**3GPP TSG-RAN WG3 #107-e R3-201421**

**24 February-6 March 2020**

**Online**

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| *CR-Form-v12.0* |
| **CHANGE REQUEST** |
|  |
|  | **36.413** | **CR** | **-** | **rev** | **-** | **Current version:** | **16.0.0** |  |
|  |
| *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)*.* |
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| ***Proposed change affects:*** | UICC apps |  | ME |  | Radio Access Network | **X** | Core Network |  |

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|  |
| ***Title:***  | Baseline CR for introducing Rel-16 LTE further mobility enhancements  |
|  |  |
| ***Source to WG:*** | CATT |
| ***Source to TSG:*** | RAN3 |
|  |  |
| ***Work item code:*** | LTE\_feMob |  | ***Date:*** | 2020-03-02 |
|  |  |  |  |  |
| ***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:*** | In order to enable enhacements to the handover procedure, changes are needed to the S1AP protocol. This is the baseline CR covering all the agreed modification.  |
|  |  |
| ***Summary of change:*** | Following functions were added and modified:* A new procedure was added to enable indicating handover success;
* Introduce the DAPS HO per DRB indicator and DAPS response Info into Handover Preparation procedure and Handover resource allocation procedure.

 **Impact Analysis:**Impact assessment towards the previous version of the specification (same release):  |
|  |  |
| ***Consequences if not approved:*** | Rel-16 LTE mobility enhancement is not implemented. |
|  |  |
| ***Clauses affected:*** |  |
|  |  |
|  | **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:*** |  |

////////////////////////////////////////////////////////////// Start of Change /////////////////////////////////////////////////////////////////////

3.1 Definitions

For the purposes of the present document, the terms and definitions given in 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 TR 21.905 [1].

**ACL functionality:** A functionality controlling the access to network nodes. In case of Access Control Lists (ACL) functionality is applied in a network node the network node may only accept connections from other peer network nodes once the source addresses of the sending network node is already known in the target node.

**CSG Cell**: an E-UTRAN cell broadcasting a CSG indicator set to true and a CSG identity. This cell operates in Closed Access Mode as defined in TS 22.220 [28].

**DCN-ID:** DCN identity identifies a specific decicated core network (DCN).

**Dual Connectivity**: as defined in TS 36.300 [14].

**Elementary Procedure:** S1AP consists of Elementary Procedures (EPs). An Elementary Procedure is a unit of interaction between eNBs and the EPC. 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 S1AP EPs together or together with EPs from other interfaces is specified in stage 2 specifications (e.g., TS 23.401 [11] and TS 36.300 [14]).

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.

**eNB UE S1AP ID:** as defined in TS 36.401 [2].

**Hybrid Cell**: an E-UTRAN cell broadcasting a CSG indicator set to false and a CSG identity. This cell operates in Hybrid Access Mode as defined in TS 22.220 [28].

**MME UE S1AP ID:** as defined in TS 36.401 [2].

**E-RAB:** as defined in TS 36.401 [2].

NOTE 1: The E-RAB is either a default E-RAB or a dedicated E-RAB.

**E-RAB ID**: the E-RAB ID uniquely identifies an E-RAB for one UE.

NOTE 2: The E-RAB ID remains unique for the UE even if the UE-associated logical S1-connection is released during periods of user inactivity.

**Data Radio Bearer**: the Data Radio bearer transports the packets of an E-RAB between a UE and an eNB. There is a one-to-one mapping between the E-RAB and the Data Radio Bearer.

**Secondary Cell Group**: as defined in TS 36.300 [14].

**UE-associated signalling:** When S1-AP messages associated to one UE uses the UE-associated logical S1-connection for association of the message to the UE in eNB and EPC.

**UE-associated logical S1-connection:** The UE-associated logical S1-connection uses the identities *MME UE S1AP ID* and *eNB UE S1AP ID* according to definition in TS 23.401 [11]. For a received UE associated S1-AP message theMME identifies the associated UE based on the *MME UE S1AP ID* IE and theeNB identifies the associated UE based on the *eNB UE S1AP ID* IE*.* The UE-associated logical S1-connection may exist before the S1 UE context is setup in eNB.

**DAPS Handover**: as defined in TS 36.300 [14].

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].

ACL Access Control List

ARPI Additional RRM Policy Index

BBF Broadband Forum

CCO Cell Change Order

CDMA Code Division Multiple Access

CID Cell-ID (positioning method)

CIoT Cellular Internet of Things

CS Circuit Switched

CSG Closed Subscriber Group

CN Core Network

DAPS Dual Active Protocol Stacks

DCN Dedicated Core Network

DL Downlink

eAN evolved Access Network

ECGI E-UTRAN Cell Global Identifier

E-CID Enhanced Cell-ID (positioning method)

eHRPD evolved High Rate Packet Data

eNB E-UTRAN NodeB

EN-DC E-UTRA-NR Dual Connectivity

EP Elementary Procedure

EPC Evolved Packet Core

EPS Evolved Packet System

E-RAB E-UTRAN Radio Access Bearer

E-SMLC Evolved Serving Mobile Location Centre

E-UTRAN Evolved UTRAN

GBR Guaranteed Bit Rate

GNSS Global Navigation Satellite System

GUMMEI Globally Unique MME Identifier

GTP GPRS Tunnelling Protocol

HFN Hyper Frame Number

HRPD High Rate Packet Data

IE Information Element

IMEISV International Mobile station Equipment Identity and Software Version number

IoT Internet of Things

LAA Licensed-Assisted Access

L-GW Local GateWay

LHN Local Home Network

LHN ID Local Home Network ID

LIPA Local IP Access

LPPa LTE Positioning Protocol Annex

LWA LTE-WLAN Aggregation

LWIP LTE WLAN Radio Level Integration with IPsec Tunnel

MBSFN Multimedia Broadcast multicast service Single Frequency Network

MDT Minimization of Drive Tests

MME Mobility Management Entity

MTSI Multimedia Telephony Service for IMS

NAS Non Access Stratum

NB-IoT Narrowband IoT

NNSF NAS Node Selection Function

OTDOA Observed Time Difference of Arrival

PS Packet Switched

PSCell Primary SCell

ProSe Proximity Services

PWS Public Warning System

PDCP Packet Data Convergence Protocol

PLMN Public Land Mobile Network

PS Packet Switched

RRC Radio Resource Control

RIM RAN Information Management

QMC QoE Measurement Collection

QoE Quality of Experience

SCTP Stream Control Transmission Protocol

SCG Secondary Cell Group

S-GW Serving GateWay

SN Sequence Number

SIPTO Selected IP Traffic Offload

SIPTO@LN Selected IP Traffic Offload at the Local Network

SSID Service Set Identifier

S-TMSI S-Temporary Mobile Subscriber Identity

SUL Supplementary Uplink

TAC Tracking Area Code

TAI Tracking Area Identity

TEID Tunnel Endpoint Identifier

UE User Equipment

UE-AMBR UE-Aggregate Maximum Bitrate

UL Uplink

UTDOA Uplink Time Difference of Arrival

V2X Vehicle-to-Everything

8.1 List of S1AP 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** |
| Handover Preparation | HANDOVER REQUIRED | HANDOVER COMMAND | HANDOVER PREPARATION FAILURE |
| Handover Resource Allocation | HANDOVER REQUEST | HANDOVER REQUEST ACKNOWLEDGE | HANDOVER FAILURE |
| Path Switch Request | PATH SWITCH REQUEST | PATH SWITCH REQUEST ACKNOWLEDGE | PATH SWITCH REQUEST FAILURE |
| Handover Cancellation | HANDOVER CANCEL | HANDOVER CANCEL ACKNOWLEDGE |  |
| E-RAB Setup | E-RAB SETUP REQUEST | E-RAB SETUP RESPONSE |  |
| E-RAB Modify | E-RAB MODIFY REQUEST | E-RAB MODIFY RESPONSE |  |
| E-RAB Modification Indication | E-RAB MODIFICATION INDICATION | E-RAB MODIFICATION CONFIRM |  |
| E-RAB Release | E-RAB RELEASE COMMAND | E-RAB RELEASE RESPONSE |  |
| Initial Context Setup | INITIAL CONTEXT SETUP REQUEST | INITIAL CONTEXT SETUP RESPONSE | INITIAL CONTEXT SETUP FAILURE |
| Reset | RESET | RESET ACKNOWLEDGE |  |
| S1 Setup | S1 SETUP REQUEST | S1 SETUP RESPONSE | S1 SETUP FAILURE |
| UE Context Release | UE CONTEXT RELEASE COMMAND | UE CONTEXT RELEASE COMPLETE |  |
| UE Context Modification | UE CONTEXT MODIFICATION REQUEST | UE CONTEXT MODIFICATION RESPONSE | UE CONTEXT MODIFICATION FAILURE |
| eNB Configuration Update | ENB CONFIGURATION UPDATE | ENB CONFIGURATION UPDATE ACKNOWLEDGE | ENB CONFIGURATION UPDATE FAILURE |
| MME Configuration Update | MME CONFIGURATION UPDATE | MME CONFIGURAION UPDATE ACKNOWLEDGE | MME CONFIGURATION UPDATE FAILURE |
| Write-Replace Warning  | WRITE-REPLACE WARNING REQUEST | WRITE-REPLACE WARNING RESPONSE |  |
| Kill | KILL REQUEST | KILL RESPONSE |  |
| UE Radio Capability Match | UE RADIO CAPABILITY MATCH REQUEST | UE RADIO CAPABILITY MATCH RESPONSE |  |
| UE Context Modification Indication | UE CONTEXT MODIFICATION INDICATION | UE CONTEXT MODIFICATION CONFIRM |  |
| UE Context Suspend | UE CONTEXT SUSPEND REQUEST | UE CONTEXT SUSPEND RESPONSE |  |
| UE Context Resume | UE CONTEXT RESUME REQUEST | UE CONTEXT RESUME RESPONSE | UE CONTEXT RESUME FAILURE |

**Table 2: Class 2 procedures**

|  |  |
| --- | --- |
| **Elementary Procedure** | **Message** |
| Handover Notification | HANDOVER NOTIFY |
| E-RAB Release Indication | E-RAB RELEASE INDICATION |
| Paging | PAGING |
| Initial UE Message | INITIAL UE MESSAGE |
| Downlink NAS Transport | DOWNLINK NAS TRANSPORT |
| Uplink NAS Transport | UPLINK NAS TRANSPORT |
| NAS non delivery indication | NAS NON DELIVERY INDICATION |
| Error Indication | ERROR INDICATION |
| UE Context Release Request | UE CONTEXT RELEASE REQUEST |
| DownlinkS1 CDMA2000 Tunnelling | DOWNLINK S1 CDMA2000 TUNNELLING |
| Uplink S1 CDMA2000 Tunnelling | UPLINK S1 CDMA2000 TUNNELLING |
| UE Capability Info Indication | UE CAPABILITY INFO INDICATION |
| eNB Status Transfer | eNB STATUS TRANSFER |
| MME Status Transfer | MME STATUS TRANSFER |
| Deactivate Trace | DEACTIVATE TRACE |
| Trace Start | TRACE START |
| Trace Failure Indication | TRACE FAILURE INDICATION |
| Location Reporting Control | LOCATION REPORTING CONTROL |
| Location Reporting Failure Indication | LOCATION REPORTING FAILURE INDICATION |
| Location Report | LOCATION REPORT |
| Overload Start | OVERLOAD START |
| Overload Stop | OVERLOAD STOP |
| eNB Direct Information Transfer | eNB DIRECT INFORMATION TRANSFER |
| MME Direct Information Transfer | MME DIRECT INFORMATION TRANSFER |
| eNB Configuration Transfer | eNB CONFIGURATION TRANSFER |
| MME Configuration Transfer | MME CONFIGURATION TRANSFER |
| Cell Traffic Trace | CELL TRAFFIC TRACE |
| Downlink UE Associated LPPa Transport | DOWNLINK UE ASSOCIATED LPPA TRANSPORT |
| Uplink UE Associated LPPa Transport | UPLINK UE ASSOCIATED LPPA TRANSPORT |
| Downlink Non UE Associated LPPa Transport | DOWNLINK NON UE ASSOCIATED LPPA TRANSPORT |
| Uplink Non UE Associated LPPa Transport | UPLINK NON UE ASSOCIATED LPPA TRANSPORT |
| PWS Restart Indication | PWS RESTART INDICATION |
| Reroute NAS Request | REROUTE NAS REQUEST |
| PWS Failure Indication | PWS FAILURE INDICATION |
| Connection Establishment Indication | CONNECTION ESTABLISHMENT INDICATION |
| NAS Delivery Indication | NAS DELIVERY INDICATION |
| Retrieve UE Information | RETRIEVE UE INFORMATION |
| UE Information Transfer | UE INFORMATION TRANSFER |
| eNB CP Relocation Indication | eNB CP RELOCATION INDICATION |
| MME CP Relocation Indication | MME CP RELOCATION INDICATION |
| Secondary RAT Data Usage Report | SECONDARY RAT DATA USAGE REPORT |
| Handover Success | HANDOVER SUCCESS |

The following applies concerning interference between Elementary Procedures:

- The Reset procedure takes precedence over all other EPs.

- The UE Context Release procedure takes precedence over all other EPs that are using the UE-associated signalling.

8.4.1 Handover Preparation

8.4.1.1 General

The purpose of the Handover Preparation procedure is to request the preparation of resources at the target side via the EPC. There is only one Handover Preparation procedure ongoing at the same time for a certain UE.

#### 8.4.1.2 Successful Operation



Figure 8.4.1.2-1: Handover preparation: successful operation

The source eNB initiates the handover preparation by sending the HANDOVER REQUIRED message to the serving MME. When the source eNB sends the HANDOVER REQUIRED message, it shall start the timer TS1RELOCprep. The source eNB shall indicate the appropriate cause value for the handover in the *Cause* IE.

The source eNB shall include the *Source to Target Transparent Container* IE in the HANDOVER REQUIRED message.

In case of intra-system handover, the information in the *Source to Target Transparent Container* IE shall be encoded according to the definition of the *Source eNB to Target eNB Transparent Container* IE. In case of handover to UTRAN, the information in the *Source to Target Transparent Container* IE shall be encoded according to the *Source RNC to Target RNC Transparent Container* IE definition as specified in TS 25.413 [19] and the source eNB shall include the *UE History Information* IE in the *Source RNC to Target RNC Transparent Container* IE. If the handover is to GERAN A/Gb mode then the information in the *Source to Target Transparent Container* IE shall be encoded according to the definition of the *Source BSS to Target BSS Transparent Container* IE as described in TS 48.018 [18]. If the handover is to NG-RAN, the information in the *Source to Target Transparent Container* IE shall be encoded according to the *Source NG-RAN Node to Target NG-RAN Node Transparent Container*IE definition as specified in TS 38.413 [44].

When the preparation, including the reservation of resources at the target side is ready, the MME responds with the HANDOVER COMMAND message to the source eNB.

If the *Target to Source Transparent Container* IE has been received by the MME from the handover target then the transparent container shall be included in the HANDOVER COMMAND message.

Upon reception of the HANDOVER COMMAND message the source eNB shall stop the timer TS1RELOCprep and start the timer TS1RELOCOverall.

In case of intra-system handover, the information in the *Target to Source Transparent Container* IE shall be encoded according to the definition of the *Target eNB to Source eNB Transparent Container* IE. In case of inter-system handover to UTRAN, the information in the *Target to Source Transparent Container* IE shall be encoded according to the *Target RNC to Source RNC Transparent Container* IE definition as specified in TS 25.413 [19]. In case of inter-system handover to GERAN A/Gb mode, the information in the *Target to Source Transparent Container* IE shall be encoded according to the *Target BSS to Source BSS Transparent Container* IE definition as described in TS 48.018 [18]. In case of inter-system handover to NG-RAN, the information in the *Target to Source Transparent Container* IE shall be encoded according to the *Target NG-RAN Node to Source NG-RAN Node Transparent Container* IE definition as specified in TS 38.413 [44].

If there are any E-RABs that could not be admitted in the target, they shall be indicated in the *E-RABs to Release List* IE.

If the *DL forwarding* IE is included within the *Source eNB to Target eNB Transparent Container* IE of the HANDOVER REQUIRED message and it is set to “DL forwarding proposed”, it indicates that the source eNB proposes forwarding of downlink data.

If the MME receives the *Direct Forwarding Path Availability* IE in the HANDOVER REQUIRED message indicating that a direct data path is available, it shall handle it as specified in TS 23.401 [11].

If the *CSG Id* IE and no *Cell Access Mode* IE are received in the HANDOVER REQUIRED message, the MME shall perform the access control according to the CSG Subscription Data of that UE and, if the access control is successful or if at least one of the E-RABs has a particular ARP value (see TS 23.401 [11]), it shall continue the handover and propagate the *CSG Id* IE to the target side. If the access control is unsuccessful but at least one of the E-RABs has a particular ARP value (see TS 23.401 [11]) the MME shall also provide the *CSG Membership Status* IE set to “non member” to the target side.

If the *CSG Id* IE and the *Cell Access Mode* IE set to “hybrid” are received in the HANDOVER REQUIRED message, the MME shall provide the membership status of the UE and the CSG Id to the target side.

The source eNB shall include the *SRVCC HO Indication* IE in the HANDOVER REQUIRED message if the SRVCC operation is needed as defined in TS 23.216 [9]. The source eNB shall indicate to the MME in the *SRVCC HO Indication* IE if the handover shall be prepared for PS and CS domain or only for CS domain. The *SRVCC HO Indication* IE is set according to the target cell capability and UE capability. In case the target system is GERAN without DTM support or the UE is without DTM support, the source eNB shall indicate “CS only” in the *SRVCC HO Indication* IE and “PS service not available” in *PS Service Not Available* IE. In case the target system is either GERAN with DTM but without DTM HO support and the UE is supporting DTM or the target system is UTRAN without PS HO support, the source eNB shall indicate “CS only” in the *SRVCC HO Indication* IE. Otherwise, the source eNB shall indicate “PS and CS” in the *SRVCC HO Indication* IE.

In case of inter-system handover from E-UTRAN, the source eNB shall indicate in the *Target ID* IE, in case the target system is UTRAN, the Target RNC-ID of the RNC (including the Routing Area Code only in case the UTRAN PS domain is involved), in case the target system is GERAN the Cell Global Identity (including the Routing Area Code only in case the GERAN PS domain is involved) of the cell, and in case the target system is NG-RAN the Target NG-RAN Node ID of the NG-RAN node in the target system.

In case of inter-system handover from E-UTRAN to UTRAN, the source eNB shall, if supported, include the *HO Cause Value* IE in the *UE History Information* IE of the HANDOVER REQUIRED message.

In case the SRVCC operation is performed and the *SRVCC HO Indication* IE indicates that handover shall be prepared only for CS domain, and if

- the target system is GERAN, then the source eNB

- shall encode the information in the *Source to Target Transparent Container* IE within the HANDOVER REQUIRED message, according to the definition of the *Old BSS to New BSS information* IE as specified in TS 48.008 [23], and

- shall not include the *Source to Target Transparent Container Secondary* IE in the HANDOVER REQUIRED message;

- the target system is UTRAN, then the source eNB

- shall encode the information in the *Source to Target Transparent Container* IE within the HANDOVER REQUIRED message according to the definition of the *Source RNC to Target RNC Transparent Container* IE as specified in TS 25.413 [19],

- shall include the *UE History Information* IE in the *Source RNC to Target RNC Transparent Container* IE, and

- shall not include the *Source to Target Transparent Container Secondary* IE in the HANDOVER REQUIRED message.

In case the SRVCC operation is performed, the *SRVCC HO Indication* IE in the HANDOVER REQUIRED message indicates that handover shall be prepared for PS and CS domain, and if

- the target system is GERAN with DTM HO support, then the source eNB

- shall encode the information in the *Source to Target Transparent Container* IE within the HANDOVER REQUIRED message according to the definition of the *Source BSS to Target BSS Transparent Container* IE as described in TS 48.018 [18],and

- shall include the *Source to Target Transparent Container* *Secondary* IE in the HANDOVER REQUIRED message and encode information in it according to the definition of the *Old BSS to New BSS information* IE as specified in TS 48.008 [23];

- the target system is UTRAN, then the source eNB

- shall encode the information in the *Source to Target Transparent Container* IE within the HANDOVER REQUIRED message according to the definition of the *Source* RNC to *Target RNC Transparent Container* IE as specified in TS 25.413 [19],

- shall include the *UE History Information* IE in the *Source RNC to Target RNC Transparent Container* IE, and

- shall not include the *Source to Target Transparent Container Secondary* IE in the HANDOVER REQUIRED message.

In case the SRVCC operation is performed, the *SRVCC HO Indication* IE in the HANDOVER REQUIRED message indicates that handover shall be prepared only for CS domain, and if

- the target system is GERAN, then the MME

- shall encode the information in the *Target to Source Transparent Container* IE within the HANDOVER COMMAND message according to the definition of the *Layer 3 Information* IE as specified in TS 48.008 [23], and

- shall not include the *Target to Source Transparent Container Secondary* IE in the HANDOVER COMMAND message;

- the target system is UTRAN, then the MME

- shall encode the information in the *Target to Source Transparent Container* IE within the HANDOVER COMMAND message according to the definition of the *Target RNC to Source RNC Transparent Container* IE as specified in TS 25.413 [19], and

- shall not include the *Target to Source Transparent Container Secondary* IE in the HANDOVER COMMAND message.

In case the SRVCC operation is performed, the *SRVCC HO Indication* IE in the HANDOVER REQUIRED message indicates that handover shall be prepared for PS and CS domain,

- the target system is GERAN with DTM HO support, and if

- the Handover Preparation procedure has succeeded in the CS and PS domain, then the MME

- shall encode the information in the *Target to Source Transparent Container* IE within the HANDOVER COMMAND message according to the definition of the *Layer 3 Information* IE as specified in TS 48.008 [23], and

- shall include the *Target to Source Transparent Container* *Secondary* IE in the HANDOVER COMMAND message and encode information in it according to the definition of the *Target BSS to Source BSS Transparent Container* IE as specified in TS 48.018 [18];

- the Handover Preparation procedure has succeeded in the CS domain only, then the MME

- shall encode the information in the *Target to Source Transparent Container* IE within the HANDOVER COMMAND message according to the definition of the *Layer 3 Information* IE as specified in TS 48.008 [23], and

- shall not include the *Target to Source Transparent Container Secondary* IE in the HANDOVER COMMAND message;

- the target system is UTRAN, then the Handover Preparation procedure shall be considered successful if the Handover Preparation procedure has succeeded in the CS domain, and the MME

- shall encode the information in the *Target to Source Transparent Container* IE within the HANDOVER COMMAND message according to the definition of the *Target RNC to Source RNC Transparent Container* IE as specified in TS 25.413 [19], and

- shall not include the *Target to Source Transparent Container Secondary* IE in the HANDOVER COMMAND message.

If the HANDOVER COMMAND message contains the *DL GTP-TEID* IE and the *DL Transport Layer Address* IE for a given bearer in the *E-RABs Subject to Forwarding List* IE, then the source eNB shall consider that the forwarding of downlink data for this given bearer is possible.

If the HANDOVER COMMAND message contains the *UL GTP-TEID* IE and the *UL Transport Layer Address* IE for a given bearer in the *E-RABs Subject to Forwarding List* IE, then it means the target eNB has requested the forwarding of uplink data for this given bearer.

If the *DAPS Information* IE is included for an E-RAB in the *Source eNB to Target eNB Transparent Container* IE within the HANDOVER REQUIRED message, it indicates that the source eNB proposes to perform DAPS Handover for the concerned E-RAB.

**Interactions with E-RAB Management procedures:**

If, after a HANDOVER REQUIRED message is sent and before the Handover Preparation procedure is terminated, the source eNB receives an MME initiated E-RAB Management procedure on the same UE associated signalling connection, the source eNB shall either:

1. cancel the Handover Preparation procedure by executing the Handover Cancel procedure with an appropriate cause value. After successful completion of the Handover Cancel procedure, the source eNB shall continue the MME initiated E-RAB Management procedure

or

2. terminate the MME initiated E-RAB Management procedure by sending the appropriate response message with an appropriate cause value, e.g., “S1 intra system Handover Triggered”, “S1 inter system Handover Triggered” to the MME and then the source eNB shall continue with the handover procedure.

8.4.2 Handover Resource Allocation

8.4.2.1 General

The purpose of the Handover Resource Allocation procedure is to reserve resources at the target eNB for the handover of a UE.

8.4.2.2 Successful Operation

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**Figure 8.4.2.2-1: Handover resource allocation: successful operation**

The MME initiates the procedure by sending the HANDOVER REQUEST message to the target eNB. The HANDOVER REQUEST message may contain the *Handover Restriction List* IE, which contains roaming or access restrictions.

If the *Handover Restriction List* IE is contained in the HANDOVER REQUEST message, the target eNB shall store this information in the UE context. This information shall however not be considered whenever one of the handed over E-RABs has a particular ARP value (TS 23.401 [11]).

The target eNB shall use the information in *Handover Restriction List* IE if present in the HANDOVER REQUEST message to

- determine a target for subsequent mobility action for which the eNB provides information about the target of the mobility action towards the UE;

- select a proper SCG during dual connectivity operation.

If the *Handover Restriction List* IE is not contained in the HANDOVER REQUEST message, the target eNB shall consider that no roaming and no access restriction apply to the UE.

Upon reception of the HANDOVER REQUEST message the eNB shall store the received *UE Security Capabilities* IE in the UE context and use it to prepare the configuration of the AS security relation with the UE.

If the *SRVCC Operation Possible* IE is included in the HANDOVER REQUEST message, the target eNB shall store the content of the received *SRVCC Operation Possible* IE in the UE context and, if supported, use it as defined in TS 23.216 [9].

Upon reception of the HANDOVER REQUEST message the eNB shall store the received *Security Context* IE in the UE context and the eNB shall use it to derive the security configuration as specified in TS 33.401 [15].

If the *Trace Activation* IE is included in the HANDOVER REQUEST message, the target eNB shall if supported, initiate the requested trace function as described in TS 32.422 [10]. In particular, the eNB shall, if supported:

- if the *Trace Activation* IE does not include the *MDT Configuration* IE, initiate the requested trace session as described in TS 32.422 [10];

- if the *Trace Activation* IE includes the *MDT Activation* IE, within the *MDT Configuration* IE, set to “Immediate MDT and Trace”, initiate the requested trace session and MDT session as described in TS 32.422 [10];

- if the *Trace Activation* IE includes the *MDT Activation* IE, within the *MDT Configuration* IE, set to “Immediate MDT Only”, “Logged MDT only” or “Logged MBSFN MDT”, initiate the requested MDT session as described in TS 32.422 [10] and the target eNB shall ignore *Interfaces To Trace* IE, and *Trace Depth* IE.

- if the *Trace Activation* IE includes the *MDT Location Information* IE, within the *MDT Configuration* IE, store this information and take it into account in the requested MDT session.

- if the *Trace Activation* IE includes the *Signalling based MDT PLMN List* IE, within the *MDT Configuration* IE, the eNB may use it to propagate the MDT Configuration as described in TS 37.320 [31].

- if the *Trace Activation* IE includes the *MBSFN-ResultToLog* IE, within the *MDT Configuration* IE, take it into account for MDT Configuration as described in TS 37.320 [31].

- if the *Trace Activation* IE includes the *MBSFN-AreaId* IE in the *MBSFN-ResultToLog* IE, within the *MDT Configuration* IE, take it into account for MDT Configuration as described in TS 37.320 [31].

- if the *Trace Activation* IE includes the *UE Application layer measurement configuration* IE, initiate the requested trace session and QoE Measurement Collection function as described in TS 36.300 [14].

- if the *Trace Activation* IE includes the *Bluetooth Measurement Configuration* IE, within the *MDT Configuration* IE, take it into account for MDT Configuration as described in TS 37.320 [31].

- if the *Trace Activation* IE includes the *WLAN Measurement Configuration* IE, within the *MDT Configuration* IE, take it into account for MDT Configuration as described in TS 37.320 [31].

If the *CSG Id* IE is received in the HANDOVER REQUEST message, the eNB shall compare the received value with the CSG Id broadcast by the target cell.

If the *CSG Membership Status* IE is received in the HANDOVER REQUEST message and the *CSG Membership Status* is set to “member”, the eNB may provide the QoS to the UE as for member provided that the CSG Id received in the HANDOVER REQUEST messages corresponds to the CSG Id broadcast by the target cell.

If the *CSG Membership Status* IE and the *CSG Id* IE are received in the HANDOVER REQUEST message and the CSG Id does not correspond to the CSG Id broadcast by the target cell, the eNB may provide the QoS to the UE as for a non member and shall send back in the HANDOVER REQUEST ACKNOWLEDGE message the actual CSG Id broadcast by the target cell.

If the target cell is CSG cell or hybrid cell, the target eNB shall include the *CSG ID* IE in the HANDOVER REQUEST ACKNOWLEDGE message.

If the target eNB receives the *CSG Id* IE and the *CSG Membership Status* IE is set to “non member” in the HANDOVER REQUEST message and the target cell is a closed cell and at least one of the E-RABs has a particular ARP value (see TS 23.401 [11]), the eNB shall send back the HANDOVER REQUEST ACKNOWLEDGE message to the MME accepting those E-RABs and failing the other E-RABs.

If the *Subscriber Profile ID* *for RAT/Frequency priority* IE is contained in the *Source eNB to Target eNB Transparent Container* IE, the target eNB shall store the content of the received *Subscriber Profile ID for RAT/Frequency priority* IE in the UE context and use it as defined in TS 36.300 [14].

If the *Additional RRM Policy Index* IE is contained in the *Source eNB to Target eNB Transparent Container* IE, the target eNB shall, if supported, store it and use it as defined in TS 36.300 [14].

Upon reception of the *UE History Information* IE, which is included within the *Source eNB to Target eNB Transparent Container* IE in the HANDOVER REQUEST message, the target eNB shall collect the information defined as mandatory in the *UE History Information* IE and shall, if supported, collect the information defined as optional in the *UE History Information* IE, for as long as the UE stays in one of its cells, and store the collected information to be used for future handover preparations.

Upon reception of the *UE History Information from the UE* IE, which is included within the *Source eNB to Target eNB Transparent Container* IE in the HANDOVER REQUEST message, the target eNB shall, if supported, store the collected information, to be used for future handover preparations.

If the *Mobility Information* IE is included within the *Source eNB to Target eNB Transparent Container* IE in the HANDOVER REQUEST message, the target eNB shall, if supported, store this information and use it as defined in TS 36.300 [14].

If the *Expected UE Behaviour* IE is included in the HANDOVER REQUEST message, the eNB shall, if supported, store this information and may use it to determine the RRC connection time.

If the *Bearer Type* IE is included in the HANDOVER REQUEST message and is set to “non IP”, then the eNB shall not perform header compression for the concerned E-RAB.

After all necessary resources for the admitted E-RABs have been allocated, the target eNB shall generate the HANDOVER REQUEST ACKNOWLEDGE message. The target eNB shall include in the *E-RABs Admitted List* IE the E-RABs for which resources have been prepared at the target cell. The E-RABs that have not been admitted in the target cell, if any, shall be included in the *E-RABs Failed to Setup List* IE.

If the HANDOVER REQUEST message contains the *Data Forwarding Not Possible* IE associated with a given E-RAB within the *E-RABs To Be Setup List* IE set to “Data forwarding not possible”, then the target eNB may decide not to include the *DL Transport Layer Address* IE and the *DL GTP-TEID* IE and for intra LTE handover the *UL Transport Layer Address* IE and the *UL GTP-TEID* IE within the *E-RABs Admitted List* IE of the HANDOVER REQUEST ACKNOWLEDGE message for that E-RAB.

For each bearer that target eNB has decided to admit and for which *DL forwarding* IE is set to “DL forwarding proposed”, the target eNB may include the *DL GTP-TEID* IE and the *DL Transport Layer Address* IE within the *E-RABs Admitted List* IE of the HANDOVER REQUEST ACKNOWLEDGE message indicating that it accepts the proposed forwarding of downlink data for this bearer.

If the HANDOVER REQUEST ACKNOWLEDGE message contains the *UL GTP-TEID* IE and the *UL Transport Layer Address* IE for a given bearer in the *E-RABs Admitted List* IE, then it means the target eNB has requested the forwarding of uplink data for this given bearer.

If the *Request Type* IE is included in the HANDOVER REQUEST message, then the target eNB should perform the requested location reporting functionality for the UE as described in subclause 8.11.

If the *UE Security Capabilities* IE included in the HANDOVER REQUEST message only contains the EIA0 algorithm as defined in TS 33.401 [15] and if this EIA0 algorithm is defined in the configured list of allowed integrity protection algorithms in the eNB (TS 33.401 [15]), the eNB shall take it into use and ignore the keys received in the *Security Context* IE.

The *GUMMEI* IE shall only be contained in the HANDOVER REQUEST message according to subclauses 4.6.2 and 4.7.6.6 of TS 36.300 [14]. If the *GUMMEI* IE is present, the target eNB shall store this information in the UE context and use it for subsequent X2 handovers.

The *MME UE S1AP ID 2* IE shall only be contained in the HANDOVER REQUEST message according to subclause 4.6.2 of TS 36.300 [14].If the *MME UE S1AP ID 2* IE is present, the target eNB shall store this information in the UE context and use it for subsequent X2 handovers.

If the *Management Based MDT Allowed* IE only or the *Management Based MDT Allowed* IE and the *Management Based MDT PLMN List* IE is contained in the HANDOVER REQUEST message, the target eNB shall, if supported, store the received information in the UE context, and use this information to allow subsequent selections of the UE for management based MDT defined in TS 32.422 [10].

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

If the HANDOVER REQUEST contains a *Target Cell ID* IE, as part of the *Source eNB to Target eNB Transparent Container* IE, for a cell which is no longer active, the eNB may respond with an HANDOVER REQUEST ACKNOWLEDGE in case the PCI of the deactivated cell is in use by another active cell.

If the *ProSe Authorized* IE is contained in the HANDOVER REQUEST message and it contains one or more IEs set to “authorized”, the eNB shall, if supported, consider that the UE is authorized for the relevant ProSe service(s).

If the *UE User Plane CIoT Support Indicator* IE is included in the HANDOVER REQUEST message and is set to "supported", the eNB shall, if supported, consider that User Plane CIoT EPS Optimisation as specified in TS 23.401 [11] is supported for the UE.

If the *CE-mode-B Support Indicator* IE is included in the HANDOVER REQUEST ACKNOWLEDGE message and set to "supported", the MME shall, if supported, take this information into account when setting NAS timer values for the UE as specified in TS 24.301[24].

If the *V2X Services Authorized* IE is contained in the HANDOVER REQUEST message and it contains one or more IEs set to “authorized”, the eNB shall, if supported, consider that the UE is authorized for the relevant service(s).

If the *UE Sidelink Aggregate Maximum Bit Rate* IE is included in the HANDOVER REQUEST message, the eNB shall, if supported, use the received value for the concerned UE’s sidelink communication in network scheduled mode for V2X services.

If the *Enhanced Coverage Restricted* IE is included in the HANDOVER REQUEST message, the eNB shall store this information in the UE context and use it as defined in TS 23.401 [11].

If the *CE-Mode-B Restricted* IE is included in the HANDOVER REQUEST message and the *Enhanced Coverage Restricted* IE is not set to *restricted* and the Enhanced Coverage Restricted information stored in the UE context is not set to *restricted*, the eNB shall store this information in the UE context and use it as defined in TS 23.401 [11].

If the *NR UE Security Capabilities* IE is included in the HANDOVER REQUEST message, the eNB shall, if supported, store this information in the UE context and use it as defined in TS 33.401 [15].

If the *Aerial UE subscription information* IE is included in the HANDOVER REQUEST message, the eNB shall, if supported, store this information in the UE context and use it as defined in TS 36.300 [14].

If the *Pending Data Indication* IE is included in the HANDOVER REQUEST message, the eNB shall use it as defined in TS 23.401 [11].

If the *Subscription Based UE Differentiation Information* IE is included in the HANDOVER REQUEST message, the eNB shall, if supported, store this information in the UE context for further use according to TS 23.401 [11].

If the *Additional RRM Policy Index* IE is contained in the HANDOVER REQUEST message, the eNB shall, if supported, store it and use it as defined in TS 36.300 [14].

If the HANDOVER REQUEST message is received for an handover originating from a source NG-RAN node, the list of E-RABs contained in the source eNB to target eNB Transparent Container which are not included in the HANDOVER REQUEST message shall be considered as not to be handed over and ignored.

If the *DAPS Information* IE is included for an E-RAB in the *Source eNB to Target eNB Transparent Container* IE within the HANDOVER REUQEST message, the target eNB shall consider that the request concerns a DAPS Handover for that E-RAB, as defined in TS 36.300 [14]. The target eNB shall, if supported, include the *DAPS Response information* IE in the *Target eNB to Source eNB Transparent Container* IE within the HANDOVER REQUEST ACKNOWLEDGE message.

///////////////////////////////////////////////////////////////////////Next Change/////////////////////////////////////////////////////////////////////

8.4.X Handover Success

8.4.X.1 General

The Handover Success procedure is used during a DAPS handover, to inform the source eNB that the UE has successfully accessed the target eNB.

The procedure uses UE-associated signalling.

8.4.X.2 Successful Operation

****

**Figure 8.2.X.2-1: Handover Success, successful operation**

The MME initiates the procedure by sending the HANDOVER SUCCESS message to the source eNB, when the MME successfully received the HANDOVER NOTIFY message from the target eNB for the UE for which a DAPS handover has been applied.

8.4.X.3 Unsuccessful Operation

Not applicable.

8.4.X.4 Abnormal Conditions

If the HANDOVER SUCCESS message refers to a context that does not exist, the source eNB shall ignore the message.

///////////////////////////////////////////////////////////////////////next Change/////////////////////////////////////////////////////////////////////

9.1.5.Y HANDOVER SUCCESS

This message is sent by the MME to the source eNB, to indicate the successful access of the UE toward the target eNB.

Direction: MME →source eNB.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **IE/Group Name** | **Presence** | **Range** | **IE type and reference** | **Semantics description** | **Criticality** | **Assigned Criticality** |
| Message Type | M |  | 9.2.1.1 |  | YES | ignore  |
| MME UE S1AP ID | M |  | 9.2.3.3 |  | YES | reject |
| eNB UE S1AP ID | M |  | 9.2.3.4 |  | YES | reject |

#### 9.2.1.7 Source eNB to Target eNB Transparent Container

The *Source eNB to target eNB Transparent Container* IE is an information element that is produced by the source eNB and is transmitted to the target eNB. For inter-system handovers to E-UTRAN, the IE is transmitted from the external handover source to the target eNB.

This IE is transparent to the EPC.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| IE/Group Name | Presence | Range | IE type and reference | Semantics description | Criticality | Assigned Criticality |
| RRC Container | M |  | OCTET STRING | Includes the RRC Handover Preparation Information message as defined in subclause 10.2.2 of TS 36.331 [16]. | - |  |
| **E-RABs Information List** |  | *0..1* |  |  | - |  |
| **>E-RABs Information Item** |  | *1 .. <maxnoof E-RABs>* |  |  | EACH | ignore |
| >>E-RAB ID | M |  | 9.2.1.2 |  | - |  |
| >>DL Forwarding | O |  | 9.2.3.14 |  | - |  |
| >>DAPS Information | O |  | 9.2.1.x |  | YES | Ignore |
| Target Cell ID | M |  | E-UTRAN CGI9.2.1.38 |  | - |  |
| Subscriber Profile IDfor RAT/Frequency priority | O |  | 9.2.1.39 |  | - |  |
| UE History Information | M |  | 9.2.1.42 |  | - |  |
| Mobility Information | O |  | BIT STRING (SIZE (32)) | Information related to the handover; the external handover source provides it in order to enable later analysis of the conditions that led to a wrong HO. | YES | ignore |
| UE History Information from the UE | O |  | OCTET STRING | VisitedCellInfoList contained in the UEInformationResponse message (TS 36.331 [16]) | YES | ignore |
| IMS voice EPS fallback from 5G | O |  | ENUMERATED (true, …) |  | YES | ignore |

#### 9.2.1.8 Target eNB to Source eNB Transparent Container

The *Target eNB to Source eNB Transparent Container* IE is an information element that is produced by the target eNB and is transmitted to the source eNB. For inter-system handovers to E-UTRAN, the IE is transmitted from the target eNB to the external relocation source.

This IE is transparent to EPC.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| IE/Group Name | Presence | Range | IE type and reference | Semantics description | Criticality | Assigned Criticality |
| RRC Container | M |  | OCTET STRING | Includes the RRC E-UTRA Handover Command message as defined in subclause 10.2.2 of TS 36.331 [16]. | - |  |
| DAPS Reponse Information  | O |  | 9.2.1.y |  | YES | Reject |

//////////////////////////////////////////////////////////////unchange skipped/////////////////////////////////////////////////////////////////////

### 9.2.1.x DAPS Information

The *DAPS Indicator* IE indicates that the source eNB requests a DAPS HO for the concered E-RAB

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

///////////////////////////////////////////////////////////////unchange skipped /////////////////////////////////////////////////////////////////////

### 9.2.1.y DAPS Response Information

The *DAPS Response Indicator* IE indicates that the response to a requested DAPS Handover..

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| IE/Group Name | Presence | Range | IE type and reference | Semantics description |
| DAPS Response Indicator | M |  | ENUMERATED (DAPS HO accepted, fallback to legacy HO, fallback to rel14 MBB, …) | Indicates if the DAPS HO is accepted |

*Editor’s note: FFS whether it is sufficient to contain just the value “DAPS HO accepted”, or to contain the other values “fallback to legacy HO” or/and “ fallback to rel14 MBB”?*

*Editor’s note: FFS whether the DAPS response is per UE level or per DRB*

//////////////////////////////////////////////////////////////// next Change /////////////////////////////////////////////////////////////////////

9.3.2 Elementary Procedure Definitions

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

--

-- Elementary Procedure definitions

--

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

S1AP-PDU-Descriptions {

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

eps-Access (21) modules (3) s1ap (1) version1 (1) s1ap-PDU-Descriptions (0)}

DEFINITIONS AUTOMATIC TAGS ::=

BEGIN

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

--

-- IE parameter types from other modules.

--

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

IMPORTS

 Criticality,

 ProcedureCode

FROM S1AP-CommonDataTypes

 CellTrafficTrace,

 DeactivateTrace,

 DownlinkUEAssociatedLPPaTransport,

 DownlinkNASTransport,

 DownlinkNonUEAssociatedLPPaTransport,

 DownlinkS1cdma2000tunnelling,

 ENBDirectInformationTransfer,

 ENBStatusTransfer,

 ENBConfigurationUpdate,

 ENBConfigurationUpdateAcknowledge,

 ENBConfigurationUpdateFailure,

 ErrorIndication,

 HandoverCancel,

 HandoverCancelAcknowledge,

 HandoverCommand,

 HandoverFailure,

 HandoverNotify,

 HandoverPreparationFailure,

 HandoverRequest,

 HandoverRequestAcknowledge,

 HandoverRequired, InitialContextSetupFailure,

 InitialContextSetupRequest,

 InitialContextSetupResponse,

 InitialUEMessage,

 KillRequest,

 KillResponse,

 LocationReportingControl,

 LocationReportingFailureIndication,

 LocationReport,

 MMEConfigurationUpdate,

 MMEConfigurationUpdateAcknowledge,

 MMEConfigurationUpdateFailure,

 MMEDirectInformationTransfer,

 MMEStatusTransfer,

 NASNonDeliveryIndication,

 OverloadStart,

 OverloadStop,

 Paging,

 PathSwitchRequest,

 PathSwitchRequestAcknowledge,

 PathSwitchRequestFailure,

 PrivateMessage,

 Reset,

 ResetAcknowledge,

 S1SetupFailure,

 S1SetupRequest,

 S1SetupResponse,

 E-RABModifyRequest,

 E-RABModifyResponse,

 E-RABModificationIndication,

 E-RABModificationConfirm,

 E-RABReleaseCommand,

 E-RABReleaseResponse,

 E-RABReleaseIndication,

 E-RABSetupRequest,

 E-RABSetupResponse,

 TraceFailureIndication,

 TraceStart,

 UECapabilityInfoIndication,

 UEContextModificationFailure,

 UEContextModificationRequest,

 UEContextModificationResponse,

 UEContextReleaseCommand,

 UEContextReleaseComplete,

 UEContextReleaseRequest,

 UERadioCapabilityMatchRequest,

 UERadioCapabilityMatchResponse,

 UplinkUEAssociatedLPPaTransport,

 UplinkNASTransport,

 UplinkNonUEAssociatedLPPaTransport,

 UplinkS1cdma2000tunnelling,

 WriteReplaceWarningRequest,

 WriteReplaceWarningResponse,

 ENBConfigurationTransfer,

 MMEConfigurationTransfer,

 PWSRestartIndication,

 UEContextModificationIndication,

 UEContextModificationConfirm,

 RerouteNASRequest,

 PWSFailureIndication,

 UEContextSuspendRequest,

 UEContextSuspendResponse,

 UEContextResumeRequest,

 UEContextResumeResponse,

 UEContextResumeFailure,

 ConnectionEstablishmentIndication,

 NASDeliveryIndication,

 RetrieveUEInformation,

 UEInformationTransfer,

 ENBCPRelocationIndication,

 MMECPRelocationIndication,

 SecondaryRATDataUsageReport,

 HandoverSuccess

FROM S1AP-PDU-Contents

 id-CellTrafficTrace,

 id-DeactivateTrace,

 id-downlinkUEAssociatedLPPaTransport,

 id-downlinkNASTransport,

 id-downlinkNonUEAssociatedLPPaTransport,

 id-DownlinkS1cdma2000tunnelling,

 id-eNBStatusTransfer,

 id-ErrorIndication,

 id-HandoverCancel,

 id-HandoverNotification,

 id-HandoverPreparation,

 id-HandoverResourceAllocation,

 id-InitialContextSetup,

 id-initialUEMessage,

 id-ENBConfigurationUpdate,

 id-Kill,

 id-LocationReportingControl,

 id-LocationReportingFailureIndication,

 id-LocationReport,

 id-eNBDirectInformationTransfer,

 id-MMEConfigurationUpdate,

 id-MMEDirectInformationTransfer,

 id-MMEStatusTransfer,

 id-NASNonDeliveryIndication,

 id-OverloadStart,

 id-OverloadStop,

 id-Paging,

 id-PathSwitchRequest,

 id-PrivateMessage,

 id-Reset,

 id-S1Setup,

 id-E-RABModify,

 id-E-RABModificationIndication,

 id-E-RABRelease,

 id-E-RABReleaseIndication,

 id-E-RABSetup,

 id-TraceFailureIndication,

 id-TraceStart,

 id-UECapabilityInfoIndication,

 id-UEContextModification,

 id-UEContextRelease,

 id-UEContextReleaseRequest,

 id-UERadioCapabilityMatch,

 id-uplinkUEAssociatedLPPaTransport,

 id-uplinkNASTransport,

 id-uplinkNonUEAssociatedLPPaTransport,

 id-UplinkS1cdma2000tunnelling,

 id-WriteReplaceWarning,

 id-eNBConfigurationTransfer,

 id-MMEConfigurationTransfer,

 id-PWSRestartIndication,

 id-UEContextModificationIndication,

 id-RerouteNASRequest,

 id-PWSFailureIndication,

 id-UEContextSuspend,

 id-UEContextResume,

 id-ConnectionEstablishmentIndication,

 id-NASDeliveryIndication,

 id-RetrieveUEInformation,

 id-UEInformationTransfer,

 id-eNBCPRelocationIndication,

 id-MMECPRelocationIndication,

 id-SecondaryRATDataUsageReport

 id-HandoverSuccess,

FROM S1AP-Constants;

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

--

-- Interface Elementary Procedure Class

--

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

S1AP-ELEMENTARY-PROCEDURE ::= CLASS {

 &InitiatingMessage ,

 &SuccessfulOutcome OPTIONAL,

 &UnsuccessfulOutcome OPTIONAL,

 &procedureCode ProcedureCode UNIQUE,

 &criticality Criticality DEFAULT ignore

}

WITH SYNTAX {

 INITIATING MESSAGE &InitiatingMessage

 [SUCCESSFUL OUTCOME &SuccessfulOutcome]

 [UNSUCCESSFUL OUTCOME &UnsuccessfulOutcome]

 PROCEDURE CODE &procedureCode

 [CRITICALITY &criticality]

}

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

--

-- Interface PDU Definition

--

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

S1AP-PDU ::= CHOICE {

 initiatingMessage InitiatingMessage,

 successfulOutcome SuccessfulOutcome,

 unsuccessfulOutcome UnsuccessfulOutcome,

 ...

}

InitiatingMessage ::= SEQUENCE {

 procedureCode S1AP-ELEMENTARY-PROCEDURE.&procedureCode ({S1AP-ELEMENTARY-PROCEDURES}),

 criticality S1AP-ELEMENTARY-PROCEDURE.&criticality ({S1AP-ELEMENTARY-PROCEDURES}{@procedureCode}),

 value S1AP-ELEMENTARY-PROCEDURE.&InitiatingMessage ({S1AP-ELEMENTARY-PROCEDURES}{@procedureCode})

}

SuccessfulOutcome ::= SEQUENCE {

 procedureCode S1AP-ELEMENTARY-PROCEDURE.&procedureCode ({S1AP-ELEMENTARY-PROCEDURES}),

 criticality S1AP-ELEMENTARY-PROCEDURE.&criticality ({S1AP-ELEMENTARY-PROCEDURES}{@procedureCode}),

 value S1AP-ELEMENTARY-PROCEDURE.&SuccessfulOutcome ({S1AP-ELEMENTARY-PROCEDURES}{@procedureCode})

}

UnsuccessfulOutcome ::= SEQUENCE {

 procedureCode S1AP-ELEMENTARY-PROCEDURE.&procedureCode ({S1AP-ELEMENTARY-PROCEDURES}),

 criticality S1AP-ELEMENTARY-PROCEDURE.&criticality ({S1AP-ELEMENTARY-PROCEDURES}{@procedureCode}),

 value S1AP-ELEMENTARY-PROCEDURE.&UnsuccessfulOutcome ({S1AP-ELEMENTARY-PROCEDURES}{@procedureCode})

}

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

--

-- Interface Elementary Procedure List

--

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

S1AP-ELEMENTARY-PROCEDURES S1AP-ELEMENTARY-PROCEDURE ::= {

 S1AP-ELEMENTARY-PROCEDURES-CLASS-1 |

 S1AP-ELEMENTARY-PROCEDURES-CLASS-2,

 ...

}

S1AP-ELEMENTARY-PROCEDURES-CLASS-1 S1AP-ELEMENTARY-PROCEDURE ::= {

 handoverPreparation |

 handoverResourceAllocation |

 pathSwitchRequest |

 e-RABSetup |

 e-RABModify |

 e-RABRelease |

 initialContextSetup |

 handoverCancel |

 kill |

 reset |

 s1Setup |

 uEContextModification |

 uEContextRelease |

 eNBConfigurationUpdate |

 mMEConfigurationUpdate |

 writeReplaceWarning ,

 ...,

 uERadioCapabilityMatch |

 e-RABModificationIndication |

 uEContextModificationIndication |

 uEContextSuspend |

 uEContextResume

}

S1AP-ELEMENTARY-PROCEDURES-CLASS-2 S1AP-ELEMENTARY-PROCEDURE ::= {

 handoverNotification |

 e-RABReleaseIndication |

 paging |

 downlinkNASTransport |

 initialUEMessage |

 uplinkNASTransport |

 errorIndication |

 nASNonDeliveryIndication |

 uEContextReleaseRequest |

 downlinkS1cdma2000tunnelling |

 uplinkS1cdma2000tunnelling |

 uECapabilityInfoIndication |

 eNBStatusTransfer |

 mMEStatusTransfer |

 deactivateTrace |

 traceStart |

 traceFailureIndication |

 cellTrafficTrace |

 locationReportingControl |

 locationReportingFailureIndication |

 locationReport |

 overloadStart |

 overloadStop |

 eNBDirectInformationTransfer |

 mMEDirectInformationTransfer |

 eNBConfigurationTransfer |

 mMEConfigurationTransfer |

 privateMessage ,

 ...,

 downlinkUEAssociatedLPPaTransport |

 uplinkUEAssociatedLPPaTransport |

 downlinkNonUEAssociatedLPPaTransport |

 uplinkNonUEAssociatedLPPaTransport |

 pWSRestartIndication |

 rerouteNASRequest |

 pWSFailureIndication |

 connectionEstablishmentIndication |

 nASDeliveryIndication |

 retrieveUEInformation |

 uEInformationTransfer |

 eNBCPRelocationIndication |

 mMECPRelocationIndication |

 secondaryRATDataUsageReport |

 handoverSuccess

}

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

--

-- Interface Elementary Procedures

--

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

handoverPreparation S1AP-ELEMENTARY-PROCEDURE ::= {

 INITIATING MESSAGE HandoverRequired

 SUCCESSFUL OUTCOME HandoverCommand

 UNSUCCESSFUL OUTCOME HandoverPreparationFailure

 PROCEDURE CODE id-HandoverPreparation

 CRITICALITY reject

}

handoverResourceAllocation S1AP-ELEMENTARY-PROCEDURE ::= {

 INITIATING MESSAGE HandoverRequest

 SUCCESSFUL OUTCOME HandoverRequestAcknowledge

 UNSUCCESSFUL OUTCOME HandoverFailure

 PROCEDURE CODE id-HandoverResourceAllocation

 CRITICALITY reject

}

handoverNotification S1AP-ELEMENTARY-PROCEDURE ::= {

 INITIATING MESSAGE HandoverNotify

 PROCEDURE CODE id-HandoverNotification

 CRITICALITY ignore

}

pathSwitchRequest S1AP-ELEMENTARY-PROCEDURE ::= {

 INITIATING MESSAGE PathSwitchRequest

 SUCCESSFUL OUTCOME PathSwitchRequestAcknowledge

 UNSUCCESSFUL OUTCOME PathSwitchRequestFailure

 PROCEDURE CODE id-PathSwitchRequest

 CRITICALITY reject

}

e-RABSetup S1AP-ELEMENTARY-PROCEDURE ::= {

 INITIATING MESSAGE E-RABSetupRequest

 SUCCESSFUL OUTCOME E-RABSetupResponse

 PROCEDURE CODE id-E-RABSetup

 CRITICALITY reject

}

e-RABModify S1AP-ELEMENTARY-PROCEDURE ::= {

 INITIATING MESSAGE E-RABModifyRequest

 SUCCESSFUL OUTCOME E-RABModifyResponse

 PROCEDURE CODE id-E-RABModify

 CRITICALITY reject

}

e-RABRelease S1AP-ELEMENTARY-PROCEDURE ::= {

 INITIATING MESSAGE E-RABReleaseCommand

 SUCCESSFUL OUTCOME E-RABReleaseResponse

 PROCEDURE CODE id-E-RABRelease

 CRITICALITY reject

}

e-RABReleaseIndication S1AP-ELEMENTARY-PROCEDURE ::= {

 INITIATING MESSAGE E-RABReleaseIndication

 PROCEDURE CODE id-E-RABReleaseIndication

 CRITICALITY ignore

}

initialContextSetup S1AP-ELEMENTARY-PROCEDURE ::= {

 INITIATING MESSAGE InitialContextSetupRequest

 SUCCESSFUL OUTCOME InitialContextSetupResponse

 UNSUCCESSFUL OUTCOME InitialContextSetupFailure

 PROCEDURE CODE id-InitialContextSetup

 CRITICALITY reject

}

uEContextReleaseRequest S1AP-ELEMENTARY-PROCEDURE ::= {

 INITIATING MESSAGE UEContextReleaseRequest

 PROCEDURE CODE id-UEContextReleaseRequest

 CRITICALITY ignore

}

paging S1AP-ELEMENTARY-PROCEDURE ::= {

 INITIATING MESSAGE Paging

 PROCEDURE CODE id-Paging

 CRITICALITY ignore

}

downlinkNASTransport S1AP-ELEMENTARY-PROCEDURE ::= {

 INITIATING MESSAGE DownlinkNASTransport

 PROCEDURE CODE id-downlinkNASTransport

 CRITICALITY ignore

}

initialUEMessage S1AP-ELEMENTARY-PROCEDURE ::= {

 INITIATING MESSAGE InitialUEMessage

 PROCEDURE CODE id-initialUEMessage

 CRITICALITY ignore

}

uplinkNASTransport S1AP-ELEMENTARY-PROCEDURE ::= {

 INITIATING MESSAGE UplinkNASTransport

 PROCEDURE CODE id-uplinkNASTransport

 CRITICALITY ignore

}

nASNonDeliveryIndication S1AP-ELEMENTARY-PROCEDURE ::= {

 INITIATING MESSAGE NASNonDeliveryIndication

 PROCEDURE CODE id-NASNonDeliveryIndication

 CRITICALITY ignore

}

handoverCancel S1AP-ELEMENTARY-PROCEDURE ::= {

 INITIATING MESSAGE HandoverCancel

 SUCCESSFUL OUTCOME HandoverCancelAcknowledge

 PROCEDURE CODE id-HandoverCancel

 CRITICALITY reject

}

reset S1AP-ELEMENTARY-PROCEDURE ::= {

 INITIATING MESSAGE Reset

 SUCCESSFUL OUTCOME ResetAcknowledge

 PROCEDURE CODE id-Reset

 CRITICALITY reject

}

errorIndication S1AP-ELEMENTARY-PROCEDURE ::= {

 INITIATING MESSAGE ErrorIndication

 PROCEDURE CODE id-ErrorIndication

 CRITICALITY ignore

}

s1Setup S1AP-ELEMENTARY-PROCEDURE ::= {

 INITIATING MESSAGE S1SetupRequest

 SUCCESSFUL OUTCOME S1SetupResponse

 UNSUCCESSFUL OUTCOME S1SetupFailure

 PROCEDURE CODE id-S1Setup

 CRITICALITY reject

}

eNBConfigurationUpdate S1AP-ELEMENTARY-PROCEDURE ::= {

 INITIATING MESSAGE ENBConfigurationUpdate

 SUCCESSFUL OUTCOME ENBConfigurationUpdateAcknowledge

 UNSUCCESSFUL OUTCOME ENBConfigurationUpdateFailure

 PROCEDURE CODE id-ENBConfigurationUpdate

 CRITICALITY reject

}

mMEConfigurationUpdate S1AP-ELEMENTARY-PROCEDURE ::= {

 INITIATING MESSAGE MMEConfigurationUpdate

 SUCCESSFUL OUTCOME MMEConfigurationUpdateAcknowledge

 UNSUCCESSFUL OUTCOME MMEConfigurationUpdateFailure

 PROCEDURE CODE id-MMEConfigurationUpdate

 CRITICALITY reject

}

downlinkS1cdma2000tunnelling S1AP-ELEMENTARY-PROCEDURE ::= {

 INITIATING MESSAGE DownlinkS1cdma2000tunnelling

 PROCEDURE CODE id-DownlinkS1cdma2000tunnelling

 CRITICALITY ignore

}

uplinkS1cdma2000tunnelling S1AP-ELEMENTARY-PROCEDURE ::= {

 INITIATING MESSAGE UplinkS1cdma2000tunnelling

 PROCEDURE CODE id-UplinkS1cdma2000tunnelling

 CRITICALITY ignore

}

uEContextModification S1AP-ELEMENTARY-PROCEDURE ::= {

 INITIATING MESSAGE UEContextModificationRequest

 SUCCESSFUL OUTCOME UEContextModificationResponse

 UNSUCCESSFUL OUTCOME UEContextModificationFailure

 PROCEDURE CODE id-UEContextModification

 CRITICALITY reject

}

uECapabilityInfoIndication S1AP-ELEMENTARY-PROCEDURE ::= {

 INITIATING MESSAGE UECapabilityInfoIndication

 PROCEDURE CODE id-UECapabilityInfoIndication

 CRITICALITY ignore

}

uEContextRelease S1AP-ELEMENTARY-PROCEDURE ::= {

 INITIATING MESSAGE UEContextReleaseCommand

 SUCCESSFUL OUTCOME UEContextReleaseComplete

 PROCEDURE CODE id-UEContextRelease

 CRITICALITY reject

}

eNBStatusTransfer S1AP-ELEMENTARY-PROCEDURE ::= {

 INITIATING MESSAGE ENBStatusTransfer

 PROCEDURE CODE id-eNBStatusTransfer

 CRITICALITY ignore

}

mMEStatusTransfer S1AP-ELEMENTARY-PROCEDURE ::= {

 INITIATING MESSAGE MMEStatusTransfer

 PROCEDURE CODE id-MMEStatusTransfer

 CRITICALITY ignore

}

deactivateTrace S1AP-ELEMENTARY-PROCEDURE ::= {

 INITIATING MESSAGE DeactivateTrace

 PROCEDURE CODE id-DeactivateTrace

 CRITICALITY ignore

}

traceStart S1AP-ELEMENTARY-PROCEDURE ::= {

 INITIATING MESSAGE TraceStart

 PROCEDURE CODE id-TraceStart

 CRITICALITY ignore

}

traceFailureIndication S1AP-ELEMENTARY-PROCEDURE ::= {

 INITIATING MESSAGE TraceFailureIndication

 PROCEDURE CODE id-TraceFailureIndication

 CRITICALITY ignore

}

cellTrafficTrace S1AP-ELEMENTARY-PROCEDURE ::={

INITIATING MESSAGE CellTrafficTrace

PROCEDURE CODE id-CellTrafficTrace

CRITICALITY ignore

}

locationReportingControl S1AP-ELEMENTARY-PROCEDURE ::= {

 INITIATING MESSAGE LocationReportingControl

 PROCEDURE CODE id-LocationReportingControl

 CRITICALITY ignore

}

locationReportingFailureIndication S1AP-ELEMENTARY-PROCEDURE ::= {

 INITIATING MESSAGE LocationReportingFailureIndication

 PROCEDURE CODE id-LocationReportingFailureIndication

 CRITICALITY ignore

}

locationReport S1AP-ELEMENTARY-PROCEDURE ::= {

 INITIATING MESSAGE LocationReport

 PROCEDURE CODE id-LocationReport

 CRITICALITY ignore

}

overloadStart S1AP-ELEMENTARY-PROCEDURE ::= {

 INITIATING MESSAGE OverloadStart

 PROCEDURE CODE id-OverloadStart

 CRITICALITY ignore

}

overloadStop S1AP-ELEMENTARY-PROCEDURE ::= {

 INITIATING MESSAGE OverloadStop

 PROCEDURE CODE id-OverloadStop

 CRITICALITY reject

}

writeReplaceWarning S1AP-ELEMENTARY-PROCEDURE ::= {

 INITIATING MESSAGE WriteReplaceWarningRequest

 SUCCESSFUL OUTCOME WriteReplaceWarningResponse

 PROCEDURE CODE id-WriteReplaceWarning

 CRITICALITY reject

}

eNBDirectInformationTransfer S1AP-ELEMENTARY-PROCEDURE ::= {

 INITIATING MESSAGE ENBDirectInformationTransfer

 PROCEDURE CODE id-eNBDirectInformationTransfer

 CRITICALITY ignore

}

mMEDirectInformationTransfer S1AP-ELEMENTARY-PROCEDURE ::= {

 INITIATING MESSAGE MMEDirectInformationTransfer

 PROCEDURE CODE id-MMEDirectInformationTransfer

 CRITICALITY ignore

}

eNBConfigurationTransfer S1AP-ELEMENTARY-PROCEDURE ::= {

 INITIATING MESSAGE ENBConfigurationTransfer

 PROCEDURE CODE id-eNBConfigurationTransfer

 CRITICALITY ignore

}

mMEConfigurationTransfer S1AP-ELEMENTARY-PROCEDURE ::= {

 INITIATING MESSAGE MMEConfigurationTransfer

 PROCEDURE CODE id-MMEConfigurationTransfer

 CRITICALITY ignore

}

privateMessage S1AP-ELEMENTARY-PROCEDURE ::= {

 INITIATING MESSAGE PrivateMessage

 PROCEDURE CODE id-PrivateMessage

 CRITICALITY ignore

}

pWSRestartIndication S1AP-ELEMENTARY-PROCEDURE ::= {

 INITIATING MESSAGE PWSRestartIndication

 PROCEDURE CODE id-PWSRestartIndication

 CRITICALITY ignore

}

kill S1AP-ELEMENTARY-PROCEDURE ::= {

 INITIATING MESSAGE KillRequest

 SUCCESSFUL OUTCOME KillResponse

 PROCEDURE CODE id-Kill

 CRITICALITY reject

}

downlinkUEAssociatedLPPaTransport S1AP-ELEMENTARY-PROCEDURE ::= {

 INITIATING MESSAGE DownlinkUEAssociatedLPPaTransport

 PROCEDURE CODE id-downlinkUEAssociatedLPPaTransport

 CRITICALITY ignore

}

uplinkUEAssociatedLPPaTransport S1AP-ELEMENTARY-PROCEDURE ::= {

 INITIATING MESSAGE UplinkUEAssociatedLPPaTransport

 PROCEDURE CODE id-uplinkUEAssociatedLPPaTransport

 CRITICALITY ignore

}

downlinkNonUEAssociatedLPPaTransport S1AP-ELEMENTARY-PROCEDURE ::= {

 INITIATING MESSAGE DownlinkNonUEAssociatedLPPaTransport

 PROCEDURE CODE id-downlinkNonUEAssociatedLPPaTransport

 CRITICALITY ignore

}

uplinkNonUEAssociatedLPPaTransport S1AP-ELEMENTARY-PROCEDURE ::= {

 INITIATING MESSAGE UplinkNonUEAssociatedLPPaTransport

 PROCEDURE CODE id-uplinkNonUEAssociatedLPPaTransport

 CRITICALITY ignore

}

uERadioCapabilityMatch S1AP-ELEMENTARY-PROCEDURE ::= {

 INITIATING MESSAGE UERadioCapabilityMatchRequest

 SUCCESSFUL OUTCOME UERadioCapabilityMatchResponse

 PROCEDURE CODE id-UERadioCapabilityMatch

 CRITICALITY reject

}

e-RABModificationIndication S1AP-ELEMENTARY-PROCEDURE ::= {

 INITIATING MESSAGE E-RABModificationIndication

 SUCCESSFUL OUTCOME E-RABModificationConfirm

 PROCEDURE CODE id-E-RABModificationIndication

 CRITICALITY reject

}

uEContextModificationIndication S1AP-ELEMENTARY-PROCEDURE ::= {

 INITIATING MESSAGE UEContextModificationIndication

 SUCCESSFUL OUTCOME UEContextModificationConfirm

 PROCEDURE CODE id-UEContextModificationIndication

 CRITICALITY reject

}

rerouteNASRequest S1AP-ELEMENTARY-PROCEDURE ::= {

 INITIATING MESSAGE RerouteNASRequest

 PROCEDURE CODE id-RerouteNASRequest

 CRITICALITY reject

}

pWSFailureIndication S1AP-ELEMENTARY-PROCEDURE ::= {

 INITIATING MESSAGE PWSFailureIndication

 PROCEDURE CODE id-PWSFailureIndication

 CRITICALITY ignore

}

uEContextSuspend S1AP-ELEMENTARY-PROCEDURE ::= {

 INITIATING MESSAGE UEContextSuspendRequest

 SUCCESSFUL OUTCOME UEContextSuspendResponse

 PROCEDURE CODE id-UEContextSuspend

 CRITICALITY reject

}

uEContextResume S1AP-ELEMENTARY-PROCEDURE ::= {

 INITIATING MESSAGE UEContextResumeRequest

 SUCCESSFUL OUTCOME UEContextResumeResponse

 UNSUCCESSFUL OUTCOME UEContextResumeFailure

 PROCEDURE CODE id-UEContextResume

 CRITICALITY reject

}

connectionEstablishmentIndication S1AP-ELEMENTARY-PROCEDURE ::= {

 INITIATING MESSAGE ConnectionEstablishmentIndication

 PROCEDURE CODE id-ConnectionEstablishmentIndication

 CRITICALITY reject

}

nASDeliveryIndication S1AP-ELEMENTARY-PROCEDURE ::= {

 INITIATING MESSAGE NASDeliveryIndication

 PROCEDURE CODE id-NASDeliveryIndication

 CRITICALITY ignore

}

retrieveUEInformation S1AP-ELEMENTARY-PROCEDURE ::= {

 INITIATING MESSAGE RetrieveUEInformation

 PROCEDURE CODE id-RetrieveUEInformation

 CRITICALITY reject

}

uEInformationTransfer S1AP-ELEMENTARY-PROCEDURE ::= {

 INITIATING MESSAGE UEInformationTransfer

 PROCEDURE CODE id-UEInformationTransfer

 CRITICALITY reject

}

eNBCPRelocationIndication S1AP-ELEMENTARY-PROCEDURE ::= {

 INITIATING MESSAGE ENBCPRelocationIndication

 PROCEDURE CODE id-eNBCPRelocationIndication

 CRITICALITY reject

}

mMECPRelocationIndication S1AP-ELEMENTARY-PROCEDURE ::= {

 INITIATING MESSAGE MMECPRelocationIndication

 PROCEDURE CODE id-MMECPRelocationIndication

 CRITICALITY reject

}

secondaryRATDataUsageReport S1AP-ELEMENTARY-PROCEDURE ::= {

 INITIATING MESSAGE SecondaryRATDataUsageReport

 PROCEDURE CODE id-SecondaryRATDataUsageReport

 CRITICALITY ignore

}

handoverSuccess S1AP-ELEMENTARY-PROCEDURE ::= {

 INITIATING MESSAGE HandoverSuccess

 PROCEDURE CODE id-HandoverSuccess

 CRITICALITY ignore

}

END

### 9.3.3 PDU Definitions

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

--

-- PDU definitions for S1AP.

--

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

S1AP-PDU-Contents {

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

eps-Access (21) modules (3) s1ap (1) version1 (1) s1ap-PDU-Contents (1) }

DEFINITIONS AUTOMATIC TAGS ::=

BEGIN

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

--

-- IE parameter types from other modules.

--

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

-- HANDOVER PREPARATION ELEMENTARY PROCEDURE

--

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

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

--

-- Handover Required

--

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

HandoverRequired ::= SEQUENCE {

 protocolIEs ProtocolIE-Container { { HandoverRequiredIEs} },

 ...

}

HandoverRequiredIEs S1AP-PROTOCOL-IES ::= {

 { ID id-MME-UE-S1AP-ID CRITICALITY reject TYPE MME-UE-S1AP-ID PRESENCE mandatory}|

 { ID id-eNB-UE-S1AP-ID CRITICALITY reject TYPE ENB-UE-S1AP-ID PRESENCE mandatory}|

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

 { ID id-Cause CRITICALITY ignore TYPE Cause PRESENCE mandatory}|

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

 { ID id-Direct-Forwarding-Path-Availability CRITICALITY ignore TYPE Direct-Forwarding-Path-Availability PRESENCE optional}|

 { ID id-SRVCCHOIndication CRITICALITY reject TYPE SRVCCHOIndication PRESENCE optional}|

 { ID id-Source-ToTarget-TransparentContainer CRITICALITY reject TYPE Source-ToTarget-TransparentContainer PRESENCE mandatory}|

 { ID id-Source-ToTarget-TransparentContainer-Secondary CRITICALITY reject TYPE Source-ToTarget-TransparentContainer PRESENCE optional}|

 { ID id-MSClassmark2 CRITICALITY reject TYPE MSClassmark2 PRESENCE conditional}|

 { ID id-MSClassmark3 CRITICALITY ignore TYPE MSClassmark3 PRESENCE conditional}|

 { ID id-CSG-Id CRITICALITY reject TYPE CSG-Id PRESENCE optional}|

 { ID id-CellAccessMode CRITICALITY reject TYPE CellAccessMode PRESENCE optional}|

 { ID id-PS-ServiceNotAvailable CRITICALITY ignore TYPE PS-ServiceNotAvailable PRESENCE optional},

 ...

}

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

--

-- Handover Command

--

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

HandoverCommand ::= SEQUENCE {

 protocolIEs ProtocolIE-Container { { HandoverCommandIEs} },

 ...

}

HandoverCommandIEs S1AP-PROTOCOL-IES ::= {

 { ID id-MME-UE-S1AP-ID CRITICALITY reject TYPE MME-UE-S1AP-ID PRESENCE mandatory}|

 { ID id-eNB-UE-S1AP-ID CRITICALITY reject TYPE ENB-UE-S1AP-ID PRESENCE mandatory}|

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

 { ID id-NASSecurityParametersfromE-UTRAN CRITICALITY reject TYPE NASSecurityParametersfromE-UTRAN PRESENCE conditional

 -- This IE shall be present if *HandoverType* IE is set to value "LTEtoUTRAN" or "LTEtoGERAN" --}|

 { ID id-E-RABSubjecttoDataForwardingList CRITICALITY ignore TYPE E-RABSubjecttoDataForwardingList PRESENCE optional}|

 { ID id-E-RABtoReleaseListHOCmd CRITICALITY ignore TYPE E-RABList PRESENCE optional}|

 { ID id-Target-ToSource-TransparentContainer CRITICALITY reject TYPE Target-ToSource-TransparentContainer PRESENCE mandatory}|

 { ID id-Target-ToSource-TransparentContainer-Secondary CRITICALITY reject TYPE Target-ToSource-TransparentContainer PRESENCE optional}|

 { ID id-CriticalityDiagnostics CRITICALITY ignore TYPE CriticalityDiagnostics PRESENCE optional},

 ...

}

E-RABSubjecttoDataForwardingList ::= E-RAB-IE-ContainerList { {E-RABDataForwardingItemIEs} }

E-RABDataForwardingItemIEs S1AP-PROTOCOL-IES ::= {

 { ID id-E-RABDataForwardingItem CRITICALITY ignore TYPE E-RABDataForwardingItem PRESENCE mandatory },

 ...

}

E-RABDataForwardingItem ::= SEQUENCE {

 e-RAB-ID E-RAB-ID,

 dL-transportLayerAddress TransportLayerAddress OPTIONAL,

 dL-gTP-TEID GTP-TEID OPTIONAL,

 uL-TransportLayerAddress TransportLayerAddress OPTIONAL,

 uL-GTP-TEID GTP-TEID OPTIONAL,

 iE-Extensions ProtocolExtensionContainer { { E-RABDataForwardingItem-ExtIEs} } OPTIONAL,

 ...

}

E-RABDataForwardingItem-ExtIEs S1AP-PROTOCOL-EXTENSION ::= {

 ...

}

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

--

-- Handover Preparation Failure

--

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

HandoverPreparationFailure ::= SEQUENCE {

 protocolIEs ProtocolIE-Container { { HandoverPreparationFailureIEs} },

 ...

}

HandoverPreparationFailureIEs S1AP-PROTOCOL-IES ::= {

 { ID id-MME-UE-S1AP-ID CRITICALITY ignore TYPE MME-UE-S1AP-ID PRESENCE mandatory }|

 { ID id-eNB-UE-S1AP-ID CRITICALITY ignore TYPE ENB-UE-S1AP-ID PRESENCE mandatory }|

 { ID id-Cause CRITICALITY ignore TYPE Cause PRESENCE mandatory }|

 { ID id-CriticalityDiagnostics CRITICALITY ignore TYPE CriticalityDiagnostics PRESENCE optional },

 ...

}

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

--

-- HANDOVER RESOURCE ALLOCATION ELEMENTARY PROCEDURE

--

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

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

--

-- Handover Request

--

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

HandoverRequest ::= SEQUENCE {

 protocolIEs ProtocolIE-Container { {HandoverRequestIEs} },

 ...

}

HandoverRequestIEs S1AP-PROTOCOL-IES ::= {

 { ID id-MME-UE-S1AP-ID CRITICALITY reject TYPE MME-UE-S1AP-ID PRESENCE mandatory}|

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

 { ID id-Cause CRITICALITY ignore TYPE Cause PRESENCE mandatory}|

 { ID id-uEaggregateMaximumBitrate CRITICALITY reject TYPE UEAggregateMaximumBitrate PRESENCE mandatory}|

 { ID id-E-RABToBeSetupListHOReq CRITICALITY reject TYPE E-RABToBeSetupListHOReq PRESENCE mandatory}|

 { ID id-Source-ToTarget-TransparentContainer CRITICALITY reject TYPE Source-ToTarget-TransparentContainer PRESENCE mandatory}|

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

 { ID id-HandoverRestrictionList CRITICALITY ignore TYPE HandoverRestrictionList PRESENCE optional}|

 { ID id-TraceActivation CRITICALITY ignore TYPE TraceActivation PRESENCE optional}|

 { ID id-RequestType CRITICALITY ignore TYPE RequestType PRESENCE optional}|

 { ID id-SRVCCOperationPossible CRITICALITY ignore TYPE SRVCCOperationPossible PRESENCE optional}|

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

 { ID id-NASSecurityParameterstoE-UTRAN CRITICALITY reject TYPE NASSecurityParameterstoE-UTRAN PRESENCE conditional

 -- This IE shall be present if the Handover Type IE is set to the value "UTRANtoLTE" or "GERANtoLTE" -- }|

 { ID id-CSG-Id CRITICALITY reject TYPE CSG-Id PRESENCE optional}|

 { ID id-CSGMembershipStatus CRITICALITY ignore TYPE CSGMembershipStatus PRESENCE optional}|

 { ID id-GUMMEI-ID CRITICALITY ignore TYPE GUMMEI PRESENCE optional}|

 { ID id-MME-UE-S1AP-ID-2 CRITICALITY ignore TYPE MME-UE-S1AP-ID PRESENCE optional}|

 { ID id-ManagementBasedMDTAllowed CRITICALITY ignore TYPE ManagementBasedMDTAllowed PRESENCE optional}|

 { ID id-ManagementBasedMDTPLMNList CRITICALITY ignore TYPE MDTPLMNList PRESENCE optional}|

 { ID id-Masked-IMEISV CRITICALITY ignore TYPE Masked-IMEISV PRESENCE optional}|

 { ID id-ExpectedUEBehaviour CRITICALITY ignore TYPE ExpectedUEBehaviour PRESENCE optional}|

 { ID id-ProSeAuthorized CRITICALITY ignore TYPE ProSeAuthorized PRESENCE optional}|

 { ID id-UEUserPlaneCIoTSupportIndicator CRITICALITY ignore TYPE UEUserPlaneCIoTSupportIndicator PRESENCE optional}|

 { ID id-V2XServicesAuthorized CRITICALITY ignore TYPE V2XServicesAuthorized PRESENCE optional}|

 { ID id-UESidelinkAggregateMaximumBitrate CRITICALITY ignore TYPE UESidelinkAggregateMaximumBitrate PRESENCE optional}|

 { ID id-EnhancedCoverageRestricted CRITICALITY ignore TYPE EnhancedCoverageRestricted PRESENCE optional}|

 { ID id-NRUESecurityCapabilities CRITICALITY ignore TYPE NRUESecurityCapabilities PRESENCE optional}|

 { ID id-CE-ModeBRestricted CRITICALITY ignore TYPE CE-ModeBRestricted PRESENCE optional}|

 { ID id-AerialUEsubscriptionInformation CRITICALITY ignore TYPE AerialUEsubscriptionInformation PRESENCE optional}|

 { ID id-PendingDataIndication CRITICALITY ignore TYPE PendingDataIndication PRESENCE optional}|

 { ID id-Subscription-Based-UE-DifferentiationInfo CRITICALITY ignore TYPE Subscription-Based-UE-DifferentiationInfo PRESENCE optional}|

 { ID id-AdditionalRRMPriorityIndex CRITICALITY ignore TYPE AdditionalRRMPriorityIndex PRESENCE optional },

 ...

}

E-RABToBeSetupListHOReq ::= E-RAB-IE-ContainerList { {E-RABToBeSetupItemHOReqIEs} }

E-RABToBeSetupItemHOReqIEs S1AP-PROTOCOL-IES ::= {

 { ID id-E-RABToBeSetupItemHOReq CRITICALITY reject TYPE E-RABToBeSetupItemHOReq PRESENCE mandatory },

 ...

}

E-RABToBeSetupItemHOReq ::= SEQUENCE {

 e-RAB-ID E-RAB-ID,

 transportLayerAddress TransportLayerAddress,

 gTP-TEID GTP-TEID,

 e-RABlevelQosParameters E-RABLevelQoSParameters,

 iE-Extensions ProtocolExtensionContainer { {E-RABToBeSetupItemHOReq-ExtIEs} } OPTIONAL,

 ...

}

E-RABToBeSetupItemHOReq-ExtIEs S1AP-PROTOCOL-EXTENSION ::= {

 { ID id-Data-Forwarding-Not-Possible CRITICALITY ignore EXTENSION Data-Forwarding-Not-Possible PRESENCE optional}|

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

 ...

}

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

--

-- Handover Request Acknowledge

--

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

HandoverRequestAcknowledge ::= SEQUENCE {

 protocolIEs ProtocolIE-Container { {HandoverRequestAcknowledgeIEs} },

 ...

}

HandoverRequestAcknowledgeIEs S1AP-PROTOCOL-IES ::= {

 { ID id-MME-UE-S1AP-ID CRITICALITY ignore TYPE MME-UE-S1AP-ID PRESENCE mandatory}|

 { ID id-eNB-UE-S1AP-ID CRITICALITY ignore TYPE ENB-UE-S1AP-ID PRESENCE mandatory}|

 { ID id-E-RABAdmittedList CRITICALITY ignore TYPE E-RABAdmittedList PRESENCE mandatory}|

 { ID id-E-RABFailedToSetupListHOReqAck CRITICALITY ignore TYPE E-RABFailedtoSetupListHOReqAck PRESENCE optional}|

 { ID id-Target-ToSource-TransparentContainer CRITICALITY reject TYPE Target-ToSource-TransparentContainer PRESENCE mandatory}|

 { ID id-CSG-Id CRITICALITY ignore TYPE CSG-Id PRESENCE optional}|

 { ID id-CriticalityDiagnostics CRITICALITY ignore TYPE CriticalityDiagnostics PRESENCE optional}|

 { ID id-CellAccessMode CRITICALITY ignore TYPE CellAccessMode PRESENCE optional}|

 { ID id-CE-mode-B-SupportIndicator CRITICALITY ignore TYPE CE-mode-B-SupportIndicator PRESENCE optional},

 ...

}

E-RABAdmittedList ::= E-RAB-IE-ContainerList { {E-RABAdmittedItemIEs} }

E-RABAdmittedItemIEs S1AP-PROTOCOL-IES ::= {

 { ID id-E-RABAdmittedItem CRITICALITY ignore TYPE E-RABAdmittedItem PRESENCE mandatory },

 ...

}

E-RABAdmittedItem ::= SEQUENCE {

 e-RAB-ID E-RAB-ID,

 transportLayerAddress TransportLayerAddress,

 gTP-TEID GTP-TEID,

 dL-transportLayerAddress TransportLayerAddress OPTIONAL,

 dL-gTP-TEID GTP-TEID OPTIONAL,

 uL-TransportLayerAddress TransportLayerAddress OPTIONAL,

 uL-GTP-TEID GTP-TEID OPTIONAL,

 iE-Extensions ProtocolExtensionContainer { {E-RABAdmittedItem-ExtIEs} } OPTIONAL,

 ...

}

E-RABAdmittedItem-ExtIEs S1AP-PROTOCOL-EXTENSION ::= {

 ...

}

E-RABFailedtoSetupListHOReqAck ::= E-RAB-IE-ContainerList { {E-RABFailedtoSetupItemHOReqAckIEs} }

E-RABFailedtoSetupItemHOReqAckIEs S1AP-PROTOCOL-IES ::= {

 { ID id-E-RABFailedtoSetupItemHOReqAck CRITICALITY ignore TYPE E-RABFailedToSetupItemHOReqAck PRESENCE mandatory },

 ...

}

E-RABFailedToSetupItemHOReqAck ::= SEQUENCE {

 e-RAB-ID E-RAB-ID,

 cause Cause,

 iE-Extensions ProtocolExtensionContainer { { E-RABFailedToSetupItemHOReqAckExtIEs} } OPTIONAL,

 ...

}

E-RABFailedToSetupItemHOReqAckExtIEs S1AP-PROTOCOL-EXTENSION ::= {

 ...

}

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

--

-- Handover Failure

--

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

HandoverFailure ::= SEQUENCE {

 protocolIEs ProtocolIE-Container { { HandoverFailureIEs} },

 ...

}

HandoverFailureIEs S1AP-PROTOCOL-IES ::= {

 { ID id-MME-UE-S1AP-ID CRITICALITY ignore TYPE MME-UE-S1AP-ID PRESENCE mandatory }|

 { ID id-Cause CRITICALITY ignore TYPE Cause PRESENCE mandatory }|

 { ID id-CriticalityDiagnostics CRITICALITY ignore TYPE CriticalityDiagnostics PRESENCE optional },

 ...

}

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

--

-- HANDOVER NOTIFICATION ELEMENTARY PROCEDURE

--

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

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

--

-- Handover Notify

--

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

HandoverNotify ::= SEQUENCE {

 protocolIEs ProtocolIE-Container { { HandoverNotifyIEs} },

 ...

}

HandoverNotifyIEs S1AP-PROTOCOL-IES ::= {

 { ID id-MME-UE-S1AP-ID CRITICALITY reject TYPE MME-UE-S1AP-ID PRESENCE mandatory}|

 { ID id-eNB-UE-S1AP-ID CRITICALITY reject TYPE ENB-UE-S1AP-ID PRESENCE mandatory}|

 { ID id-EUTRAN-CGI CRITICALITY ignore TYPE EUTRAN-CGI PRESENCE mandatory}|

 { ID id-TAI CRITICALITY ignore TYPE TAI PRESENCE mandatory}|

-- Extension for Release 11 to support BBAI --

 { ID id-Tunnel-Information-for-BBF CRITICALITY ignore TYPE TunnelInformation PRESENCE optional}|

 { ID id-LHN-ID CRITICALITY ignore TYPE LHN-ID PRESENCE optional}|

 { ID id-PSCellInformation CRITICALITY ignore TYPE PSCellInformation PRESENCE optional },

 ...

}

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

--

-- PATH SWITCH REQUEST ELEMENTARY PROCEDURE

--

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

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

--

-- Path Switch Request

--

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

PathSwitchRequest ::= SEQUENCE {

 protocolIEs ProtocolIE-Container { { PathSwitchRequestIEs} },

 ...

}

PathSwitchRequestIEs S1AP-PROTOCOL-IES ::= {

 { ID id-eNB-UE-S1AP-ID CRITICALITY reject TYPE ENB-UE-S1AP-ID PRESENCE mandatory}|

 { ID id-E-RABToBeSwitchedDLList CRITICALITY reject TYPE E-RABToBeSwitchedDLList PRESENCE mandatory}|

 { ID id-SourceMME-UE-S1AP-ID CRITICALITY reject TYPE MME-UE-S1AP-ID PRESENCE mandatory}|

 { ID id-EUTRAN-CGI CRITICALITY ignore TYPE EUTRAN-CGI PRESENCE mandatory}|

 { ID id-TAI CRITICALITY ignore TYPE TAI PRESENCE mandatory}|

 { ID id-UESecurityCapabilities CRITICALITY ignore TYPE UESecurityCapabilities PRESENCE mandatory}|

 { ID id-CSG-Id CRITICALITY ignore TYPE CSG-Id PRESENCE optional}|

 { ID id-CellAccessMode CRITICALITY ignore TYPE CellAccessMode PRESENCE optional}|

 { ID id-SourceMME-GUMMEI CRITICALITY ignore TYPE GUMMEI PRESENCE optional}|

 { ID id-CSGMembershipStatus CRITICALITY ignore TYPE CSGMembershipStatus PRESENCE optional}|

-- Extension for Release 11 to support BBAI --

 { ID id-Tunnel-Information-for-BBF CRITICALITY ignore TYPE TunnelInformation PRESENCE optional}|

 { ID id-LHN-ID CRITICALITY ignore TYPE LHN-ID PRESENCE optional}|

 { ID id-RRC-Resume-Cause CRITICALITY ignore TYPE RRC-Establishment-Cause PRESENCE optional }|

 { ID id-NRUESecurityCapabilities CRITICALITY ignore TYPE NRUESecurityCapabilities PRESENCE optional}|

 { ID id-PSCellInformation CRITICALITY ignore TYPE PSCellInformation PRESENCE optional },

 ...

}

E-RABToBeSwitchedDLList ::= E-RAB-IE-ContainerList { {E-RABToBeSwitchedDLItemIEs} }

E-RABToBeSwitchedDLItemIEs S1AP-PROTOCOL-IES ::= {

 { ID id-E-RABToBeSwitchedDLItem CRITICALITY reject TYPE E-RABToBeSwitchedDLItem PRESENCE mandatory },

 ...

}

E-RABToBeSwitchedDLItem ::= SEQUENCE {

 e-RAB-ID E-RAB-ID,

 transportLayerAddress TransportLayerAddress,

 gTP-TEID GTP-TEID,

 iE-Extensions ProtocolExtensionContainer { { E-RABToBeSwitchedDLItem-ExtIEs} } OPTIONAL,

 ...

}

E-RABToBeSwitchedDLItem-ExtIEs S1AP-PROTOCOL-EXTENSION ::= {

 ...

}

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

--

-- Path Switch Request Acknowledge

--

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

PathSwitchRequestAcknowledge ::= SEQUENCE {

 protocolIEs ProtocolIE-Container { { PathSwitchRequestAcknowledgeIEs} },

 ...

}

PathSwitchRequestAcknowledgeIEs S1AP-PROTOCOL-IES ::= {

 { ID id-MME-UE-S1AP-ID CRITICALITY ignore TYPE MME-UE-S1AP-ID PRESENCE mandatory}|

 { ID id-eNB-UE-S1AP-ID CRITICALITY ignore TYPE ENB-UE-S1AP-ID PRESENCE mandatory}|

 { ID id-uEaggregateMaximumBitrate CRITICALITY ignore TYPE UEAggregateMaximumBitrate PRESENCE optional}|

 { ID id-E-RABToBeSwitchedULList CRITICALITY ignore TYPE E-RABToBeSwitchedULList PRESENCE optional}|

 { ID id-E-RABToBeReleasedList CRITICALITY ignore TYPE E-RABList PRESENCE optional}|

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

 { ID id-CriticalityDiagnostics CRITICALITY ignore TYPE CriticalityDiagnostics PRESENCE optional}|

 { ID id-MME-UE-S1AP-ID-2 CRITICALITY ignore TYPE MME-UE-S1AP-ID PRESENCE optional}|

 { ID id-CSGMembershipStatus CRITICALITY ignore TYPE CSGMembershipStatus PRESENCE optional}|

 { ID id-ProSeAuthorized CRITICALITY ignore TYPE ProSeAuthorized PRESENCE optional}|

 { ID id-UEUserPlaneCIoTSupportIndicator CRITICALITY ignore TYPE UEUserPlaneCIoTSupportIndicator PRESENCE optional}|

 { ID id-V2XServicesAuthorized CRITICALITY ignore TYPE V2XServicesAuthorized PRESENCE optional}|

 { ID id-UESidelinkAggregateMaximumBitrate CRITICALITY ignore TYPE UESidelinkAggregateMaximumBitrate PRESENCE optional}|

 { ID id-EnhancedCoverageRestricted CRITICALITY ignore TYPE EnhancedCoverageRestricted PRESENCE optional}|

 { ID id-NRUESecurityCapabilities CRITICALITY ignore TYPE NRUESecurityCapabilities PRESENCE optional}|

 { ID id-CE-ModeBRestricted CRITICALITY ignore TYPE CE-ModeBRestricted PRESENCE optional}|

 { ID id-AerialUEsubscriptionInformation CRITICALITY ignore TYPE AerialUEsubscriptionInformation PRESENCE optional}|

 { ID id-PendingDataIndication CRITICALITY ignore TYPE PendingDataIndication PRESENCE optional}|

 { ID id-Subscription-Based-UE-DifferentiationInfo CRITICALITY ignore TYPE Subscription-Based-UE-DifferentiationInfo PRESENCE optional}|

 { ID id-HandoverRestrictionList CRITICALITY ignore TYPE HandoverRestrictionList PRESENCE optional}|

 { ID id-AdditionalRRMPriorityIndex CRITICALITY ignore TYPE AdditionalRRMPriorityIndex PRESENCE optional },

 ...

}

E-RABToBeSwitchedULList ::= E-RAB-IE-ContainerList { {E-RABToBeSwitchedULItemIEs} }

E-RABToBeSwitchedULItemIEs S1AP-PROTOCOL-IES ::= {

 { ID id-E-RABToBeSwitchedULItem CRITICALITY ignore TYPE E-RABToBeSwitchedULItem PRESENCE mandatory },

 ...

}

E-RABToBeSwitchedULItem ::= SEQUENCE {

 e-RAB-ID E-RAB-ID,

 transportLayerAddress TransportLayerAddress,

 gTP-TEID GTP-TEID,

 iE-Extensions ProtocolExtensionContainer { { E-RABToBeSwitchedULItem-ExtIEs} } OPTIONAL,

 ...

}

E-RABToBeSwitchedULItem-ExtIEs S1AP-PROTOCOL-EXTENSION ::= {

 ...

}

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

--

-- Path Switch Request Failure

--

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

PathSwitchRequestFailure ::= SEQUENCE {

 protocolIEs ProtocolIE-Container { { PathSwitchRequestFailureIEs} },

 ...

}

PathSwitchRequestFailureIEs S1AP-PROTOCOL-IES ::= {

 { ID id-MME-UE-S1AP-ID CRITICALITY ignore TYPE MME-UE-S1AP-ID PRESENCE mandatory }|

 { ID id-eNB-UE-S1AP-ID CRITICALITY ignore TYPE ENB-UE-S1AP-ID PRESENCE mandatory }|

 { ID id-Cause CRITICALITY ignore TYPE Cause PRESENCE mandatory }|

 { ID id-CriticalityDiagnostics CRITICALITY ignore TYPE CriticalityDiagnostics PRESENCE optional },

 ...

}

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

--

-- HANDOVER CANCEL ELEMENTARY PROCEDURE

--

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

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

--

-- Handover Cancel

--

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

HandoverCancel ::= SEQUENCE {

 protocolIEs ProtocolIE-Container { { HandoverCancelIEs} },

 ...

}

HandoverCancelIEs S1AP-PROTOCOL-IES ::= {

 { ID id-MME-UE-S1AP-ID CRITICALITY reject TYPE MME-UE-S1AP-ID PRESENCE mandatory }|

 { ID id-eNB-UE-S1AP-ID CRITICALITY reject TYPE ENB-UE-S1AP-ID PRESENCE mandatory }|

 { ID id-Cause CRITICALITY ignore TYPE Cause PRESENCE mandatory },

 ...

}

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

--

-- Handover Cancel Request Acknowledge

--

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

HandoverCancelAcknowledge ::= SEQUENCE {

 protocolIEs ProtocolIE-Container { { HandoverCancelAcknowledgeIEs} },

 ...

}

HandoverCancelAcknowledgeIEs S1AP-PROTOCOL-IES ::= {

 { ID id-MME-UE-S1AP-ID CRITICALITY ignore TYPE MME-UE-S1AP-ID PRESENCE mandatory }|

 { ID id-eNB-UE-S1AP-ID CRITICALITY ignore TYPE ENB-UE-S1AP-ID PRESENCE mandatory }|

 { ID id-CriticalityDiagnostics CRITICALITY ignore TYPE CriticalityDiagnostics PRESENCE optional },

 ...

}

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

--

-- HANDOVER SUCCESS ELEMENTARY PROCEDURE

--

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

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

--

-- Handover Success

--

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

HandoverSuccess ::= SEQUENCE {

 protocolIEs ProtocolIE-Container { { HandoverSuccessIEs} },

 ...

}

HandoverSuccessIEs S1AP-PROTOCOL-IES ::= {

 { ID id-MME-UE-S1AP-ID CRITICALITY reject TYPE MME-UE-S1AP-ID PRESENCE mandatory}|

 { ID id-eNB-UE-S1AP-ID CRITICALITY reject TYPE ENB-UE-S1AP-ID PRESENCE mandatory},

 ...

}

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

--

-- E-RAB SETUP ELEMENTARY PROCEDURE

--

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

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

--

-- E-RAB Setup Request

--

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

E-RABSetupRequest ::= SEQUENCE {

 protocolIEs ProtocolIE-Container { {E-RABSetupRequestIEs} },

 ...

}

E-RABSetupRequestIEs S1AP-PROTOCOL-IES ::= {

 { ID id-MME-UE-S1AP-ID CRITICALITY reject TYPE MME-UE-S1AP-ID PRESENCE mandatory }|

 { ID id-eNB-UE-S1AP-ID CRITICALITY reject TYPE ENB-UE-S1AP-ID PRESENCE mandatory }|

 { ID id-uEaggregateMaximumBitrate CRITICALITY reject TYPE UEAggregateMaximumBitrate PRESENCE optional }|

 { ID id-E-RABToBeSetupListBearerSUReq CRITICALITY reject TYPE E-RABToBeSetupListBearerSUReq PRESENCE mandatory },

 ...

}

E-RABToBeSetupListBearerSUReq ::= SEQUENCE (SIZE(1.. maxnoofE-RABs)) OF ProtocolIE-SingleContainer { {E-RABToBeSetupItemBearerSUReqIEs} }

E-RABToBeSetupItemBearerSUReqIEs S1AP-PROTOCOL-IES ::= {

 { ID id-E-RABToBeSetupItemBearerSUReq CRITICALITY reject TYPE E-RABToBeSetupItemBearerSUReq PRESENCE mandatory },

 ...

}

E-RABToBeSetupItemBearerSUReq ::= SEQUENCE {

 e-RAB-ID E-RAB-ID,

 e-RABlevelQoSParameters E-RABLevelQoSParameters,

 transportLayerAddress TransportLayerAddress,

 gTP-TEID GTP-TEID,

 nAS-PDU NAS-PDU,

 iE-Extensions ProtocolExtensionContainer { {E-RABToBeSetupItemBearerSUReqExtIEs} } OPTIONAL,

 ...

}

E-RABToBeSetupItemBearerSUReqExtIEs S1AP-PROTOCOL-EXTENSION ::= {

 { ID id-Correlation-ID CRITICALITY ignore EXTENSION Correlation-ID PRESENCE optional}|

 { ID id-SIPTO-Correlation-ID CRITICALITY ignore EXTENSION Correlation-ID PRESENCE optional}|

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

 ...

}

### 9.3.4 Information Element Definitions

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

--

-- Information Element Definitions

--

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

S1AP-IEs {

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

eps-Access (21) modules (3) s1ap (1) version1 (1) s1ap-IEs (2) }

DEFINITIONS AUTOMATIC TAGS ::=

BEGIN

IMPORTS

 id-E-RABInformationListItem,

 id-E-RABItem,

 id-Bearers-SubjectToStatusTransfer-Item,

 id-Time-Synchronisation-Info,

 id-x2TNLConfigurationInfo,

 id-eNBX2ExtendedTransportLayerAddresses,

 id-MDTConfiguration,

 id-Time-UE-StayedInCell-EnhancedGranularity,

 id-HO-Cause,

 id-M3Configuration,

 id-M4Configuration,

 id-M5Configuration,

 id-MDT-Location-Info,

 id-SignallingBasedMDTPLMNList,

 id-MobilityInformation,

 id-ULCOUNTValueExtended,

 id-DLCOUNTValueExtended,

 id-ReceiveStatusOfULPDCPSDUsExtended,

 id-eNBIndirectX2TransportLayerAddresses,

 id-Muting-Availability-Indication,

 id-Muting-Pattern-Information,

 id-NRrestrictioninEPSasSecondaryRAT,

 id-NRrestrictionin5GS,

 id-Synchronisation-Information,

 id-uE-HistoryInformationFromTheUE,

 id-LoggedMBSFNMDT,

 id-SON-Information-Report,

 id-RecommendedCellItem,

 id-RecommendedENBItem,

 id-ProSeUEtoNetworkRelaying,

 id-ULCOUNTValuePDCP-SNlength18,

 id-DLCOUNTValuePDCP-SNlength18,

 id-ReceiveStatusOfULPDCPSDUsPDCP-SNlength18,

 id-M6Configuration,

 id-M7Configuration,

 id-RAT-Type,

 id-extended-e-RAB-MaximumBitrateDL,

 id-extended-e-RAB-MaximumBitrateUL,

 id-extended-e-RAB-GuaranteedBitrateDL,

 id-extended-e-RAB-GuaranteedBitrateUL,

 id-extended-uEaggregateMaximumBitRateDL,

 id-extended-uEaggregateMaximumBitRateUL,

 id-SecondaryRATDataUsageReportItem,

 id-E-RABUsageReportItem,

 id-UEAppLayerMeasConfig,

 id-serviceType,

 id-UnlicensedSpectrumRestriction,

 id-CNTypeRestrictions,

 id-DownlinkPacketLossRate,

 id-UplinkPacketLossRate,

 id-BluetoothMeasurementConfiguration,

 id-WLANMeasurementConfiguration,

 id-LastNG-RANPLMNIdentity,

 id-PSCellInformation,

 id-IMSvoiceEPSfallbackfrom5G,

 id-RequestTypeAdditionalInfo,

 id-DAPSInfo,

 id-DAPSResponseInfo,

 maxnoofCSGs,

 maxnoofE-RABs,

 maxnoofErrors,

 maxnoofBPLMNs,

 maxnoofPLMNsPerMME,

 maxnoofTACs,

 maxnoofEPLMNs,

 maxnoofEPLMNsPlusOne,

 maxnoofForbLACs,

 maxnoofForbTACs,

 maxnoofCellsinUEHistoryInfo,

 maxnoofCellID,

 maxnoofDCNs,

 maxnoofEmergencyAreaID,

 maxnoofTAIforWarning,

 maxnoofCellinTAI,

 maxnoofCellinEAI,

 maxnoofeNBX2TLAs,

 maxnoofeNBX2ExtTLAs,

 maxnoofeNBX2GTPTLAs,

 maxnoofRATs,

 maxnoofGroupIDs,

 maxnoofMMECs,

 maxnoofTAforMDT,

 maxnoofCellIDforMDT,

 maxnoofMDTPLMNs,

 maxnoofCellsforRestart,

 maxnoofRestartTAIs,

 maxnoofRestartEmergencyAreaIDs,

 maxnoofMBSFNAreaMDT,

 maxEARFCN,

 maxnoofCellsineNB,

 maxnoofRecommendedCells,

 maxnoofRecommendedENBs,

 maxnooftimeperiods,

 maxnoofCellIDforQMC,

 maxnoofTAforQMC,

 maxnoofPLMNforQMC,

 maxnoofBluetoothName,

 maxnoofWLANName,

 maxnoofConnectedengNBs

FROM S1AP-Constants

//////////////////////////////////////////////////////////////////////// unchange skipped ///////////////////////////////////////////////////////////////////////

-- D

DataCodingScheme ::= BIT STRING (SIZE (8))

DAPSInfo ::= SEQUENCE {

 DAPSIndicator ENUMERATED {DAPS-required, ...},

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

 ...

}

DAPSInfo-ExtIEs S1AP-PROTOCOL-EXTENSION ::= {

 ...

}

DAPSResponseInfo ::= SEQUENCE {

 dapsresponseindicator ENUMERATED {dapshoaccepted, fallback-to-legacy-HO, fallback-to-rel14-MBB,...},

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

 ...

}

DAPSResponseInfo-ExtIEs S1AP-PROTOCOL-EXTENSION ::= {

 ...

}

DCN-ID ::= INTEGER (0..65535)

ServedDCNs ::= SEQUENCE (SIZE(0..maxnoofDCNs)) OF ServedDCNsItem

ServedDCNsItem ::= SEQUENCE {

 dCN-ID DCN-ID,

 relativeDCNCapacity RelativeMMECapacity,

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

 ...

}

ServedDCNsItem-ExtIEs S1AP-PROTOCOL-EXTENSION ::= {

 ...

}

DL-CP-SecurityInformation ::= SEQUENCE {

 dl-NAS-MAC DL-NAS-MAC,

 iE-Extensions ProtocolExtensionContainer { { DL-CP-SecurityInformation-ExtIEs} } OPTIONAL,

 ...

}

DL-CP-SecurityInformation-ExtIEs S1AP-PROTOCOL-EXTENSION ::= {

 ...

}

DL-Forwarding ::= ENUMERATED {

 dL-Forwarding-proposed,

 ...

}

DL-NAS-MAC ::= BIT STRING (SIZE (16))

Direct-Forwarding-Path-Availability ::= ENUMERATED {

 directPathAvailable,

 ...

}

Data-Forwarding-Not-Possible ::= ENUMERATED {

 data-Forwarding-not-Possible,

 ...

}

DLNASPDUDeliveryAckRequest ::= ENUMERATED {

 requested,

 ...

}

-- E

EARFCN ::= INTEGER(0..maxEARFCN, ...)

ECGIList ::= SEQUENCE (SIZE(1..maxnoofCellID)) OF EUTRAN-CGI

PWSfailedECGIList ::= SEQUENCE (SIZE(1..maxnoofCellsineNB)) OF EUTRAN-CGI

EDT-Session ::= ENUMERATED {

 true,

 ...

}

EmergencyAreaIDList ::= SEQUENCE (SIZE(1..maxnoofEmergencyAreaID)) OF EmergencyAreaID

EmergencyAreaID ::= OCTET STRING (SIZE (3))

EmergencyAreaID-Broadcast ::= SEQUENCE (SIZE(1..maxnoofEmergencyAreaID)) OF EmergencyAreaID-Broadcast-Item

EmergencyAreaID-Broadcast-Item ::= SEQUENCE {

 emergencyAreaID EmergencyAreaID,

 completedCellinEAI CompletedCellinEAI,

 iE-Extensions ProtocolExtensionContainer { {EmergencyAreaID-Broadcast-Item-ExtIEs} } OPTIONAL,

 ...

}

EmergencyAreaID-Broadcast-Item-ExtIEs S1AP-PROTOCOL-EXTENSION ::= {

 ...

}

EmergencyAreaID-Cancelled ::= SEQUENCE (SIZE(1..maxnoofEmergencyAreaID)) OF EmergencyAreaID-Cancelled-Item

EmergencyAreaID-Cancelled-Item ::= SEQUENCE {

 emergencyAreaID EmergencyAreaID,

 cancelledCellinEAI CancelledCellinEAI,

 iE-Extensions ProtocolExtensionContainer { {EmergencyAreaID-Cancelled-Item-ExtIEs} } OPTIONAL,

 ...

}

EmergencyAreaID-Cancelled-Item-ExtIEs S1AP-PROTOCOL-EXTENSION ::= {

 ...

}

CompletedCellinEAI ::= SEQUENCE (SIZE(1..maxnoofCellinEAI)) OF CompletedCellinEAI-Item

CompletedCellinEAI-Item ::= SEQUENCE {

 eCGI EUTRAN-CGI,

 iE-Extensions ProtocolExtensionContainer { {CompletedCellinEAI-Item-ExtIEs} } OPTIONAL,

 ...

}

CompletedCellinEAI-Item-ExtIEs S1AP-PROTOCOL-EXTENSION ::= {

 ...

}

ECGI-List ::= SEQUENCE (SIZE(1..maxnoofCellsineNB)) OF EUTRAN-CGI

EmergencyAreaIDListForRestart ::= SEQUENCE (SIZE(1..maxnoofRestartEmergencyAreaIDs)) OF EmergencyAreaID

ENB-ID ::= CHOICE {

 macroENB-ID BIT STRING (SIZE(20)),

 homeENB-ID BIT STRING (SIZE(28)),

 ... ,

 short-macroENB-ID BIT STRING (SIZE(18)),

 long-macroENB-ID BIT STRING (SIZE(21))

}

En-gNB-ID ::= BIT STRING (SIZE(22..32, ...))

GERAN-Cell-ID ::= SEQUENCE {

 lAI LAI,

 rAC RAC,

 cI CI,

 iE-Extensions ProtocolExtensionContainer { { GERAN-Cell-ID-ExtIEs} } OPTIONAL,

 ...

}

GERAN-Cell-ID-ExtIEs S1AP-PROTOCOL-EXTENSION ::= {

 ...

}

Global-ENB-ID ::= SEQUENCE {

 pLMNidentity PLMNidentity,

 eNB-ID ENB-ID,

 iE-Extensions ProtocolExtensionContainer { {GlobalENB-ID-ExtIEs} } OPTIONAL,

 ...

}

GlobalENB-ID-ExtIEs S1AP-PROTOCOL-EXTENSION ::= {

 ...

}

Global-en-gNB-ID ::= SEQUENCE {

 pLMNidentity PLMNidentity,

 en-gNB-ID En-gNB-ID,

 iE-Extensions ProtocolExtensionContainer { {Global-en-gNB-ID-ExtIEs} } OPTIONAL,

 ...

}

Global-en-gNB-ID-ExtIEs S1AP-PROTOCOL-EXTENSION ::= {

 ...

}

GUMMEIList::= SEQUENCE (SIZE (1.. maxnoofMMECs)) OF GUMMEI

ENB-StatusTransfer-TransparentContainer ::= SEQUENCE {

 bearers-SubjectToStatusTransferList Bearers-SubjectToStatusTransferList,

 iE-Extensions ProtocolExtensionContainer { {ENB-StatusTransfer-TransparentContainer-ExtIEs} } OPTIONAL,

 ...

}

ENB-StatusTransfer-TransparentContainer-ExtIEs S1AP-PROTOCOL-EXTENSION ::= {

 ...

}

ENB-UE-S1AP-ID ::= INTEGER (0..16777215)

ENBname ::= PrintableString (SIZE (1..150,...))

ENBX2TLAs ::= SEQUENCE (SIZE(1.. maxnoofeNBX2TLAs)) OF TransportLayerAddress

EncryptionAlgorithms ::= BIT STRING (SIZE (16,...))

EN-DCSONConfigurationTransfer ::= SEQUENCE {

 transfertype EN-DCSONTransferType,

 sONInformation SONInformation,

 x2TNLConfigInfo X2TNLConfigurationInfo OPTIONAL,

 -- This IE shall be present if the SON Information IE contains the SON Information Request IE and the SON Information Request IE is set to “X2TNL Configuration Info” --

 iE-Extensions ProtocolExtensionContainer { {EN-DCSONConfigurationTransfer-ExtIEs} } OPTIONAL,

...

}

EN-DCSONConfigurationTransfer-ExtIEs S1AP-PROTOCOL-EXTENSION ::= {

 ...

}

EN-DCSONTransferType ::= CHOICE {

 request EN-DCTransferTypeRequest,

 reply EN-DCTransferTypeReply,

 ...

}

EN-DCTransferTypeRequest ::= SEQUENCE {

 sourceeNB EN-DCSONeNBIdentification,

 targetengNB EN-DCSONengNBIdentification,

 targeteNB EN-DCSONeNBIdentification OPTIONAL,

 associatedTAI TAI OPTIONAL,

 broadcast5GSTAI FiveGSTAI OPTIONAL,

 iE-Extensions ProtocolExtensionContainer { {EN-DCTransferTypeRequest-ExtIEs} } OPTIONAL,

...

}

EN-DCTransferTypeRequest-ExtIEs S1AP-PROTOCOL-EXTENSION ::= {

 ...

}

EN-DCTransferTypeReply ::= SEQUENCE {

 sourceengNB EN-DCSONengNBIdentification,

 targeteNB EN-DCSONeNBIdentification,

 iE-Extensions ProtocolExtensionContainer { {EN-DCTransferTypeReply-ExtIEs} } OPTIONAL,

...

}

EN-DCTransferTypeReply-ExtIEs S1AP-PROTOCOL-EXTENSION ::= {

 ...

}

EN-DCSONeNBIdentification ::= SEQUENCE {

 globaleNBID Global-ENB-ID,

 selectedTAI TAI,

 iE-Extensions ProtocolExtensionContainer { {EN-DCSONeNBIdentification-ExtIEs} } OPTIONAL,

...

}

EN-DCSONeNBIdentification-ExtIEs S1AP-PROTOCOL-EXTENSION ::= {

 ...

}

EN-DCSONengNBIdentification ::= SEQUENCE {

 globalengNBID Global-en-gNB-ID,

 selectedTAI TAI,

 iE-Extensions ProtocolExtensionContainer { {EN-DCSONengNBIdentification-ExtIEs} } OPTIONAL,

...

}

EN-DCSONengNBIdentification-ExtIEs S1AP-PROTOCOL-EXTENSION ::= {

 ...

}

EndIndication ::= ENUMERATED {

 no-further-data,

 further-data-exists,

 ...

}

EnhancedCoverageRestricted ::= ENUMERATED {

 restricted,

 ...

}

CE-ModeBRestricted ::= ENUMERATED {

 restricted,

 not-restricted,

 ...

}

EPLMNs ::= SEQUENCE (SIZE(1..maxnoofEPLMNs)) OF PLMNidentity

EventType ::= ENUMERATED {

 direct,

 change-of-serve-cell,

 stop-change-of-serve-cell,

 ...

}

E-RAB-ID ::= INTEGER (0..15, ...)

E-RABInformationList ::= SEQUENCE (SIZE (1.. maxnoofE-RABs)) OF ProtocolIE-SingleContainer { { E-RABInformationListIEs } }

E-RABInformationListIEs S1AP-PROTOCOL-IES ::= {

 { ID id-E-RABInformationListItem CRITICALITY ignore TYPE E-RABInformationListItem PRESENCE mandatory },

 ...

}

E-RABInformationListItem ::= SEQUENCE {

 e-RAB-ID E-RAB-ID,

 dL-Forwarding DL-Forwarding OPTIONAL,

 iE-Extensions ProtocolExtensionContainer { {E-RABInformationListItem-ExtIEs} } OPTIONAL,

 ...

}

E-RABInformationListItem-ExtIEs S1AP-PROTOCOL-EXTENSION ::= {

 { ID id-DAPSInfo CRITICALITY ignore EXTENSION DAPSInfo PRESENCE optional },

 ...

}

E-RABList ::= SEQUENCE (SIZE(1.. maxnoofE-RABs)) OF ProtocolIE-SingleContainer { {E-RABItemIEs} }

E-RABItemIEs S1AP-PROTOCOL-IES ::= {

 { ID id-E-RABItem CRITICALITY ignore TYPE E-RABItem PRESENCE mandatory },

 ...

}

E-RABItem ::= SEQUENCE {

 e-RAB-ID E-RAB-ID,

 cause Cause,

 iE-Extensions ProtocolExtensionContainer { {E-RABItem-ExtIEs} } OPTIONAL,

 ...

}

E-RABItem-ExtIEs S1AP-PROTOCOL-EXTENSION ::= {

 ...

}

E-RABLevelQoSParameters ::= SEQUENCE {

 qCI QCI,

 allocationRetentionPriority AllocationAndRetentionPriority,

 gbrQosInformation GBR-QosInformation OPTIONAL,

 iE-Extensions ProtocolExtensionContainer { {E-RABQoSParameters-ExtIEs} } OPTIONAL,

 ...

}

E-RABUsageReportList ::= SEQUENCE (SIZE(1..maxnooftimeperiods)) OF ProtocolIE-SingleContainer { {E-RABUsageReportItemIEs} }

E-RABUsageReportItemIEs S1AP-PROTOCOL-IES ::= {

 { ID id-E-RABUsageReportItem CRITICALITY ignore TYPE E-RABUsageReportItem PRESENCE mandatory },

 ...

}

E-RABUsageReportItem ::= SEQUENCE {

 startTimestamp OCTET STRING (SIZE(4)),

 endTimestamp OCTET STRING (SIZE(4)),

 usageCountUL INTEGER (0..18446744073709551615),

 usageCountDL INTEGER (0..18446744073709551615),

 iE-Extensions ProtocolExtensionContainer { { E-RABUsageReportItem-ExtIEs} } OPTIONAL,

 ...

}

E-RABUsageReportItem-ExtIEs S1AP-PROTOCOL-EXTENSION ::= {

 ...

}

E-RABQoSParameters-ExtIEs S1AP-PROTOCOL-EXTENSION ::= {

-- Extended for introduction of downlink and uplink packet loss rate for enhanced Voice performance –-

 { ID id-DownlinkPacketLossRate CRITICALITY ignore EXTENSION Packet-LossRate PRESENCE optional}|

 { ID id-UplinkPacketLossRate CRITICALITY ignore EXTENSION Packet-LossRate PRESENCE optional},

 ...

}

EUTRAN-CGI ::= SEQUENCE {

 pLMNidentity PLMNidentity,

 cell-ID CellIdentity,

 iE-Extensions ProtocolExtensionContainer { {EUTRAN-CGI-ExtIEs} } OPTIONAL,

 ...

}

EUTRAN-CGI-ExtIEs S1AP-PROTOCOL-EXTENSION ::= {

 ...

}

EUTRANRoundTripDelayEstimationInfo ::= INTEGER (0..2047)

ExpectedUEBehaviour ::= SEQUENCE {

 expectedActivity ExpectedUEActivityBehaviour OPTIONAL,

 expectedHOInterval ExpectedHOInterval OPTIONAL,

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

 ...

}

ExpectedUEBehaviour-ExtIEs S1AP-PROTOCOL-EXTENSION ::= {

 ...

}

ExpectedUEActivityBehaviour ::= SEQUENCE {

 expectedActivityPeriod ExpectedActivityPeriod OPTIONAL,

 expectedIdlePeriod ExpectedIdlePeriod OPTIONAL,

 sourceofUEActivityBehaviourInformation SourceOfUEActivityBehaviourInformation OPTIONAL,

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

 ...

}

ExpectedUEActivityBehaviour-ExtIEs S1AP-PROTOCOL-EXTENSION ::= {

 ...

}

ExpectedActivityPeriod ::= INTEGER (1..30|40|50|60|80|100|120|150|180|181,...)

ExpectedIdlePeriod ::= INTEGER (1..30|40|50|60|80|100|120|150|180|181,...)

SourceOfUEActivityBehaviourInformation ::= ENUMERATED {

 subscription-information,

 statistics,

 ...

}

ExpectedHOInterval ::= ENUMERATED {

 sec15, sec30, sec60, sec90, sec120, sec180, long-time,

 ...

}

ExtendedBitRate ::= INTEGER (10000000001..4000000000000, ...)

ExtendedRNC-ID ::= INTEGER (4096..65535)

ExtendedRepetitionPeriod ::= INTEGER (4096..131071)

Extended-UEIdentityIndexValue ::= BIT STRING (SIZE (14))

-- F

//////////////////////////////////////////////////////////////// unchange skipped /////////////////////////////////////////////////////////////////////

-- T

TAC ::= OCTET STRING (SIZE (2))

TAIBasedMDT ::= SEQUENCE {

 tAIListforMDT TAIListforMDT,

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

 ...

}

TAIBasedMDT-ExtIEs S1AP-PROTOCOL-EXTENSION ::= {

 ...

}

TAIListforMDT ::= SEQUENCE (SIZE(1..maxnoofTAforMDT)) OF TAI

TAIListforWarning ::= SEQUENCE (SIZE(1..maxnoofTAIforWarning)) OF TAI

TAI ::= SEQUENCE {

 pLMNidentity PLMNidentity,

 tAC TAC,

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

 ...

}

TAI-ExtIEs S1AP-PROTOCOL-EXTENSION ::= {

 ...

}

TAI-Broadcast ::= SEQUENCE (SIZE(1..maxnoofTAIforWarning)) OF TAI-Broadcast-Item

TAI-Broadcast-Item ::= SEQUENCE {

 tAI TAI,

 completedCellinTAI CompletedCellinTAI,

 iE-Extensions ProtocolExtensionContainer { {TAI-Broadcast-Item-ExtIEs} } OPTIONAL,

 ...

}

TAI-Broadcast-Item-ExtIEs S1AP-PROTOCOL-EXTENSION ::= {

 ...

}

TAI-Cancelled ::= SEQUENCE (SIZE(1..maxnoofTAIforWarning)) OF TAI-Cancelled-Item

TAI-Cancelled-Item ::= SEQUENCE {

 tAI TAI,

 cancelledCellinTAI CancelledCellinTAI,

 iE-Extensions ProtocolExtensionContainer { {TAI-Cancelled-Item-ExtIEs} } OPTIONAL,

 ...

}

TAI-Cancelled-Item-ExtIEs S1AP-PROTOCOL-EXTENSION ::= {

 ...

}

TABasedMDT ::= SEQUENCE {

 tAListforMDT TAListforMDT,

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

 ...

}

TABasedMDT-ExtIEs S1AP-PROTOCOL-EXTENSION ::= {

 ...

}

TAListforMDT ::= SEQUENCE (SIZE(1..maxnoofTAforMDT)) OF TAC

TABasedQMC ::= SEQUENCE {

 tAListforQMC TAListforQMC,

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

 ...

}

TABasedQMC-ExtIEs S1AP-PROTOCOL-EXTENSION ::= {

 ...

}

TAListforQMC ::= SEQUENCE (SIZE(1..maxnoofTAforQMC)) OF TAC

TAIBasedQMC ::= SEQUENCE {

 tAIListforQMC TAIListforQMC,

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

 ...

}

TAIBasedQMC-ExtIEs S1AP-PROTOCOL-EXTENSION ::= {

 ...

}

TAIListforQMC ::= SEQUENCE (SIZE(1..maxnoofTAforQMC)) OF TAI

CompletedCellinTAI ::= SEQUENCE (SIZE(1..maxnoofCellinTAI)) OF CompletedCellinTAI-Item

CompletedCellinTAI-Item ::= SEQUENCE{

 eCGI EUTRAN-CGI,

 iE-Extensions ProtocolExtensionContainer { {CompletedCellinTAI-Item-ExtIEs} } OPTIONAL,

 ...

}

CompletedCellinTAI-Item-ExtIEs S1AP-PROTOCOL-EXTENSION ::= {

 ...

}

TBCD-STRING ::= OCTET STRING (SIZE (3))

TargetID ::= CHOICE {

 targeteNB-ID TargeteNB-ID,

 targetRNC-ID TargetRNC-ID,

 cGI CGI,

 ...,

 targetgNgRanNode-ID TargetNgRanNode-ID

}

TargeteNB-ID ::= SEQUENCE {

 global-ENB-ID Global-ENB-ID,

 selected-TAI TAI,

 iE-Extensions ProtocolExtensionContainer { {TargeteNB-ID-ExtIEs} } OPTIONAL,

 ...

}

TargeteNB-ID-ExtIEs S1AP-PROTOCOL-EXTENSION ::= {

 ...

}

TargetRNC-ID ::= SEQUENCE {

 lAI LAI,

 rAC RAC OPTIONAL,

 rNC-ID RNC-ID,

 extendedRNC-ID ExtendedRNC-ID OPTIONAL,

 iE-Extensions ProtocolExtensionContainer { {TargetRNC-ID-ExtIEs} } OPTIONAL,

 ...

 }

TargetRNC-ID-ExtIEs S1AP-PROTOCOL-EXTENSION ::= {

 ...

}

TargetNgRanNode-ID ::= SEQUENCE {

 global-RAN-NODE-ID Global-RAN-NODE-ID,

 selected-TAI FiveGSTAI,

 iE-Extensions ProtocolExtensionContainer { { TargetNgRanNode-ID-ExtIEs} } OPTIONAL,

 ...

}

TargetNgRanNode-ID-ExtIEs S1AP-PROTOCOL-EXTENSION ::= {

 ...

}

Global-RAN-NODE-ID::= CHOICE {

 gNB GNB,

 ng-eNB NG-eNB,

 ...

}

GNB ::= SEQUENCE {

 global-gNB-ID Global-GNB-ID,

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

 ...

}

GNB-ExtIEs S1AP-PROTOCOL-EXTENSION ::= {

 ...

}

Global-GNB-ID ::= SEQUENCE {

 pLMN-Identity PLMNidentity,

 gNB-ID GNB-Identity,

 iE-Extensions ProtocolExtensionContainer { { Global-GNB-ID-ExtIEs} } OPTIONAL,

 ...

}

Global-GNB-ID-ExtIEs S1AP-PROTOCOL-EXTENSION ::= {

 ...

}

GNB-Identity ::= CHOICE {

 gNB-ID GNB-ID,

 ...

}

NG-eNB ::= SEQUENCE {

 global-ng-eNB-ID Global-ENB-ID,

 iE-Extensions ProtocolExtensionContainer { { NG-eNB-ExtIEs} } OPTIONAL,

 ...

}

NG-eNB-ExtIEs S1AP-PROTOCOL-EXTENSION ::= {

 ...

}

GNB-ID ::= BIT STRING (SIZE(22..32))

TargeteNB-ToSourceeNB-TransparentContainer ::= SEQUENCE {

 rRC-Container RRC-Container,

 iE-Extensions ProtocolExtensionContainer { {TargeteNB-ToSourceeNB-TransparentContainer-ExtIEs} } OPTIONAL,

 ...

}

TargeteNB-ToSourceeNB-TransparentContainer-ExtIEs S1AP-PROTOCOL-EXTENSION ::= {

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

 ...

}

Target-ToSource-TransparentContainer ::= OCTET STRING

-- This IE includes a transparent container from the target RAN node to the source RAN node.

-- The octets of the OCTET STRING are coded according to the specifications of the target system.

TargetRNC-ToSourceRNC-TransparentContainer ::= OCTET STRING

-- This is a dummy IE used only as a reference to the actual definition in relevant specification.

TargetBSS-ToSourceBSS-TransparentContainer ::= OCTET STRING

-- This is a dummy IE used only as a reference to the actual definition in relevant specification.

TargetNgRanNode-ToSourceNgRanNode-TransparentContainer ::= OCTET STRING

-- This is a dummy IE used only as a reference to the actual definition in relevant specification.

M1ThresholdEventA2 ::= SEQUENCE {

 measurementThreshold MeasurementThresholdA2,

 iE-Extensions ProtocolExtensionContainer { { M1ThresholdEventA2-ExtIEs} } OPTIONAL,

 ...

}

M1ThresholdEventA2-ExtIEs S1AP-PROTOCOL-EXTENSION ::= {

 ...

}

Threshold-RSRP ::= INTEGER(0..97)

Threshold-RSRQ ::= INTEGER(0..34)

TimeToWait ::= ENUMERATED {v1s, v2s, v5s, v10s, v20s, v60s, ...}

Time-UE-StayedInCell ::= INTEGER (0..4095)

Time-UE-StayedInCell-EnhancedGranularity ::= INTEGER (0..40950)

TimeSinceSecondaryNodeRelease ::= OCTET STRING (SIZE(4))

TransportInformation ::= SEQUENCE {

 transportLayerAddress TransportLayerAddress,

 uL-GTP-TEID GTP-TEID,

 ...

}

TransportLayerAddress ::= BIT STRING (SIZE(1..160, ...))

TraceActivation ::= SEQUENCE {

 e-UTRAN-Trace-ID E-UTRAN-Trace-ID,

 interfacesToTrace InterfacesToTrace,

traceDepth TraceDepth,

traceCollectionEntityIPAddress TransportLayerAddress,

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

 ...

}

TraceActivation-ExtIEs S1AP-PROTOCOL-EXTENSION ::= {

-- Extension for Rel-10 to support MDT --

 { ID id-MDTConfiguration CRITICALITY ignore EXTENSION MDT-Configuration PRESENCE optional }|

-- Extension for Rel-15 to support QMC –

 { ID id-UEAppLayerMeasConfig CRITICALITY ignore EXTENSION UEAppLayerMeasConfig PRESENCE optional },

 ...

}

TraceDepth ::= ENUMERATED {

 minimum,

 medium,

 maximum,

 minimumWithoutVendorSpecificExtension,

 mediumWithoutVendorSpecificExtension,

 maximumWithoutVendorSpecificExtension,

 ...

}

E-UTRAN-Trace-ID ::= OCTET STRING (SIZE (8))

TrafficLoadReductionIndication ::= INTEGER (1..99)

TunnelInformation ::= SEQUENCE {

 transportLayerAddress TransportLayerAddress,

 uDP-Port-Number Port-Number OPTIONAL,

 iE-Extensions ProtocolExtensionContainer { {Tunnel-Information-ExtIEs} } OPTIONAL,

 ...

}

Tunnel-Information-ExtIEs S1AP-PROTOCOL-EXTENSION ::= {

 ...

}

TypeOfError ::= ENUMERATED {

 not-understood,

 missing,

 ...

}

TAIListForRestart ::= SEQUENCE (SIZE(1..maxnoofRestartTAIs)) OF TAI

-- U

////////////////////////////////////////////////////////////// unchange skipped ////////////////////////////////////////////////////////////////////

id-EDT-Session ProtocolIE-ID ::= 281

id-CNTypeRestrictions ProtocolIE-ID ::= 282

id-PendingDataIndication ProtocolIE-ID ::= 283

id-BluetoothMeasurementConfiguration ProtocolIE-ID ::= 284

id-WLANMeasurementConfiguration ProtocolIE-ID ::= 285

id-WarningAreaCoordinates ProtocolIE-ID ::= 286

id-NRrestrictionin5GS ProtocolIE-ID ::= 287

id-PSCellInformation ProtocolIE-ID ::= 288

id-LastNG-RANPLMNIdentity ProtocolIE-ID ::= 290

id-ConnectedengNBList ProtocolIE-ID ::= 291

id-ConnectedengNBToAddList ProtocolIE-ID ::= 292

id-ConnectedengNBToRemoveList ProtocolIE-ID ::= 293

id-EN-DCSONConfigurationTransfer-ECT ProtocolIE-ID ::= 294

id-EN-DCSONConfigurationTransfer-MCT ProtocolIE-ID ::= 295

id-IMSvoiceEPSfallbackfrom5G ProtocolIE-ID ::= 296

id-TimeSinceSecondaryNodeRelease ProtocolIE-ID ::= 297

id-RequestTypeAdditionalInfo ProtocolIE-ID ::= 298

id-DAPSInfo ProtocolIE-ID ::= XXX

id-DAPSResponseInfo ProtocolIE-ID ::= YYY

END

//////////////////////////////////////////////////////////////// End of Change /////////////////////////////////////////////////////////////////////