: Successful Operation.

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

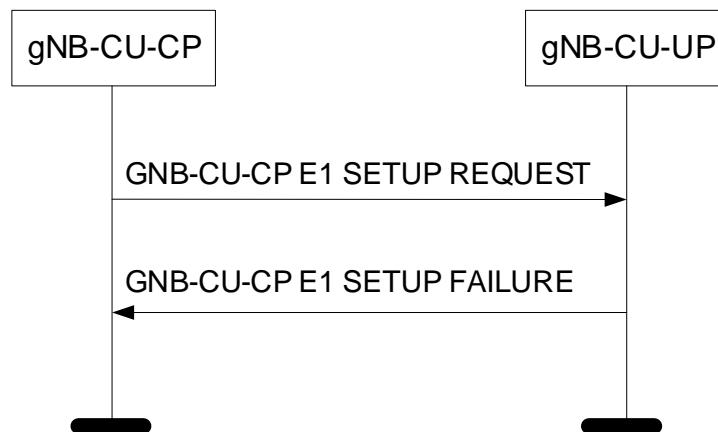


Figure 8.2.4.3-1: gNB-CU-CP E1 Setup procedure: Unsuccessful Operation.

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

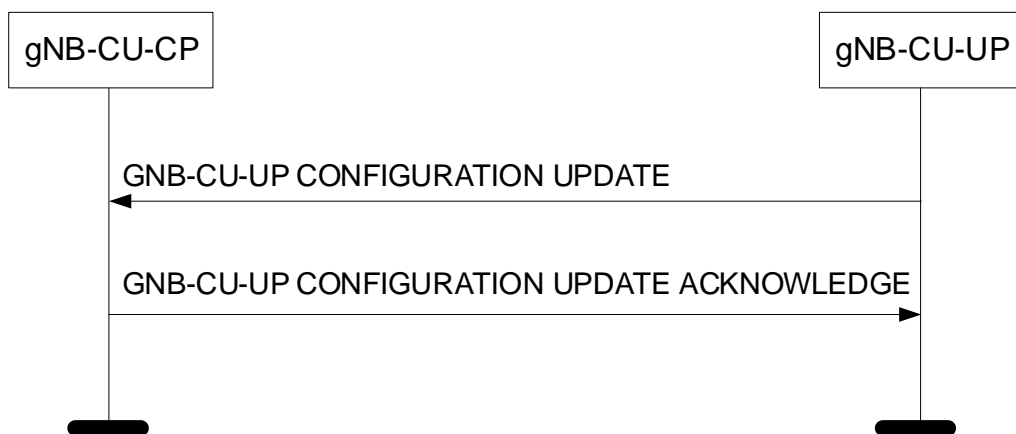


Figure 8.2.5.2-1: gNB-CU-UP Configuration Update procedure: Successful Operation.

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

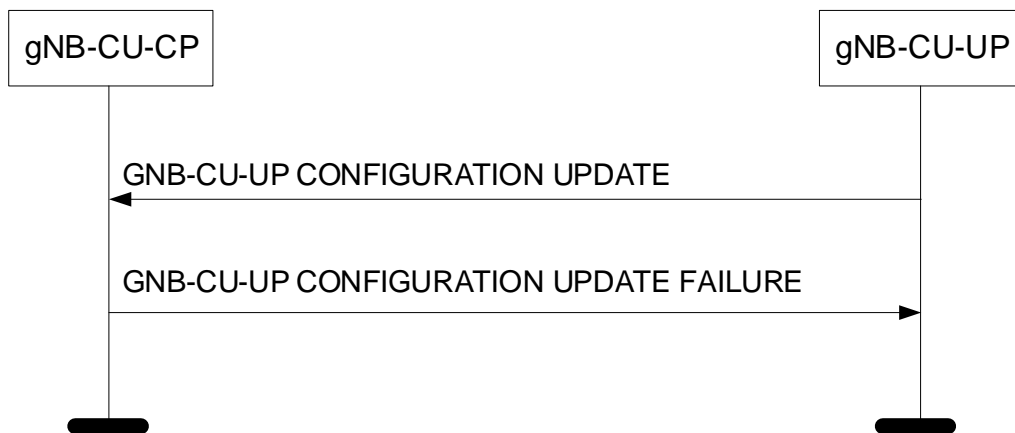


Figure 8.2.5.3-1: gNB-CU-UP Configuration Update procedure: Unsuccessful Operation.

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

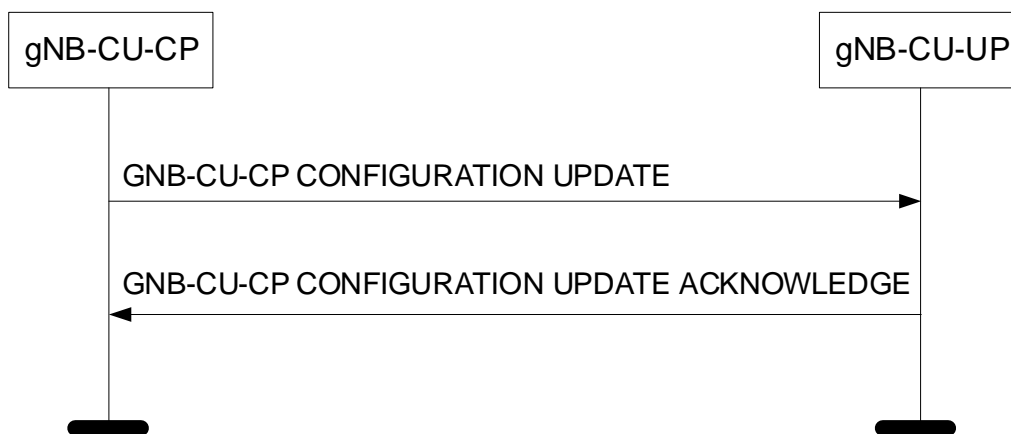


Figure 8.2.6.2-1: gNB-CU-CP Configuration Update procedure: Successful Operation.

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

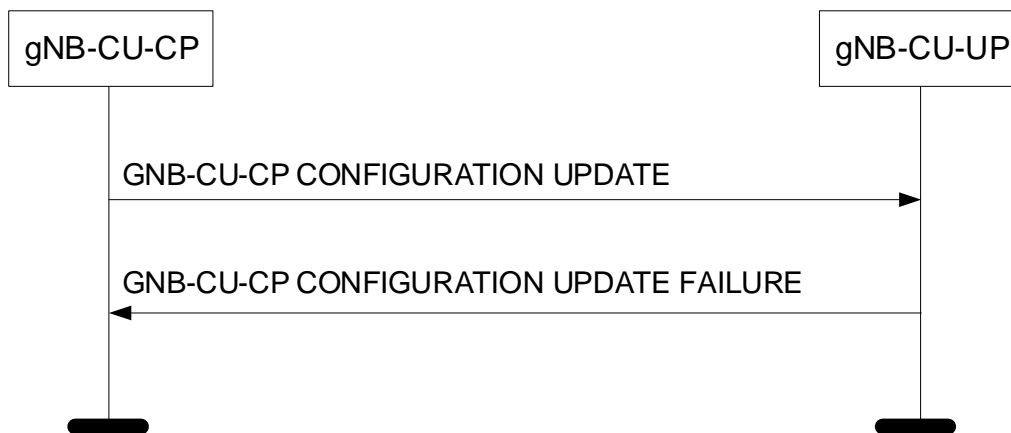


Figure 8.2.6.3-1: gNB-CU-CP Configuration Update procedure: Unsuccessful Operation.

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

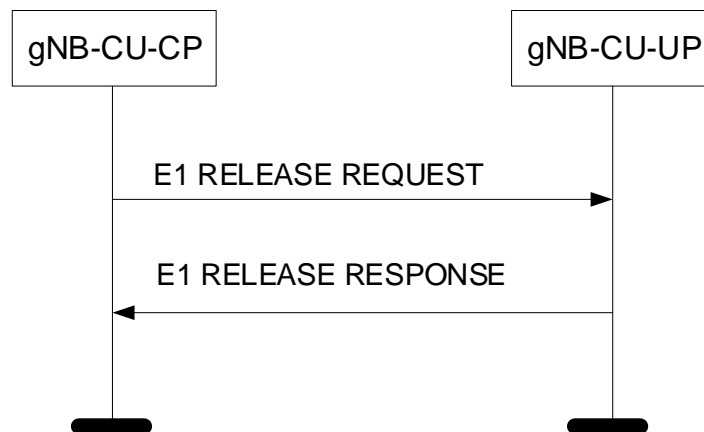


Figure 8.2.7.2.1-1: E1 Release procedure initiated from the gNB-CU-CP. Successful operation.

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

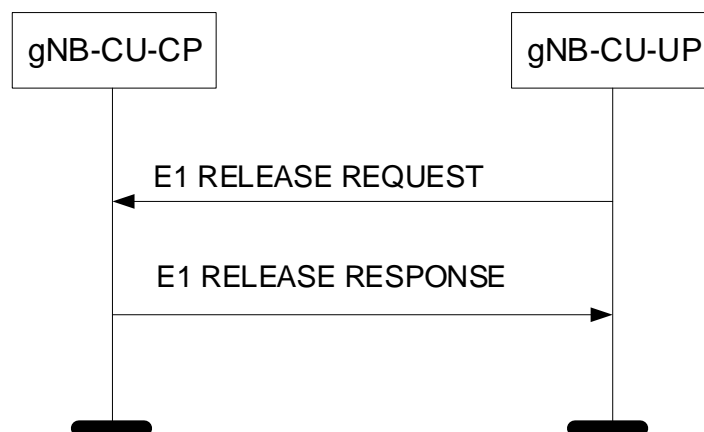


Figure 8.2.7.2.2-1: E1 Release procedure initiated from the gNB-CU-UP. Successful operation.

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

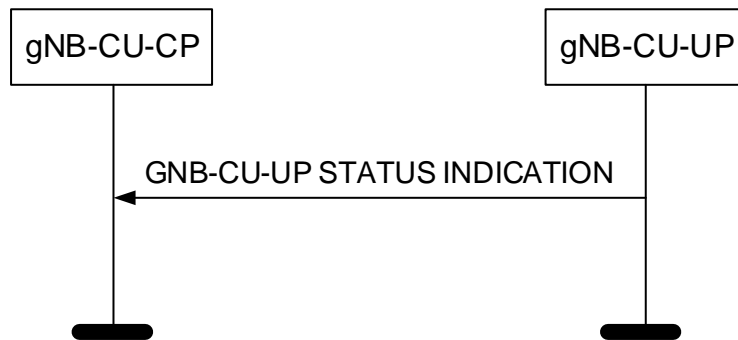


Figure 8.3.7.2-1: DL Data Notification procedure: Successful Operation.

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

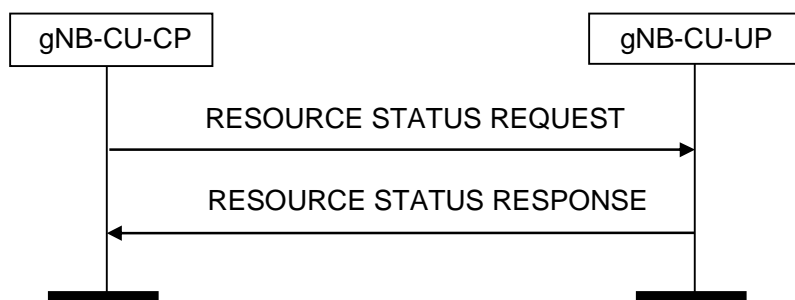


Figure 8.2.9.2-1: Resource Status Reporting Initiation, successful operation

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

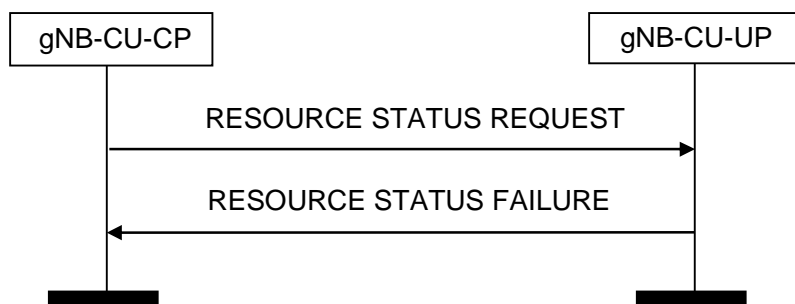


Figure 8.2.9.3-1: Resource Status Reporting Initiation, unsuccessful operation

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

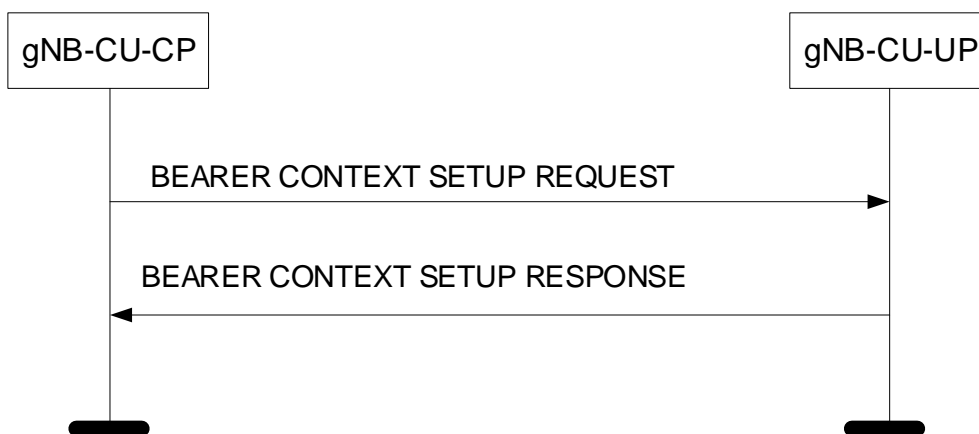


Figure 8.3.1.2-1: Bearer Context Setup procedure: Successful Operation.

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.

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.

For each requested DRB, if the *QoS Mapping Information* IE is contained in the *DL UP Parameters* IE in the BEARER CONTEXT SETUP 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 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].

8.3.1.3 Unsuccessful Operation

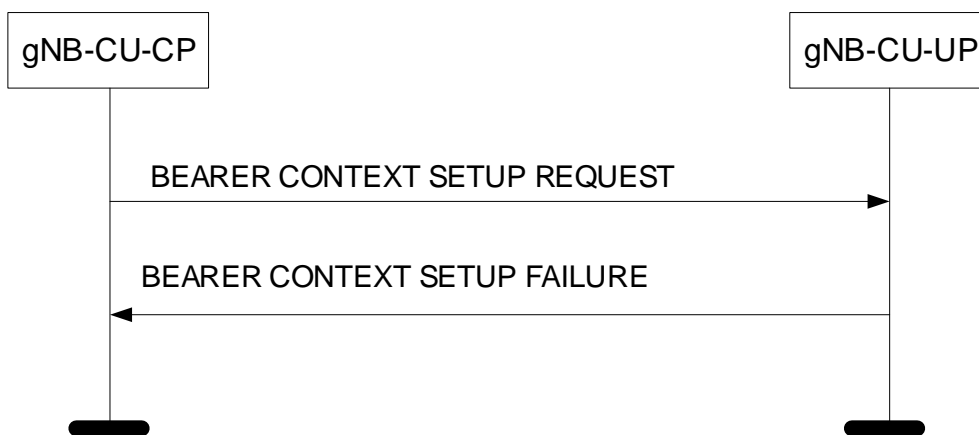


Figure 8.3.1.3-1: Bearer Context Setup procedure: Unsuccessful Operation.

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

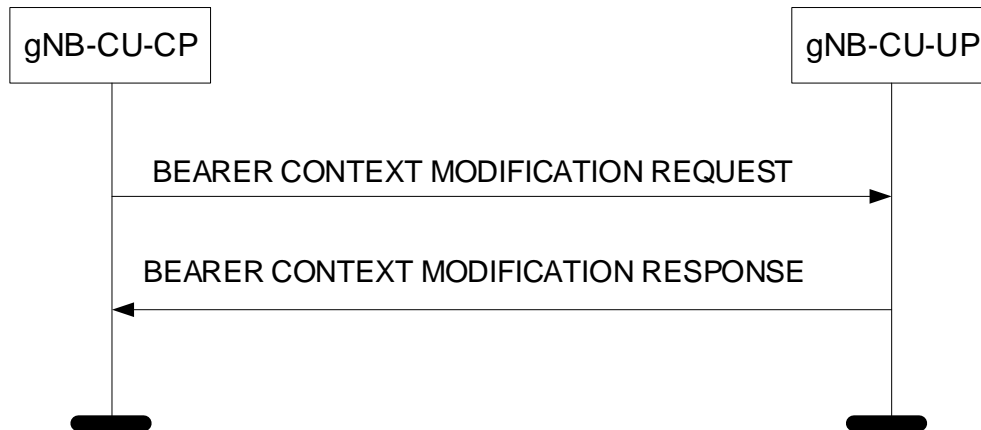


Figure 8.3.2.2-1: Bearer Context Modification procedure: Successful Operation.

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 *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 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 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 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* 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].

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

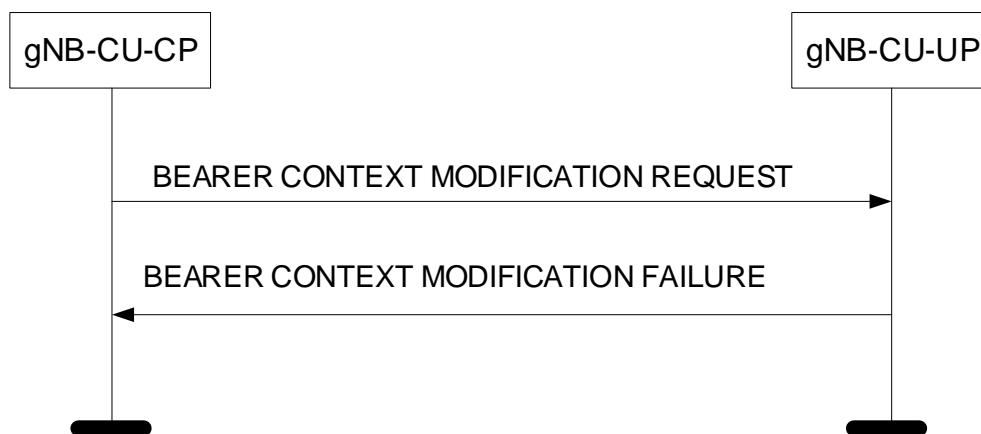


Figure 8.3.2.3-1: Bearer Context Modification procedure: Unsuccessful Operation.

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.

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

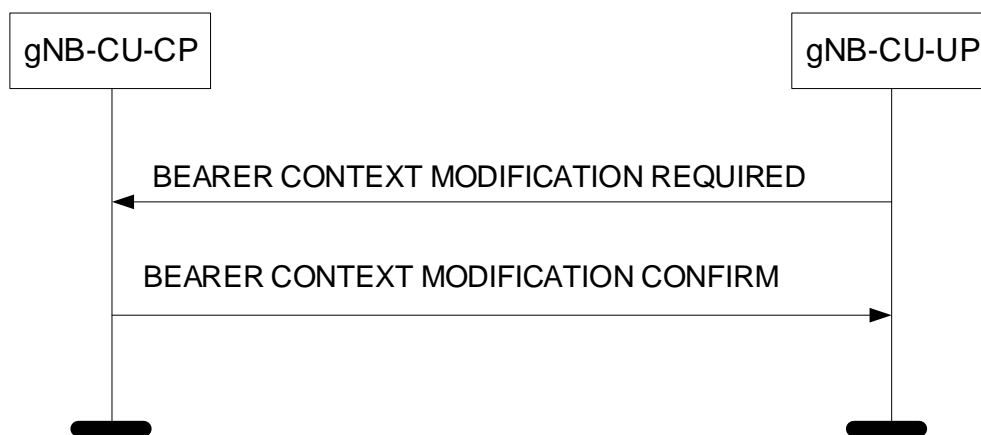


Figure 8.3.3.2-1: Bearer Context Modification Required procedure: Successful Operation.

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

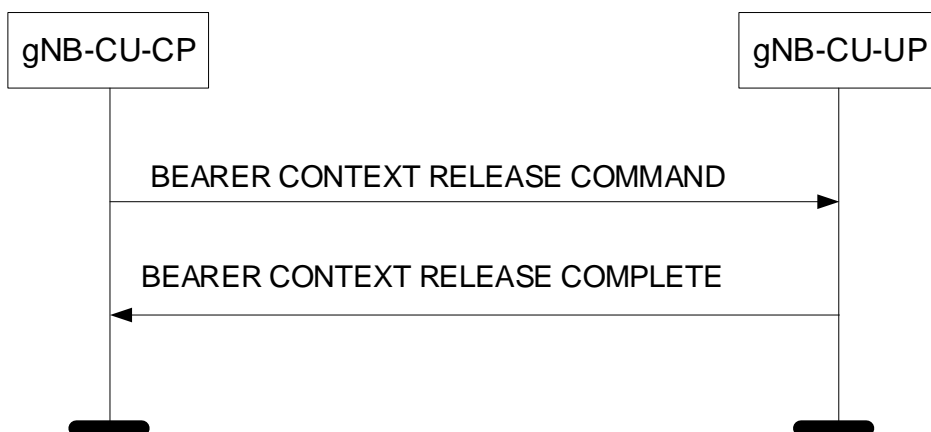


Figure 8.3.4.2-1: Bearer Context Release procedure: Successful Operation.

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. The procedure uses UE-associated signalling.

8.3.7.2 Successful Operation

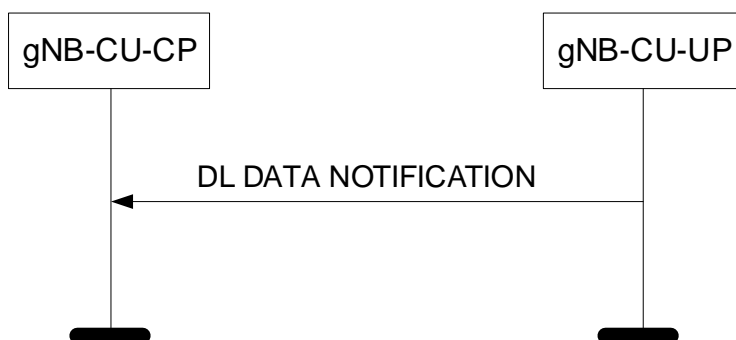


Figure 8.3.7.2-1: DL Data Notification procedure: Successful Operation.

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.

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

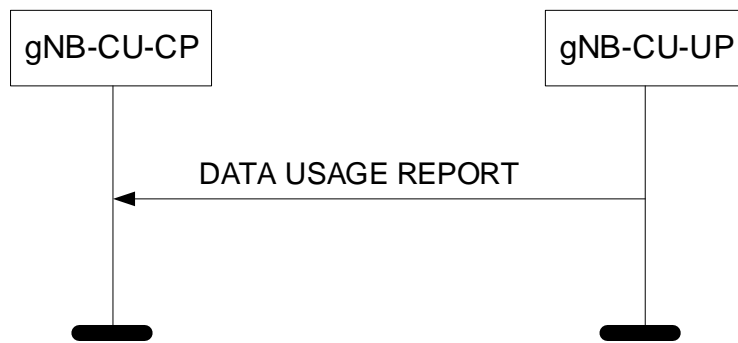


Figure 8.3.8.2-1: Data Usage Report procedure: Successful Operation.

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

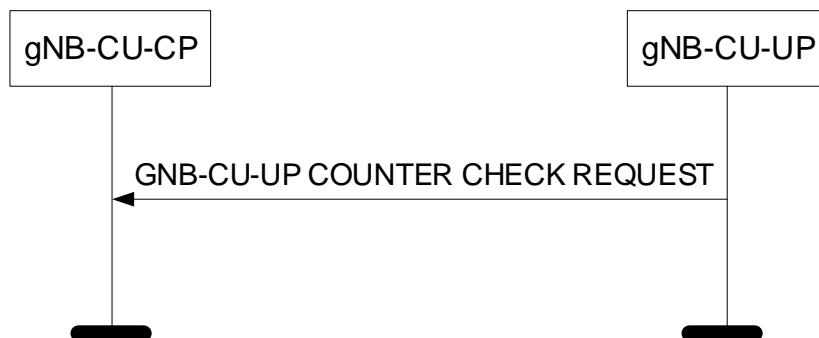


Figure 8.3.9.2-1: gNB-CU-UP Counter Check procedure, successful operation.

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 *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

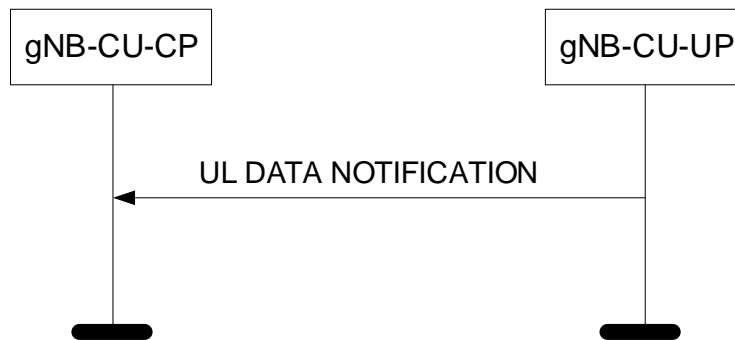


Figure 8.3.10.2-1: UL Data Notification procedure: Successful Operation.

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

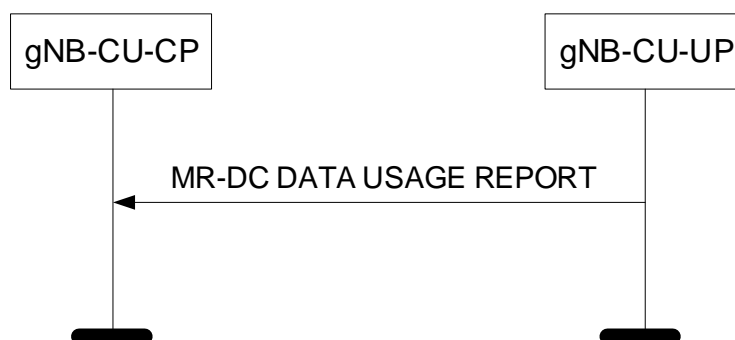


Figure 8.3.11.2-1: MR-DC Data Usage Report procedure: Successful Operation.

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

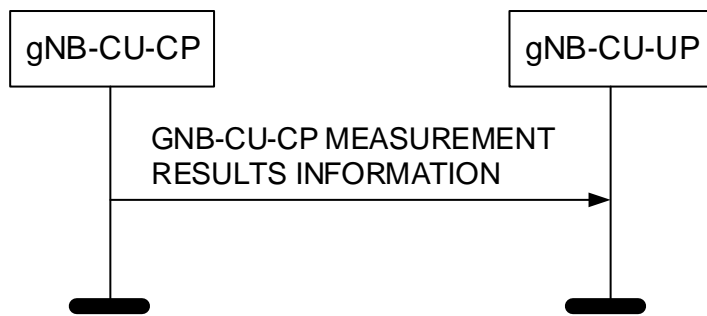


Figure 8.3.x.2-1: GNB-CU-CP Measurement Results Information procedure. Successful operation.

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

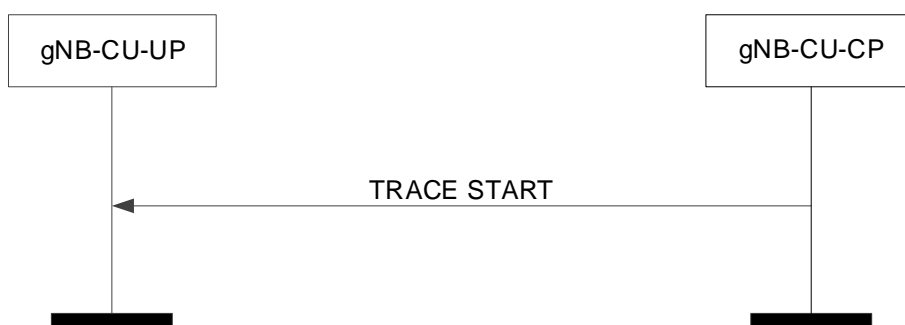


Figure 8.4.1.2-1: Trace start procedure: Successful Operation.

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

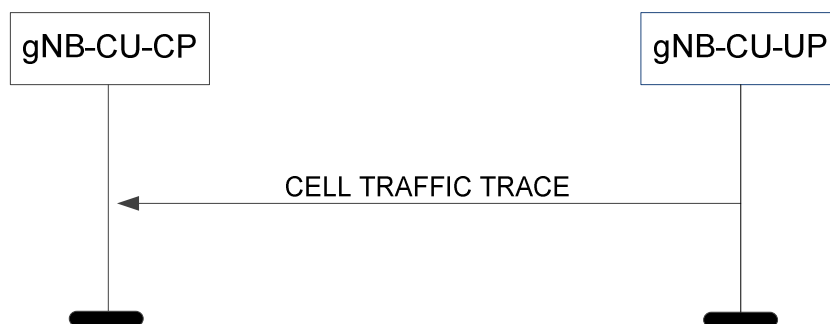


Figure 8.4.3.2-1: Cell Traffic Trace procedure. Successful operation.

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

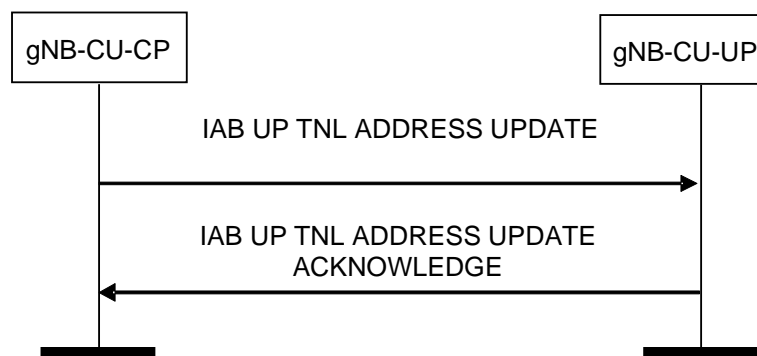


Figure 8.5.1.2-1: IAB UP TNL Address Update procedure: Successful Operation.

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

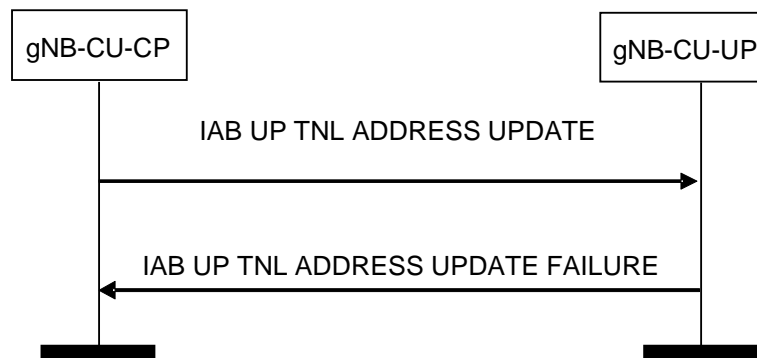


Figure 8.5.1.3-1: IAB UP TNL Address Update procedure: Unsuccessful Operation.

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.

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..<maxnoofTNLAassociations> | | | - | - |
| >>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..<maxnoofTNLAassociations> | | | - | - |
| >>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..<maxnoofTNLAassociations> | | | - | - |
| >>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-ifRegistrationRequestStop | | INTEGER (1..4095,...) | Allocated by gNB-CU-UP | YES | ignore |
| Registration Request | M | | ENUMERATED(start, stop, ...) | Type of request for which the resource status is required. | YES | ignore |
| Report Characteristics | C-ifRegistrationRequestStart | | 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 | | ENUMERATED (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 |
|---------------------------------|---|--|----------------------------------|---|-----|--------|

| 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. |

9.2.2.2 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. |
| maxnoofPDU SessionResource | 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 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 |

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 | | <i>0..1</i> | | | YES | reject |
| > DL UP TNL Address To Update Item IEs | | <i>1..<max number of TNL Addresses></i> | | | - | - |
| >>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 |

9.3 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 |

| 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 of QoSFlows> | | | - | - |
| >>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 |
| >>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 |

| 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 |
| 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 |

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 "Additional PDCP duplication Information" 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 outOfOrderDelivery 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 | |

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 |
|---------------------|----------|-------|-----------------------------------|---|
| 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] |
| 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> | M | | | |
| > <i>First DL COUNT</i> | | | | |
| >>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..<maxno ofExtSliceltems> | | | - | |
| >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 | | 0..<maxnoofExtNR RCGI> | | |
| >NR CGI | M | | 9.3.1.14 | |

| Range bound | Explanation |
|------------------|--|
| maxnoofExtNRRCGI | Maximum no. of extended NR CGIs supported. Value is 16384. |

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 | | | |
| >GTP Tunnel | | | | |
| >>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> | | | | | | |
| >Endpoint-IP-address | | | | | - | - |
| >> 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 |
|--------------------|----------|-------|---|-----------------------|
| UL Data Forwarding | O | | UP Transport Layer Information 9.3.2.1 | |
| DL Data Forwarding | O | | UP Transport Layer Information 9.3.2.1 | |

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 |
|--|----------|--------------------------------|---|--|
| 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. |

| 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 |
| >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 |
|---------------------------------------|----------|--------------------------------|---|---|
| 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. |

| 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 SessionResource | 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 | | 1..<maxnoof DRBs> | | |
| >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 | | 1..<maxnoof DRBs> | | |
| >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 |

| | | | | | | |
|---|---|--|--|--|-----|--------|
| >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 |
| >DRB To Modify List | | 0.. 1 | | | - | - |
| >>DRB To Modify Item | | 1..<maxnoof DRBs> | | | - | - |
| >>>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 |
| >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 | | - | - |

| 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 | | 1..<maxnoof PDU Session Resource> | | | - | - |
| >PDU Session ID | M | | 9.3.1.21 | | - | - |
| >Cause | O | | 9.3.1.2 | | YES | ignore |

| Range bound | Explanation |
|-----------------------------|---|
| maxnoofPDU Session Resource | 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 | | 1..<maxnoof DRBs> | | |
| >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 | | 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. |

9.3.3.15 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 | | 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 | |
| >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. |
| maxnoofPDUSessionResource | 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 PDUSession Resource></i> | | |
| >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. |

9.3.3.19 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 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 | | - | |
| >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

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

FROM ElAP-Constants;

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

ElAP-ELEMENTARY-PROCEDURE ::= CLASS {
    &InitiatingMessage
    &SuccessfulOutcome
    &UnsuccessfulOutcome
    &procedureCode
    &criticality
}
    OPTIONAL,
    ProcedureCode UNIQUE,
    Criticality DEFAULT ignore
WITH SYNTAX {
    INITIATING MESSAGE
    [SUCCESSFUL OUTCOME]
    [UNSUCCESSFUL OUTCOME]
    PROCEDURE CODE
    [CRITICALITY]
}
    &InitiatingMessage
    &SuccessfulOutcome]
    &UnsuccessfulOutcome]
    &procedureCode
    &criticality]

-- *****
--
-- Interface PDU Definition
--
-- *****

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

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

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

UnsuccessfulOutcome ::= SEQUENCE {
    procedureCode
    criticality
}
    ElAP-ELEMENTARY-PROCEDURE.&procedureCode
    ElAP-ELEMENTARY-PROCEDURE.&criticality
    ({ElAP-ELEMENTARY-PROCEDURES}),
    ({ElAP-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,
  ...
}
-- *****
--

```

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

reset E1AP-ELEMENTARY-PROCEDURE ::= {
  INITIATING MESSAGE      Reset
  SUCCESSFUL OUTCOME      ResetAcknowledge
  PROCEDURE CODE          id-reset
  CRITICALITY             reject
}

errorIndication E1AP-ELEMENTARY-PROCEDURE ::= {
  INITIATING MESSAGE      ErrorIndication
  PROCEDURE CODE          id-errorIndication
  CRITICALITY             ignore
}

gNB-CU-UP-E1Setup E1AP-ELEMENTARY-PROCEDURE ::= {
  INITIATING MESSAGE      GNB-CU-UP-E1SetupRequest
  SUCCESSFUL OUTCOME      GNB-CU-UP-E1SetupResponse
  UNSUCCESSFUL OUTCOME   GNB-CU-UP-E1SetupFailure
  PROCEDURE CODE          id-gNB-CU-UP-E1Setup
  CRITICALITY             reject
}

gNB-CU-CP-E1Setup E1AP-ELEMENTARY-PROCEDURE ::= {
  INITIATING MESSAGE      GNB-CU-CP-E1SetupRequest
  SUCCESSFUL OUTCOME      GNB-CU-CP-E1SetupResponse
  UNSUCCESSFUL OUTCOME   GNB-CU-CP-E1SetupFailure
  PROCEDURE CODE          id-gNB-CU-CP-E1Setup
  CRITICALITY             reject
}

gNB-CU-UP-ConfigurationUpdate E1AP-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 E1AP-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
}

e1Release E1AP-ELEMENTARY-PROCEDURE ::= {
  INITIATING MESSAGE      E1ReleaseRequest
  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 E1AP-ELEMENTARY-PROCEDURE ::= {  
    INITIATING MESSAGE      DataUsageReport  
    PROCEDURE CODE          id-dataUsageReport  
    CRITICALITY              ignore  
}  
  
gNB-CU-UP-CounterCheck E1AP-ELEMENTARY-PROCEDURE ::= {  
    INITIATING MESSAGE      GNB-CU-UP-CounterCheckRequest  
    PROCEDURE CODE          id-gNB-CU-UP-CounterCheck  
    CRITICALITY              ignore  
}  
  
gNB-CU-UP-StatusIndication E1AP-ELEMENTARY-PROCEDURE ::= {  
    INITIATING MESSAGE      GNB-CU-UP-StatusIndication  
    PROCEDURE CODE          id-gNB-CU-UP-StatusIndication  
    CRITICALITY              ignore  
}  
  
privateMessage E1AP-ELEMENTARY-PROCEDURE ::= {  
    INITIATING MESSAGE      PrivateMessage  
    PROCEDURE CODE          id-privateMessage  
    CRITICALITY              ignore  
}  
  
gNB-CU-CPMeasurementResultsInformation E1AP-ELEMENTARY-PROCEDURE ::= {  
    INITIATING MESSAGE      GNB-CU-CPMeasurementResultsInformation  
    PROCEDURE CODE          id-gNB-CU-CPMeasurementResultsInformation  
    CRITICALITY              ignore  
}  
  
mRDC-DataUsageReport      E1AP-ELEMENTARY-PROCEDURE ::= {  
    INITIATING MESSAGE      MRDC-DataUsageReport  
    PROCEDURE CODE          id-mRDC-DataUsageReport  
    CRITICALITY              ignore  
}  
  
deactivateTrace E1AP-ELEMENTARY-PROCEDURE ::= {  
    INITIATING MESSAGE      DeactivateTrace  
    PROCEDURE CODE          id-DeactivateTrace  
    CRITICALITY              ignore  
}  
  
traceStart E1AP-ELEMENTARY-PROCEDURE ::= {  
    INITIATING MESSAGE      TraceStart  
    PROCEDURE CODE          id-TraceStart  
    CRITICALITY              ignore  
}  
  
resourceStatusReportingInitiation E1AP-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
}

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-associatedLogicalEl-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,
MDTPLMNList,
PrivacyIndicator,
URIaddress,
DRBs-Subject-To-Early-Forwarding-List,
CHOInitiation,
ExtendedSliceSupportList,
TransportLayerAddress,
AdditionalHandoverInfo,
Extended-NR-CGI-Support-List

FROM E1AP-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-associatedLogicalE1-ConnectionItem,
id-UE-associatedLogicalE1-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,

maxnoofErrors,
maxnoofSPLMNs,
maxnoofDRBs,
maxnoofTNLAssociations,
maxnoofIndividualE1ConnectionsToReset,
maxnoofTNLAddresses

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 ElAP-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 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-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 ELAP-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 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-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.. maxnoofTNLAssociations)) 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 E1AP-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} },
  ...
}

E1ReleaseRequestIES E1AP-PROTOCOL-IES ::= {
  { ID id-TransactionID          CRITICALITY reject  TYPE TransactionID          PRESENCE mandatory }|
  { ID id-Cause                  CRITICALITY ignore  TYPE Cause                          PRESENCE mandatory },
  ...
}

-- *****
--
-- E1 Release Response
--
-- *****

```

```

E1ReleaseResponse ::= SEQUENCE {
  protocolIEs          ProtocolIE-Container      { {E1ReleaseResponseIEs} },
  ...
}

E1ReleaseResponseIEs 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 },
  ...
}

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}},
  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 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 ignore    TYPE GNB-CU-UP-UE-ElAP-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 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-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 {
    protocolIEs          ProtocolIE-Container          { { BearerContextModificationResponseIEs } },
    ...
}

BearerContextModificationResponseIEs 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-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-SingleContainer {{System-BearerContextModificationResponse-ExtIEs}}
}

```



```

}
System-BearerContextModificationResponse-ExtIEs E1AP-PROTOCOL-IES ::= {
  ...
}
EUTRAN-BearerContextModificationResponse E1AP-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 E1AP-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 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 }|
  { ID id-CriticalityDiagnostics         CRITICALITY ignore TYPE CriticalityDiagnostics         PRESENCE optional },
  ...
}

-- *****
--
-- BEARER CONTEXT MODIFICATION REQUIRED
--
-- *****

-- *****
--
-- Bearer Context Modification Required
--

```

```

-- *****
BearerContextModificationRequired ::= SEQUENCE {
    protocolIEs          ProtocolIE-Container    { { BearerContextModificationRequiredIEs } },
    ...
}

BearerContextModificationRequiredIEs 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-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 ELAP-PROTOCOL-IES ::= {
    ...
}

EUTRAN-BearerContextModificationRequired ELAP-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 ELAP-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-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-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 E1AP-PROTOCOL-IES ::= {
    ...
}

EUTRAN-BearerContextModificationConfirm E1AP-PROTOCOL-IES ::= {
    { ID id-DRB-Confirm-Modified-List-EUTRAN CRITICALITY ignore TYPE DRB-Confirm-Modified-List-EUTRAN PRESENCE optional },
    ...
}

NG-RAN-BearerContextModificationConfirm E1AP-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 },
  ...
}

-- *****

-- *****
--
-- UL Data Notification
--
-- *****

ULDataNotification ::= SEQUENCE {
  protocolIES          ProtocolIE-Container      { { ULDataNotificationIEs } },
  ...
}

ULDataNotificationIEs 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-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 EIAP-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-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 EIAP-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 ELAP-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 E1AP-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 E1AP-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 E1AP-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 ELAP-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 ELAP-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 },
    ...
}

END
-- ASN1STOP

```

9.4.5 Information Element Definitions

```

-- ASN1START
-- *****
--
-- Information Element Definitions
--
-- *****

E1AP-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-TNLAssociationTransportLayerAddressgnNBCUUP,
    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-EarlyForwardingCOUNTReg,  
id-EarlyForwardingCOUNTInfo,  
id-AlternativeQoSParaSetList,  
id-MCG-OfferedGBRQoSFlowInfo,  
id-Number-of-tunnels,  
id-DataForwardingtoE-UTRANInformationList,  
maxnoofQoSParaSets,  
maxnoofErrors,  
maxnoofSliceItems,  
maxnoofEUTRANQoSParameters,  
maxnoofNGRANQoSParameters,  
maxnoofDRBs,  
maxnoofPDUSessionResource,  
maxnoofQoSFlows,  
maxnoofUPParameters,  
maxnoofCellGroups,  
maxnooftimeperiods,  
maxnoofNR CGI,  
maxnoofTLAs,  
maxnoofGPTLAs,  
maxnoofSPLMNs,  
maxnoofMDTPLMNs,  
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 E1AP-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 E1AP-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,
    pPDCP-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 {
    nEA0,
    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 ELAP-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 E1AP-PROTOCOL-EXTENSION ::= {
    ...
}

-- D

DAPSRequestInfo ::= SEQUENCE {
    dapsIndicator              ENUMERATED {daps-HO-required, ...},
    iE-Extensions              ProtocolExtensionContainer { {DAPSRequestInfo-ExtIEs} } OPTIONAL,
    ...
}

DAPSRequestInfo-ExtIEs E1AP-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 E1AP-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 E1AP-PROTOCOL-EXTENSION ::= {
    ...
}

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 E1AP-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 E1AP-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 E1AP-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    E1AP-PROTOCOL-EXTENSION ::= {
    ...
}

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

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-Response 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 ::= {
    ...
}

DRB-Setup-Mod-List-EUTRAN      ::= SEQUENCE (SIZE(1.. maxnoofDRBs)) OF DRB-Setup-Mod-Item-EUTRAN

DRB-Setup-Mod-Item-EUTRAN      ::= SEQUENCE {

```

```

    dRB-ID
    s1-DL-UP-TNL-Information
    data-Forwarding-Information-Response
    uL-UP-Transport-Parameters
    iE-Extensions
    ...
}

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,
    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},
...
}

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  E1AP-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      E1AP-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              E1AP-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      E1AP-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 ::= {
    ...
}

```

```

}

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},
    ...
}

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  ELAP-PROTOCOL-EXTENSION ::= {
  { ID id-DRB-QoS  CRITICALITY ignore  EXTENSION QoSFlowLevelQoSParameters 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 ELAP-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 ELAP-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

```

```

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 ::= {
    ...
}

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 ELAP-PROTOCOL-EXTENSION ::= {
    ...
}

GNB-CU-UP-NameVisibleString ::= VisibleString(SIZE(1..150,...))

GNB-CU-UP-NameUTF8String ::= UTF8String(SIZE(1..150,...))

GNB-CU-UP-UE-ElAP-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 ELAP-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 ELAP-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 ELAP-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 E1AP-PROTOCOL-EXTENSION ::= {
  ...
}

GNB-CU-UP-TNLA-To-Remove-Item ::= SEQUENCE {
  tnLAssociationTransportLayerAddress          CP-TNL-Information,
  tnLAssociationTransportLayerAddressgNBCUCP  CP-TNL-Information OPTIONAL,
  iE-Extensions                               ProtocolExtensionContainer { { GNB-CU-UP-TNLA-To-Remove-Item-ExtIEs } } OPTIONAL
}

GNB-CU-UP-TNLA-To-Remove-Item-ExtIEs E1AP-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 E1AP-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 ::= {
    ...
}

GPTunnel ::= SEQUENCE {
    transportLayerAddress      TransportLayerAddress,
    gTP-TEID                  GTP-TEID,
    iE-Extensions              ProtocolExtensionContainer { { GPTunnel-ExtIEs } } OPTIONAL,
    ...
}

GPTunnel-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

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 ::= {
    ...
}

-- 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, ...)

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 E1AP-PROTOCOL-EXTENSION ::= {
    ...
}

M4Configuration ::= SEQUENCE {
    m4period          M4period,
    m4-links-to-log   Links-to-log,
    iE-Extensions     ProtocolExtensionContainer { { M4Configuration-ExtIEs } } OPTIONAL,
    ...
}

M4Configuration-ExtIEs E1AP-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 E1AP-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 E1AP-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 E1AP-PROTOCOL-EXTENSION ::= {
    ...
}

MDTMode ::= CHOICE {
    immediateMDT          ImmediateMDT,
    choice-extension      ProtocolIE-SingleContainer { {MDTMode-ExtIEs} }
}

MDTMode-ExtIEs E1AP-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
    choice-extension NPNContextInfo-SNPN,
                    ProtocolIE-SingleContainer { {NPNContextInfo-ExtIEs}}
}

NPNContextInfo-ExtIEs E1AP-PROTOCOL-IES ::= {
    ...
}

NPNContextInfo-SNPN ::= SEQUENCE {
    nID NID,
    iE-Extensions ProtocolExtensionContainer { {NPNContextInfo-SNPN-ExtIEs } } OPTIONAL
}

NPNContextInfo-SNPN-ExtIEs E1AP-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.. maxnoofNRCGI)) 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.. maxnoofExtNRCGI)) 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 ::= {
    ...
}

-- 0

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 ELAP-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      E1AP-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 E1AP-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 E1AP-PROTOCOL-EXTENSION ::= {
    ...
}

DRBBStatusTransfer ::= SEQUENCE {
    receiveStatusofPDCPSDU BIT STRING (SIZE(1..131072)) OPTIONAL,
    countValue PDCP-Count,
    iE-Extension ProtocolExtensionContainer { {DRBBStatusTransfer-ExtIEs} } OPTIONAL,
    ...
}

DRBBStatusTransfer-ExtIEs E1AP-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 E1AP-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 E1AP-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  },
  ...
}
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.. maxnoofPDUSessionResource)) 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.. maxnoofPDUSessionResource)) 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      E1AP-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          ELAP-PROTOCOL-EXTENSION ::= {
    {ID id-QoSFlowMappingIndication    CRITICALITY ignore    EXTENSION QoS-Flow-Mapping-Indication    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  ELAP-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 ELAP-PROTOCOL-EXTENSION ::= {
    ...
}

QoS-Flow-Mapping-Indication ::= ENUMERATED {ul, dl, ...}

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 ELAP-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}|
    ...
}

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 ELAP-PROTOCOL-EXTENSION ::= {
    ...
}

QoS-Mapping-Information ::= SEQUENCE {
    dscp                        BIT STRING (SIZE(6))          OPTIONAL,
    flow-label                  BIT STRING (SIZE(20))          OPTIONAL,
    ...
}

-- 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 E1AP-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 E1AP-PROTOCOL-EXTENSION ::= {
  ...
}
```

-- S

```
SecurityAlgorithm ::= SEQUENCE {
  cipheringAlgorithm CipheringAlgorithm,
  integrityProtectionAlgorithm IntegrityProtectionAlgorithm OPTIONAL,
  iE-Extensions ProtocolExtensionContainer { { SecurityAlgorithm-ExtIEs } } OPTIONAL,
  ...
}
```

```
SecurityAlgorithm-ExtIEs E1AP-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 ::= {
    ...
}

TSTrafficCharacteristics ::= SEQUENCE {
    tSCTrafficCharacteristicsUL        TSTrafficInformation        OPTIONAL,
    tSCTrafficCharacteristicsDL        TSTrafficInformation        OPTIONAL,
    iE-Extensions                    ProtocolExtensionContainer { { TSTrafficCharacteristics-ExtIEs } }    OPTIONAL
}

```



```

TSTrafficCharacteristics-ExtIEs    ELAP-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  GTPTTLAs 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  GTPTTLAs 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

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

```

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

maxnoofErrors                INTEGER ::= 256
maxnoofSPLMNs                INTEGER ::= 12
maxnoofSliceItems            INTEGER ::= 1024
maxnoofIndivdualeElConnectionsToReset  INTEGER ::= 65536
maxnoofEUTRANQoSParameters  INTEGER ::= 256
maxnoofNGRANQoSParameters  INTEGER ::= 256
maxnoofDRBs                  INTEGER ::= 32
maxnoofNR CGI                INTEGER ::= 512
maxnoofPDU SessionResource  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

-- *****

-- 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-URIaddress | 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-EarlyForwardingCOUNTReq | 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

```

```

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
--
-- *****
E1AP-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
--
-- *****

E1AP-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
--
-- *****

E1AP-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 { E1AP-PRIVATE-IES : IEsSetParam} ::= SEQUENCE {
  id          E1AP-PRIVATE-IES.&id          ({IEsSetParam}),
  criticality E1AP-PRIVATE-IES.&criticality ({IEsSetParam}@id}),
  value       E1AP-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 |

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|---------|---------|-----------|------|----|---|--|--------|
| 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 |
| 2020-09 | RP-89-e | RP-201953 | 0514 | 3 | F | Correction for SN Terminated (option 3x) GBR bearer establishment | 16.3.0 |
| 2020-09 | RP-89-e | RP-201949 | 0521 | 2 | F | Correction for TS38.463 on Unsuccessful Operation and Abnormal Conditions of MLB | 16.3.0 |
| 2020-09 | RP-89-e | RP-201949 | 0522 | 1 | F | Correction on Industrial IOT Rel-16 DC+CA duplication for E1AP | 16.3.0 |
| 2020-09 | RP-89-e | RP-201953 | 0525 | 1 | A | Correction on reusing Source TEID at Handover | 16.3.0 |
| 2020-09 | RP-89-e | RP-201950 | 0526 | 3 | F | Need of D1 for Qos monitoring for URLLC | 16.3.0 |
| 2020-09 | RP-89-e | RP-201949 | 0532 | 1 | F | TS38.463 Extend the CHO Usage and Support Intra-SN/inter-UP CPC case | 16.3.0 |
| 2020-09 | RP-89-e | RP-201953 | 0536 | 1 | F | Rapporteur's corrections for TS 38.463 | 16.3.0 |
| 2020-09 | RP-89-e | RP-201953 | 0537 | - | D | Rapporteur's editorial corrections for TS 38.463 | 16.3.0 |
| 2020-09 | RP-89-e | RP-201947 | 0551 | 1 | F | CR on clarification of QoS Mapping Information over E1 for Rel-16 IAB | 16.3.0 |
| 2020-09 | RP-89-e | RP-201955 | 0554 | - | F | Corrections to 38.463 on node name type | 16.3.0 |
| 2020-12 | RP-90-e | RP-202312 | 0555 | 1 | F | Support of direct data forwarding for inter-system HO | 16.4.0 |
| 2020-12 | RP-90-e | RP-202310 | 0556 | 3 | F | Correction on DSCP Derivation in IAB-donor node | 16.4.0 |
| 2020-12 | RP-90-e | RP-202313 | 0562 | 1 | F | Introduction of reporting frequency for Qos monitoring for URLLC | 16.4.0 |
| 2020-12 | RP-90-e | RP-202311 | 0566 | - | F | Correction on Industrial IOT Rel-16 PDCP duplication for E1AP | 16.4.0 |
| 2021-03 | RP-91-e | RP-210240 | 0568 | 2 | F | Update on QoS monitoring control | 16.5.0 |
| 2021-03 | RP-91-e | RP-210231 | 0583 | 2 | D | CR to 38.463 Correction on IAB UP TNL Address Update | 16.5.0 |
| 2021-06 | RP-92-e | RP-211335 | 0577 | 2 | F | Inter-system indicator for Bearer Context Setup | 16.6.0 |
| 2021-06 | RP-92-e | RP-211337 | 0585 | - | F | Private Message Definition | 16.6.0 |
| 2021-06 | RP-92-e | RP-211338 | 0602 | 4 | C | Maximum number of NR-CGI over E1 [EXT_NRCGI_E1] | 16.6.0 |

History

| Document history | | |
|-------------------------|---------------|-------------|
| V16.2.0 | July 2020 | Publication |
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