3GPP TSG-RAN WG3 Meeting #108-e R3-20xxxx

**1st - 11th Jun 2020**

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| *CR-Form-v12.0* |
| **CHANGE REQUEST** |
|  |
|  | **38.463** | **CR** | **0468** | **rev** | **7** | **Current version:** | **16.1.1** |  |
|  |
| *For* ***[HELP](http://www.3gpp.org/3G_Specs/CRs.htm%22%20%5Cl%20%22_blank)*** *on using this form: comprehensive instructions can be found at <http://www.3gpp.org/Change-Requests>.* |
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| ***Proposed change affects:*** | UICC apps |  | ME |  | Radio Access Network | **X** | Core Network |

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|  |
| ***Title:***  | Introduction of Non-Public Networks for TS38.463 |
|  |  |
| ***Source to WG:*** | ZTE |
| ***Source to TSG:*** | R3 |
|  |  |
| ***Work item code:*** | NG\_RAN\_PRN  |  | ***Date:*** | 2020-06-12 |
|  |  |  |  |  |
| ***Category:*** | **B** |  | ***Release:*** | Rel-16 |
|  | *Use one of the following categories:****F*** *(correction)****A*** *(mirror corresponding to a change in an earlier release)****B*** *(addition of feature),* ***C*** *(functional modification of feature)****D*** *(editorial modification)*Detailed explanations of the above categories canbe found in 3GPP [TR 21.900](http://www.3gpp.org/ftp/Specs/html-info/21900.htm). | *Use one of the following releases:Rel-8 (Release 8)Rel-9 (Release 9)Rel-10 (Release 10)Rel-11 (Release 11)Rel-12 (Release 12)Rel-13 (Release 13)Rel-14 (Release 14)Rel-15 (Release 15)Rel-16 (Release 16)* |
|  |  |
| ***Reason for change:*** | Providing the BL CR for supporting NPN in the case of CP/UP split gNB. |
|  |  |
| ***Summary of change:*** | To capture the agreements on NPN for E1 interface.  |
|  |  |
| ***Consequences if not approved:*** | NPN function is not supported in the case of CP/UP split. |
|  |  |
| ***Clauses affected:*** | 3.1, 3.2, 8.2.3.2, 8.2.4.2, 8.2.5.2, 8.3.1.2, 9.2.1.4, 9.2.1.8, 9.2.1.10, 9.2.2.1, 9.3.1.2, 9.3.1.x1, 9.3.1.x2, 9.3.1.x3, 9.4.4, 9.4.5, 9.4.7 |
|  |  |
|  | **Y** | **N** |  |  |
| ***Other specs*** |  | **X** |  Other core specifications  | TS/TR ... CR ...  |
| ***affected:*** |  | **X** |  Test specifications | TS/TR ... CR ...  |
| ***(show related CRs)*** |  | **X** |  O&M Specifications | TS/TR ... CR ...  |
|  |  |
| ***Other comments:*** |  |
|  |  |
| ***This CR's revision history:*** | V1:- keep only abbreviations, general parts, empty Sec. 3V2:- Re-submission for RAN3#107-eV3:- merge agreed TP in R3-201314 in RAN3#107e- add ASN.1V4：- update with the latest TS- Re-submission for RAN3#107bis-eV5:-merge agreed TP in R3-202141 in RAN3#107bis-e-merge agreed TP in R3-202653 in RAN3#107bis -eV6:-- Re-submission for RAN3#108-eV7:- spec version update- merged agreed TP in R3-204309 in RAN3#108-e |

<<<<<<<<<<<<<<<<<<<< START OF CHANGES >>>>>>>>>>>>>>>>>>>>

# 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.

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 thegNB-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

CN Core Network

CP Control Plane

DL Downlink

EN-DC E-UTRA-NR Dual Connectivity

EPC Evolved Packet Core

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

<<<<<<<<<<<<<<<<<<<< Next Change >>>>>>>>>>>>>>>>>>>>

#### **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 *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* 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.

<<<<<<<<<<<<<<<<<<<< Next Change >>>>>>>>>>>>>>>>>>>>

#### **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.

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.

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#### **8.2.5.2 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* 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 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.

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### 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.

<<<<<<<<<<<<<<<<<<<< unmodified text omitted >>>>>>>>>>>>>>>>>>>>

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 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.

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#### **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** |  | *1..<maxnoofSPLMNs>* |  | Supported PLMNs | YES | reject |
| >PLMN Identity | M |  | 9.3.1.7 |  | - | - |
| >Slice Support List | O |  | 9.3.1.8 | Supported S-NSSAIs per PLMN.  | - | - |
| >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.x2 |  | YES | reject |
| gNB-CU-UP Capacity | O |  | 9.3.1.56 |  | YES | ignore |
| Transport Network Layer Address Info | O |  | 9.3.2.7 |  | YES | ignore |

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

<<<<<<<<<<<<<<<<<<<< Next Change >>>>>>>>>>>>>>>>>>>>

#### **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** |  | *1..<maxnoofSPLMNs>* |  | Supported PLMNs | YES | reject |
| >PLMN Identity | M |  | 9.3.1.7 |  | - | - |
| >Slice Support List | O |  | 9.3.1.8 | Supported S-NSSAIs per PLMN.  | - | - |
| >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.x2 |  | YES | reject |
| gNB-CU-UP Capacity | O |  | 9.3.1.56 |  | YES | ignore |
| Transport Network Layer Address Info | O |  | 9.3.2.7 |  | YES | ignore |

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

<<<<<<<<<<<<<<<<<<<< Next Change >>>>>>>>>>>>>>>>>>>>

#### 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** |  | *0..<maxnoofSPLMNs>* |  | Supported PLMNs | YES | reject |
| >PLMN Identity | M |  | 9.3.1.7 |  | - | - |
| >Slice Support List | O |  | 9.3.1.8 | Supported S-NSSAIs per PLMN.  | - | - |
| >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.x2 |  | YES | reject |
| gNB-CU-UP Capacity | O |  | 9.3.1.56 |  | YES | ignore |
| gNB-CU-UP TNLA To Remove List |  | *0..1* |  |  | YES | reject |
| >gNB-CU-UP TNLA To Remove Item IEs |  | *1..<maxnoofTNLAssociations>* |  |  | - | - |
| >>TNLA Transport Layer Address | M |  | CP Transport Layer Information9.3.2.2 | Transport Layer Address of the gNB-CU-UP. | - | - |
| >>TNLA Transport Layer Address gNB-CU-CP | O |  | CP Transport Layer Information9.3.2.2 | Transport Layer Address of the gNB-CU-CP. | - | - |
| Transport Network Layer Address Info | O |  | 9.3.2.7 |  | YES | ignore |

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

<<<<<<<<<<<<<<<<<<<< NEXT CHANGE >>>>>>>>>>>>>>>>>>>>

### 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.x3 |  | 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. |

<<<<<<<<<<<<<<<<<<<< NEXT CHANGE >>>>>>>>>>>>>>>>>>>>

#### 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, NPN not supported) |  |
| *>Transport Layer* |  |  |  |  |
| >>Transport Layer Cause | M |  | ENUMERATED(Unspecified, Transport Resource Unavailable, …) |  |
| *>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 unknow. |
| 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 unknow. |
| 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. |
| NPN not supported | The action failed because the indicated SNPN is not supported in the node. |

<<<<<<<<<<<<<<<<<<<< NEXT CHANGE >>>>>>>>>>>>>>>>>>>>

#### 9.3.1.x1 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.x2 NPN Support Information

This IE provides NPN related information.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| IE/Group Name | Presence | Range | IE type and reference | Semantics description |
| CHOICE *NPN Support Information* | M |  |  |  |
| *>NPN Support Information -SNPN* |  |  |  |  |
| >>NID | M |  | 9.3.1.x1 | This IE is associated with the PLMN Identity and the Slice Support List contained in the *Supported PLMNs* IE.Together with the PLMN Identity it identifiers the SNPN supported by the gNB-CU-UP. |

#### 9.3.1.x3 NPN Context Information

This IE provides bearer context related NPN information.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| IE/Group Name | Presence | Range | IE type and reference | Semantics description |
| CHOICE *NPN Context Information* | M |  |  |  |
| *>SNPN Information* |  |  |  |  |
| >>NID | M |  | 9.3.1.x1 | This IE is associated with Serving PLMN information contained in bearer context related E1AP message. Together with the Serving PLMN identity it identifiers the serving SNPN. |

<<<<<<<<<<<<<<<<<<<< NEXT CHANGE >>>>>>>>>>>>>>>>>>>>

### **9.4.4 PDU Definitions**

-- ASN1START

-- \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

--

-- PDU definitions for E1AP

--

-- \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

E1AP-PDU-Contents {

itu-t (0) identified-organization (4) etsi (0) mobileDomain (0)

ngran-access (22) modules (3) e1ap (5) version1 (1) e1ap-PDU-Contents (1) }

DEFINITIONS AUTOMATIC TAGS ::=

BEGIN

-- \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

--

-- IE parameter types from other modules

--

-- \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

IMPORTS

 Cause,

 CriticalityDiagnostics,

 GNB-CU-CP-UE-E1AP-ID,

 GNB-CU-UP-UE-E1AP-ID,

 UE-associatedLogicalE1-ConnectionItem,

 GNB-CU-UP-ID,

 GNB-CU-UP-Name,

 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-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,

 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-Addresses-Info,

 NPNContextInfo,

 NPNSupportInfo

FROM E1AP-IEs

 PrivateIE-Container{},

 ProtocolExtensionContainer{},

 ProtocolIE-Container{},

 ProtocolIE-ContainerList{},

 ProtocolIE-SingleContainer{},

 E1AP-PRIVATE-IES,

 E1AP-PROTOCOL-EXTENSION,

 E1AP-PROTOCOL-IES

FROM E1AP-Containers

 id-Cause,

 id-CriticalityDiagnostics,

 id-gNB-CU-CP-UE-E1AP-ID,

 id-gNB-CU-UP-UE-E1AP-ID,

 id-ResetType,

 id-UE-associatedLogicalE1-ConnectionItem,

 id-UE-associatedLogicalE1-ConnectionListResAck,

 id-gNB-CU-UP-ID,

 id-gNB-CU-UP-Name,

 id-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-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-Addresses-Info,

 maxnoofErrors,

 maxnoofSPLMNs,

 maxnoofDRBs,

 maxnoofTNLAssociations,

 maxnoofIndividualE1ConnectionsToReset,

 maxnoofTLAs

 maxnoofGTPTLAs

FROM E1AP-Constants;

<<<<<<<<<<<<<<<<<<<< NEXT CHANGE >>>>>>>>>>>>>>>>>>>>

-- \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

--

-- GNB-CU-UP E1 Setup Request

--

-- \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

GNB-CU-UP-E1SetupRequest ::= SEQUENCE {

 protocolIEs ProtocolIE-Container { {GNB-CU-UP-E1SetupRequestIEs} },

 ...

}

GNB-CU-UP-E1SetupRequestIEs E1AP-PROTOCOL-IES ::= {

 { ID id-TransactionID CRITICALITY reject TYPE TransactionID PRESENCE mandatory }|

 { ID id-gNB-CU-UP-ID CRITICALITY reject TYPE GNB-CU-UP-ID PRESENCE mandatory }|

 { ID id-gNB-CU-UP-Name CRITICALITY ignore TYPE GNB-CU-UP-Name PRESENCE optional }|

 { ID id-CNSupport CRITICALITY reject TYPE CNSupport PRESENCE mandatory }|

 { ID id-SupportedPLMNs CRITICALITY reject TYPE SupportedPLMNs-List PRESENCE mandatory }|

 { ID id-gNB-CU-UP-Capacity CRITICALITY ignore TYPE GNB-CU-UP-Capacity PRESENCE optional }|

 { ID id-Transport-Layer-Address-Info CRITICALITY ignore TYPE Transport-Layer-Address-Info PRESENCE optional },

 ...

}

SupportedPLMNs-List ::= SEQUENCE (SIZE (1..maxnoofSPLMNs)) OF SupportedPLMNs-Item

SupportedPLMNs-Item ::= SEQUENCE {

 pLMN-Identity PLMN-Identity,

 slice-Support-List Slice-Support-List OPTIONAL,

 nR-CGI-Support-List NR-CGI-Support-List OPTIONAL,

 qoS-Parameters-Support-List QoS-Parameters-Support-List OPTIONAL,

 iE-Extensions ProtocolExtensionContainer { { SupportedPLMNs-ExtIEs } } OPTIONAL,

 ...

}

SupportedPLMNs-ExtIEs E1AP-PROTOCOL-EXTENSION ::= {

{ ID id-NPNSupportInfo CRITICALITY reject EXTENSION NPNSupportInfo PRESENCE optional},

 ...

}

<<<<<<<<<<<<<<<<<<<< NEXT CHANGE >>>>>>>>>>>>>>>>>>>>

-- \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

--

-- 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},

 ...

}

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 },

 ...

}

<<<<<<<<<<<<<<<<<<<< NEXT CHANGE >>>>>>>>>>>>>>>>>>>>

### 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) e1ap (5) version1 (1) e1ap-IEs (2) }

DEFINITIONS AUTOMATIC TAGS ::=

BEGIN

IMPORTS

 id-CommonNetworkInstance,

 id-SNSSAI,

 id-OldQoSFlowMap-ULendmarkerexpected,

 id-DRB-QoS,

 id-endpoint-IP-Address-and-Port,

 id-NetworkInstance,

 id-QoSFlowMappingIndication,

 id-TNLAssociationTransportLayerAddressgNBCUUP,

 id-Cause,

 maxnoofErrors,

 maxnoofSliceItems,

 maxnoofEUTRANQOSParameters,

 maxnoofNGRANQOSParameters,

 maxnoofDRBs,

 maxnoofPDUSessionResource,

 maxnoofQoSFlows,

 maxnoofUPParameters,

 maxnoofCellGroups,

 maxnooftimeperiods,

 maxnoofNRCGI,

 maxnoofTLAs,

 maxnoofGTPTLAs

<<<<<<<<<<<<<<<<<<<< NEXT CHANGE >>>>>>>>>>>>>>>>>>>>

-- C

Cause ::= CHOICE {

 radioNetwork CauseRadioNetwork,

 transport CauseTransport,

 protocol CauseProtocol,

 misc CauseMisc,

 choice-extension ProtocolIE-SingleContainer {{Cause-ExtIEs}}

}

Cause-ExtIEs E1AP-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-e1ap-id,

 unknown-or-already-allocated-gnb-cu-up-ue-e1ap-id,

 unknown-or-inconsistent-pair-of-ue-e1ap-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,

 nPN not supported

}

CauseTransport ::= ENUMERATED {

 unspecified,

 transport-resource-unavailable,

 ...

}

<<<<<<<<<<<<<<<<<<<< NEXT CHANGE >>>>>>>>>>>>>>>>>>>>

-- N

NID ::= BIT STRING (SIZE (44))

NPNSupportInfo ::= CHOICE {

 sNPN NPNSupportInfo-SNPN,

 choice-extension ProtocolIE-SingleContainer {{NPNSupportInfo-ExtIEs}}

}

NPNSupportInfo-ExtIEs E1AP-PROTOCOL-IES ::= {

 ...

}

NPNSupportInfo-SNPN ::= SEQUENCE {

 nID NID,

 iE-Extensions ProtocolExtensionContainer { { NPNSupportInfo-SNPN-ExtIEs } } OPTIONAL

}

NPNSupportInfo-SNPN-ExtIEs E1AP-PROTOCOL-EXTENSION ::= {

 ...

}

NPNContextInfo ::= CHOICE {

 sNPN NPNContextInfo-SNPN,

 choice-extension 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 ::= {

 ...

}

<<<<<<<<<<<<<<<<<<<< NEXT CHANGE >>>>>>>>>>>>>>>>>>>>

### **9.4.7 Constant Definitions**

-- ASN1START

-- \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

--

-- Constant definitions

--

-- \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

E1AP-Constants {

itu-t (0) identified-organization (4) etsi (0) mobileDomain (0)

ngran-access (22) modules (3) e1ap (5) version1 (1) e1ap-Constants (4) }

DEFINITIONS AUTOMATIC TAGS ::=

BEGIN

IMPORTS

 ProcedureCode,

 ProtocolIE-ID

FROM E1AP-CommonDataTypes;

-- \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

--

-- Elementary Procedures

--

-- \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

id-reset ProcedureCode ::= 0

id-errorIndication ProcedureCode ::= 1

id-privateMessage ProcedureCode ::= 2

id-gNB-CU-UP-E1Setup ProcedureCode ::= 3

id-gNB-CU-CP-E1Setup ProcedureCode ::= 4

id-gNB-CU-UP-ConfigurationUpdate ProcedureCode ::= 5

id-gNB-CU-CP-ConfigurationUpdate ProcedureCode ::= 6

id-e1Release 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

-- \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

--

-- Lists

--

-- \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

maxnoofErrors INTEGER ::= 256

maxnoofSPLMNs INTEGER ::= 12

maxnoofSliceItems INTEGER ::= 1024

maxnoofIndividualE1ConnectionsToReset INTEGER ::= 65536

maxnoofEUTRANQOSParameters INTEGER ::= 256

maxnoofNGRANQOSParameters INTEGER ::= 256

maxnoofDRBs INTEGER ::= 32

maxnoofNRCGI INTEGER ::= 512

maxnoofPDUSessionResource INTEGER ::= 256

maxnoofQoSFlows INTEGER ::= 64

maxnoofUPParameters INTEGER ::= 8

maxnoofCellGroups INTEGER ::= 4

maxnooftimeperiods INTEGER ::= 2

maxnoofTNLAssociations INTEGER ::= 32

maxnoofTLAs INTEGER ::= 16

maxnoofGTPTLAs INTEGER ::= 16

-- \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

--

-- 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

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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

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id-gNB-CU-UP-Capacity ProtocolIE-ID ::= 64

id-GNB-CU-UP-OverloadInformation ProtocolIE-ID ::= 65

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id-PDU-Session-To-Notify-List ProtocolIE-ID ::= 67

id-PDU-Session-Resource-Data-Usage-List ProtocolIE-ID ::= 68

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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

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id-RetainabilityMeasurementsInfo ProtocolIE-ID ::= 85

id-Transport-Layer-Address-Info ProtocolIE-ID ::= 86

id-QoSMonitoringRequest ProtocolIE-ID ::= 87

id-NPNSupportInfo ProtocolIE-ID ::= xx

id-NPNContextInfo ProtocolIE-ID ::= yy

END

-- ASN1STOP

<<<<<<<<<<<<<<<<<<<< END OF CHANGES >>>>>>>>>>>>>>>>>>>>