**f3GPP TSG- Meeting #7bis-e *R3-20xxxx***

1st to 12th June 2020

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| *CR-Form-v12.0* | | | | | | | | |
| **CHANGE REQUEST** | | | | | | | | |
|  | | | | | | | | |
|  | **38.463** | **CR** |  | **rev** | **12** | **Current version:** | **16.1.0** |  |
|  | | | | | | | | |
| *For* [***HE******LP***](http://www.3gpp.org/3G_Specs/CRs.htm#_blank)*on using this form: comprehensive instructions can be found at* [*http://www.3gpp.org/Change-Requests*](http://www.3gpp.org/Change-Requests)*.* | | | | | | | | |
|  | | | | | | | | |

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| ***Proposed change affects:*** | UICC apps |  | ME |  | Radio Access Network | **X** | Core Network |  |

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | | | | | | | | | | |
| ***Title:*** | Addition of SON features | | | | | | | | | |
|  |  | | | | | | | | | |
| ***Source to WG:*** | Ericsson, CMCC, Huawei, ZTE, Nokia, Nokia Shanghai Bell，CATT, Samsung, Qualcomm Incorporated, LG Electronics, NTT DoCoMo | | | | | | | | | |
| ***Source to TSG:*** | RAN3 | | | | | | | | | |
|  |  | | | | | | | | | |
| ***Work item code:*** | NR\_SON\_MDT | | | | |  | ***Date:*** | | | 2020-06-17 |
|  |  | | | |  | |  | | |  |
| ***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 can be 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:*** | | Addition of Load Sharing and Load Balancing Optimisation | | | | | | | | |
|  | |  | | | | | | | | |
| ***Summary of change:*** | | Adding new procedures for load information exchange | | | | | | | | |
|  | |  | | | | | | | | |
| ***Consequences if not approved:*** | | The function of load sharing and load balancing optimization can not be supported. | | | | | | | | |
|  | |  | | | | | | | | |
| ***Clauses affected:*** | |  | | | | | | | | |
|  | |  | | | | | | | | |
|  | | **Y** | **N** |  | | | |  | | |
| ***Other specs*** | | **X** |  | Other core specifications | | | | TS 38.473 CR 0441  TS 38.423 CR 0222  TS 36.423 CR 1373 | | |
| ***affected:*** | |  | **X** | Test specifications | | | | TS/TR ... CR ... | | |
| ***(show related CRs)*** | |  | **X** | O&M Specifications | | | | TS/TR ... CR ... | | |
|  | |  | | | | | | | | |
| ***Other comments:*** | |  | | | | | | | | |
|  | |  | | | | | | | | |
| ***This CR's revision history:*** | | Rev1: include agreements taken at R3-105  Rev2: Include agreements taken at R3-105bis  Rev3: corrections to TNL Capacity IEs names  Rev4: incorporation of TP in R3-197766 to BL CR in R3-197567  Rev5, 6: updates based on post RAN3#106 meetign reviews  Rev 7: updates based on RAN3-107e  Rev 8: rebased upon 38.463 v16.1.0  Rev 9, 10: resubmission to RAN3-108-e, no changes  Rev 11: Added Registration Request in 9.2.1.x1, corrected RegistrationRequest in ASN.1 and assigned values (Start, Stop, …) to it. Correct sentence “If none of the requested measurements can be initiated, gNB-CU-UP shall send a…” to “If any of the requested measurements cannot be initiated, gNB-CU-UP shall send a…”  Rev12: addition of changes from RAN3-108bis | | | | | | | | |

*Start of the first change*

# 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 |

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 |

*Start of the next change*

### 8.2.X Resource Status Reporting Initiation

#### 8.2.X.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.X.2 Successful Operation



Figure 8.2.X.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 RESPOURCE 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, the gNB-CU-UP shall use its value as the time interval between two subsequent RESOURCE STATUS UPDATE messages that include the *TNL Available Capacity Indicator* IE. If the Reporting Periodicity IE is absent, the gNB-CU-UP shall report only once.

#### 8.2.X.3 Unsuccessful Operation



Figure 8.2.X.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.

#### 8.2.X.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.

### 8.2.Y Resource Status Reporting

#### 8.2.Y.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.Y.2 Successful Operation



Figure 8.2.Y.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.

#### 8.4.Y.3 Unsuccessful Operation

Not applicable.

#### 8.4.Y.4 Abnormal Conditions

Void.

*Start of the next change*

#### 9.2.1.X1 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 *Registration Request* IE is set to the value “stop” |
| ifRegistrationRequestStart | This IE shall be present if the *Registration Request* IE is set to the value "start". |

#### 9.2.1.X2 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.X3 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-ifRegistrationRequestStop | |  | 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 *Registration Request* IE is set to the value “stop” |

#### 9.2.1.X4 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.x1 |  |  |  |
| HW Capacity Indicator | O |  | 9.3.1.x2 |  |  |  |

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

*Start of the next change*

#### 9.3.1.x1 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.x1 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,...) FFS | 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. |

*Start of ASN.1 changes*

9.4.3 Elementary Procedure Definitions

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

--

-- Elementary Procedure definitions

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

E1AP-PDU-Descriptions {

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

ngran-access (22) modules (3) e1ap (5) version1 (1) e1ap-PDU-Descriptions (0) }

DEFINITIONS AUTOMATIC TAGS ::=

BEGIN

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

--

-- IE parameter types from other modules

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

*Skip ASN.1 unchanged*

GNB-CU-UP-CounterCheckRequest,

GNB-CU-UP-StatusIndication,

MRDC-DataUsageReport,

DeactivateTrace,

TraceStart,

ResourceStatusRequest,

ResourceStatusResponse,

ResourceStatusFailure,

ResourceStatusUpdate,

PrivateMessage

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-resourceStatusReportingInitiation,

id-resourceStatusReporting,

id-privateMessage

FROM E1AP-Constants;

*Next ASN.1 change*

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

--

-- Interface Elementary Procedure List

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

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 ,

...

}

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 |

resourceStatusReporting |

privateMessage ,

...

}

*Next ASN.1 change*

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

--

-- Interface Elementary Procedures

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

*Skip ASN.1 unchanged*

resourceStatusReportingInitiation E1AP-ELEMENTARY-PROCEDURE ::= {

INITIATING MESSAGE ResourceStatusRequest

SUCCESSFUL OUTCOME ResourceStatusResponse

UNSUCCESSFUL OUTCOME ResourceStatusFailure

PROCEDURE CODE id-resourceStatusReportingInitiation

CRITICALITY reject

}

resourceStatusReporting E1AP-ELEMENTARY-PROCEDURE ::= {

INITIATING MESSAGE ResourceStatusUpdate

PROCEDURE CODE id-resourceStatusReporting

CRITICALITY ignore

}

*Next ASN.1 change*

### 9.4.4 PDU Definitions

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

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-- PDU definitions for E1AP

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

*Skip ASN.1 unchanged*

RANUEID,

GNB-DU-ID,

TraceID,

TraceActivation,

SubscriberProfileIDforRFP,

AdditionalRRMPriorityIndex,

RetainabilityMeasurementsInfo,

Transport-Layer-Address-Info,

HW-CapacityIndicator,

RegistrationRequest,

ReportCharacteristics,

ReportingPeriodicity,

TNL-AvailableCapacityIndicator,

SliceMeasurementResultList

FROM E1AP-IEs

*Next ASN.1 change*

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,

maxnoofErrors,

maxnoofSPLMNs,

maxnoofDRBs,

maxnoofTNLAssociations,

maxnoofIndividualE1ConnectionsToReset

FROM E1AP-Constants;

*Next ASN.1 change*

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

--

-- RESOURCE STATUS REQUEST

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

ResourceStatusRequest ::= SEQUENCE {

protocolIEs ProtocolIE-Container { { ResourceStatusRequestIEs } },

...

}

ResourceStatusRequestIEs 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-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},

...

}

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

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-- RESOURCE STATUS RESPONSE

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

ResourceStatusResponse ::= SEQUENCE {

protocolIEs ProtocolIE-Container { { ResourceStatusResponseIEs } },

...

}

ResourceStatusResponseIEs 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 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},

...

}

*Next ASN.1 change*

### 9.4.5 Information Element Definitions

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

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-- Information Element Definitions

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

id-CommonNetworkInstance,

id-SNSSAI,

id-OldQoSFlowMap-ULendmarkerexpected,

id-DRB-QoS,

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

id-NetworkInstance,

id-QoSFlowMappingIndication,

id-TNLAssociationTransportLayerAddressgNBCUUP,

id-Cause,

id-QoSMonitoringRequest,

maxnoofErrors,

maxnoofSliceItems,

maxnoofEUTRANQOSParameters,

maxnoofNGRANQOSParameters,

maxnoofDRBs,

maxnoofPDUSessionResource,

maxnoofQoSFlows,

maxnoofUPParameters,

maxnoofCellGroups,

maxnooftimeperiods,

maxnoofNRCGI,

maxnoofTLAs,

maxnoofGTPTLAs,

maxnoofSPLMNs

FROM E1AP-Constants

*Skip ASN.1 unchanged*

-- H

HW-CapacityIndicator ::= SEQUENCE {

offeredThroughput INTEGER (1..16777216, ...),

availableThroughput INTEGER (0..100, ...),

iE-Extensions ProtocolExtensionContainer { { HW-CapacityIndicator-ExtIEs } },

...

}

HW-CapacityIndicator-ExtIEs E1AP-PROTOCOL-EXTENSION ::= {

...

}

*Next ASN.1 change*

-- R

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,

...

}

*Next ASN.1 change*

-- 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,

...

}

-- 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 ::= {

...

}

TraceActivation ::= SEQUENCE {

traceID TraceID,

interfacesToTrace InterfacesToTrace,

traceDepth TraceDepth,

traceCollectionEntityIPAddress TransportLayerAddress,

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

...

}

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

...

}

*Next ASN.1 change*

### 9.4.7 Constant Definitions

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

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-- Elementary Procedures

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

*Skip ASN.1 unchanged*

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 ::= xx

id-resourceStatusReporting ProcedureCode ::= xx

*Next ASN.1 change*

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

--

-- IEs

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

*Skip ASN.1 unchanged*

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-gNB-CU-CP-Measurement-ID ProtocolIE-ID ::= xxx

id-gNB-CU-UP-Measurement-ID ProtocolIE-ID ::= xxx

id-RegistrationRequest ProtocolIE-ID ::= xxx

id-ReportCharacteristics ProtocolIE-ID ::= xxx

id-ReportingPeriodicity ProtocolIE-ID ::= xxx

id-TNL-AvailableCapacityIndicator ProtocolIE-ID ::= xxx

id-HW-CapacityIndicator ProtocolIE-ID ::= xxx

*End of ASN.1 changes*