# 8 Message functional definitions and contents

## 8.1 Overview

This clause defines the structure of the messages of the Layer 3 (L3) protocols defined in the present document. These are standard L3 messages as defined in 3GPP TS 24.007 [12].

Each definition given in the present clause includes:

a) a brief description of the message direction and use, including whether the message has:

1. Local significance, i.e. relevant only on the originating or terminating access;

2. Access significance, i.e. relevant in the originating and terminating access, but not in the network;

3. Dual significance, i.e. relevant in either the originating or terminating access and in the network; or

4. Global significance, i.e. relevant in the originating and terminating access and in the network.

b) a table listing the Information Elements (IE) known in the message and the order of their appearance in the message. All IEs that may be repeated are explicitly indicated (The V, LV and LV-E formatted IEs, which compose the imperative part of the message, occur before the T, TV, TLV and TLV-E formatted IEs which compose the non-imperative part of the message, see 3GPP TS 24.007 [12]). In a (maximal) sequence of consecutive IEs with half octet length, the first IE with half octet length occupies bits 1 to 4 of octet N, the second IE bits 5 to 8 of octet N, the third IE bits 1 to 4 of octet N+1 etc. Such a sequence always has an even number of elements.

For each information element the table indicates:

1. The Information Element Identifier (IEI), in hexadecimal notation, if the IE has format T, TV, TLV or TLVE. If the IEI has half octet length, it is specified by a notation representing the IEI as a hexadecimal digit followed by a "-" (example: B-).

NOTE: The same IEI can be used for different information element types in different messages of the same protocol.

2. The name of the information element (which may give an idea of the semantics of the element). The name of the information element followed by "IE" or "information element" is used in this technical report as reference to the information element within a message.

3. The name of the type of the information element (which indicates the coding of the value part of the IE), and generally, the referenced subclause of clause 9 of the present document describing the value part of the information element.

4. The presence requirement indication (M, C, or O) for the IE as defined in 3GPP TS 24.007 [12].

5. The format of the information element (T, V, TV, LV, TLV, LV-E or TLV-E) as defined in 3GPP TS 24.007 [12].

6. The length of the information element (or permissible range of lengths), in octets, in the message, where "?" means that the maximum length of the IE is only constrained by link layer protocol. This indication is non-normative.

c) subclauses specifying, where appropriate, conditions for IEs with presence requirement C or O in the relevant message which together with other conditions specified in the present document define when the information elements shall be included or not, what non-presence of such IEs means, and – for IEs with presence requirement C – the static conditions for presence or non-presence of the IEs or for both cases (see 3GPP TS 24.007 [12]).

## 8.2 EPS mobility management messages

### 8.2.1 Attach accept

#### 8.2.1.1 Message definition

This message is sent by the network to the UE to indicate that the corresponding attach request has been accepted. See table 8.2.1.1.

Message type: ATTACH ACCEPT

Significance: dual

Direction: network to UE

Table 8.2.1.1: ATTACH ACCEPT message content

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| IEI | Information Element | Type/Reference | Presence | Format | Length |
|  | Protocol discriminator | Protocol discriminator  9.2 | M | V | 1/2 |
|  | Security header type | Security header type  9.3.1 | M | V | 1/2 |
|  | Attach accept message identity | Message type  9.8 | M | V | 1 |
|  | EPS attach result | EPS attach result  9.9.3.10 | M | V | 1/2 |
|  | Spare half octet | Spare half octet  9.9.2.9 | M | V | 1/2 |
|  | T3412 value | GPRS timer  9.9.3.16 | M | V | 1 |
|  | TAI list | Tracking area identity list  9.9.3.33 | M | LV | 7-97 |
|  | ESM message container | ESM message container  9.9.3.15 | M | LV-E | 5-n |
| 50 | GUTI | EPS mobile identity  9.9.3.12 | O | TLV | 13 |
| 13 | Location area identification | Location area identification  9.9.2.2 | O | TV | 6 |
| 23 | MS identity | Mobile identity  9.9.2.3 | O | TLV | 7-10 |
| 53 | EMM cause | EMM cause  9.9.3.9 | O | TV | 2 |
| 17 | T3402 value | GPRS timer  9.9.3.16 | O | TV | 2 |
| 59 | T3423 value | GPRS timer  9.9.3.16 | O | TV | 2 |
| 4A | Equivalent PLMNs | PLMN list  9.9.2.8 | O | TLV | 5-47 |
| 34 | Emergency number list | Emergency number list  9.9.3.37 | O | TLV | 5-50 |
| 64 | EPS network feature support | EPS network feature support  9.9.3.12A | O | TLV | 3 |
| F- | Additional update result | Additional update result  9.9.3.0A | O | TV | 1 |
| 5E | T3412 extended value | GPRS timer 3  9.9.3.16B | O | TLV | 3 |
| 6A | T3324 value | GPRS timer 2  9.9.3.16A | O | TLV | 3 |
| 6E | Extended DRX parameters | Extended DRX parameters  9.9.3.46 | O | TLV | 3 |

#### 8.2.1.2 GUTI

This IE may be included to assign a GUTI to the UE during attach or combined EPS/IMSI attach.

#### 8.2.1.3 Location area identification

This IE may be included to assign a new location area identification to a UE during a combined attach.

#### 8.2.1.4 MS identity

This IE may be included to assign or unassign a new TMSI to a UE during a combined attach.

#### 8.2.1.5 EMM cause

This IE shall be included when IMSI attach for non-EPS services is not successful during a combined EPS/IMSI attach procedure.

#### 8.2.1.6 T3402 value

This IE may be included to indicate a value for timer T3402.

#### 8.2.1.7 T3423 value

This IE may be included to indicate a value for timer T3423.

If this IE is not included, the UE shall use the default value.

#### 8.2.1.8 Equivalent PLMNs

This IE may be included in order to assign a new equivalent PLMNs list to a UE.

#### 8.2.1.9 Emergency number list

This IE may be sent by the network. If this IE is sent, the contents of this IE indicates a list of emergency numbers valid within the same country as in the cell on which this IE is received.

#### 8.2.1.10 EPS network feature support

The network may include this IE to inform the UE of the support of certain features. If this IE is not included then the UE shall interpret this as a receipt of an information element with all bits of the value part coded as zero.

#### 8.2.1.11 Additional update result

The network may include this IE to provide the UE with additional information about the result of:

- a combined attach procedure if the procedure was successful for EPS services and non-EPS services, or for EPS services and "SMS only"; or

- an attach procedure requested for CIoT EPS optimizations if the procedure was successful for EPS services and "SMS only".

#### 8.2.1.12 T3412 extended value

The network may include this IE to provide the UE with longer periodic tracking area update timer.

#### 8.2.1.13 T3324 value

The network shall include the T3324 value IE if:

- the UE included the T3324 value IE in the ATTACH REQUEST message; and

- the network supports PSM and accepts the use of PSM.

#### 8.2.1.14 Extended DRX parameters

The network shall include the Extended DRX parameters IE if:

- the UE included the Extended DRX parameters IE in the ATTACH REQUEST message; and

- the network supports eDRX and accepts the use of eDRX.

### 8.2.2 Attach complete

This message is sent by the UE to the network in response to an ATTACH ACCEPT message. See table 8.2.2.1.

Message type: ATTACH COMPLETE

Significance: dual

Direction: UE to network

Table 8.2.2.1: ATTACH COMPLETE message content

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| IEI | Information Element | Type/Reference | Presence | Format | Length |
|  | Protocol discriminator | Protocol discriminator  9.2 | M | V | 1/2 |
|  | Security header type | Security header type  9.3.1 | M | V | 1/2 |
|  | Attach complete message identity | Message type  9.8 | M | V | 1 |
|  | ESM message container | ESM message container  9.9.3.15 | M | LV-E | 5-n |

### 8.2.3 Attach reject

#### 8.2.3.1 Message definition

This message is sent by the network to the UE to indicate that the corresponding attach request has been rejected. See table 8.2.3.1.

Message type: ATTACH REJECT

Significance: dual

Direction: network to UE

Table 8.2.3.1: ATTACH REJECT message content

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| IEI | Information Element | Type/Reference | Presence | Format | Length |
|  | Protocol discriminator | Protocol discriminator  9.2 | M | V | 1/2 |
|  | Security header type | Security header type  9.3.1 | M | V | 1/2 |
|  | Attach reject message identity | Message type  9.8 | M | V | 1 |
|  | EMM cause | EMM cause  9.9.3.9 | M | V | 1 |
| 78 | ESM message container | ESM message container  9.9.3.15 | O | TLV-E | 6-n |
| 5F | T3346 value | GPRS timer 2  9.9.3.16A | O | TLV | 3 |
| 16 | T3402 value | GPRS timer 2  9.9.3.16A | O | TLV | 3 |
| A- | Extended EMM cause | Extended EMM cause  9.9.3.26A | O | TV | 1 |

#### 8.2.3.2 ESM message container

This IE is included to carry a single ESM message.

#### 8.2.3.3 T3346 value

The MME may include this IE when the NAS level mobility management congestion control is active.

#### 8.2.3.4 T3402 value

This IE may be included to indicate a value for timer T3402.

#### 8.2.3.5 Extended EMM cause

This IE may be included by the network to indicate additional information associated with the EMM cause.

### 8.2.4 Attach request

#### 8.2.4.1 Message definition

This message is sent by the UE to the network in order to perform an attach procedure. See table 8.2.4.1.

Message type: ATTACH REQUEST

Significance: dual

Direction: UE to network

Table 8.2.4.1: ATTACH REQUEST message content

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| IEI | Information Element | Type/Reference | Presence | Format | Length |
|  | Protocol discriminator | Protocol discriminator  9.2 | M | V | 1/2 |
|  | Security header type | Security header type  9.3.1 | M | V | 1/2 |
|  | Attach request message identity | Message type  9.8 | M | V | 1 |
|  | EPS attach type | EPS attach type  9.9.3.11 | M | V | 1/2 |
|  | NAS key set identifier | NAS key set identifier  9.9.3.21 | M | V | 1/2 |
|  | EPS mobile identity | EPS mobile identity  9.9.3.12 | M | LV | 5-12 |
|  | UE network capability | UE network capability  9.9.3.34 | M | LV | 3-14 |
|  | ESM message container | ESM message container  9.9.3.15 | M | LV-E | 5-n |
| 19 | Old P-TMSI signature | P-TMSI signature  9.9.3.26 | O | TV | 4 |
| 50 | Additional GUTI | EPS mobile identity  9.9.3.12 | O | TLV | 13 |
| 52 | Last visited registered TAI | Tracking area identity  9.9.3.32 | O | TV | 6 |
| 5C | DRX parameter | DRX parameter  9.9.3.8 | O | TV | 3 |
| 31 | MS network capability | MS network capability  9.9.3.20 | O | TLV | 4-10 |
| 13 | Old location area identification | Location area identification  9.9.2.2 | O | TV | 6 |
| 9- | TMSI status | TMSI status  9.9.3.31 | O | TV | 1 |
| 11 | Mobile station classmark 2 | Mobile station classmark 2  9.9.2.4 | O | TLV | 5 |
| 20 | Mobile station classmark 3 | Mobile station classmark 3  9.9.2.5 | O | TLV | 2-34 |
| 40 | Supported Codecs | Supported Codec List  9.9.2.10 | O | TLV | 5-n |
| F- | Additional update type | Additional update type  9.9.3.0B | O | TV | 1 |
| 5D | Voice domain preference and UE's usage setting | Voice domain preference and UE's usage setting  9.9.3.44 | O | TLV | 3 |
| D- | Device properties | Device properties  9.9.2.0A | O | TV | 1 |
| E- | Old GUTI type | GUTI type  9.9.3.45 | O | TV | 1 |
| C- | MS network feature support | MS network feature support  9.9.3.20A | O | TV | 1 |
| 10 | TMSI based NRI container | Network resource identifier container  9.9.3.24A | O | TLV | 4 |
| 6A | T3324 value | GPRS timer 2  9.9.3.16A | O | TLV | 3 |
| 5E | T3412 extended value | GPRS timer 3  9.9.3.16B | O | TLV | 3 |
| 6E | Extended DRX parameters | Extended DRX parameters  9.9.3.46 | O | TLV | 3 |

#### 8.2.4.2 Old P-TMSI signature

The UE shall include this IE if the UE holds a valid P-TMSI signature, P-TMSI and RAI, and the TIN either indicates "P-TMSI" or is deleted. If the UE is configured for "AttachWithIMSI" as specified in 3GPP TS 24.368 [15A] or 3GPP TS 31.102 [17] and is attaching in a new PLMN that is neither the registered PLMN nor in the list of equivalent PLMNs, the UE shall not include this IE.

#### 8.2.4.3 Additional GUTI

The UE shall include this IE if the TIN indicates "P-TMSI" and the UE holds a valid GUTI, P-TMSI and RAI. If the UE is configured for "AttachWithIMSI" as specified in 3GPP TS 24.368 [15A] or 3GPP TS 31.102 [17] and is attaching in a new PLMN that is neither the registered PLMN nor in the list of equivalent PLMNs, the UE shall not include this IE.

#### 8.2.4.4 Last visited registered TAI

This IE shall be included if the UE holds a valid last visited registered TAI.

#### 8.2.4.5 DRX parameter

This IE is included if UE supports A/Gb mode or Iu mode or if the UE wants to indicate its UE specific DRX parameters to the network.

#### 8.2.4.6 MS network capability

A UE supporting A/Gb mode or Iu mode shall include this IE to indicate its capabilities to the network.

#### 8.2.4.7 Old location area identification

The UE shall include this IE during a combined attach procedure if it has a valid location area identification.

#### 8.2.4.8 TMSI status

The UE shall include this IE during combined attach procedure if it has no valid TMSI available.

#### 8.2.4.9 Mobile station classmark 2

This IE shall be included if the UE supports SRVCC to GERAN or UTRAN or supports vSRVCC to UTRAN (see 3GPP TS 23.216 [8]), or if the UE is performing a combined attach procedure.

#### 8.2.4.10 Mobile station classmark 3

This IE shall be included if the UE supports SRVCC to GERAN.

#### 8.2.4.11 Supported Codecs

This IE shall be included if the UE supports SRVCC to GERAN or UTRAN or supports vSRVCC to UTRAN to indicate its supported speech codecs for CS speech calls.

#### 8.2.4.12 Additional update type

The UE shall include this IE if the UE requests "SMS only" or CIoT EPS optimizations.

#### 8.2.4.13 Voice domain preference and UE's usage setting

This IE shall be included in WB-S1 mode if the UE supports:

- CS fallback and SMS over SGs; or

- if the UE is configured to support IMS voice, but does not support 1xCS fallback.

#### 8.2.4.14 Device properties

This IE shall be included if the UE is configured for NAS signalling low priority.

#### 8.2.4.15 Old GUTI type

The UE shall include this IE if the type of identity in the EPS mobile identity IE is set to "GUTI".

#### 8.2.4.16 MS network feature support

This IE shall be included if the UE supports extended periodic timer T3412.

#### 8.2.4.17 TMSI based NRI container

The UE shall include this IE during a combined attach procedure if it has a valid TMSI.

#### 8.2.4.18 T3324 value

The UE may include this IE to request the use of PSM.

#### 8.2.4.19 T3412 extended value

The UE may include this IE to request a particular T3412 value if the T3324 value IE is included.

#### 8.2.4.20 Extended DRX parameters

The UE may include this IE to request the use of eDRX.

### 8.2.5 Authentication failure

#### 8.2.5.1 Message definition

This message is sent by the UE to the network to indicate that authentication of the network has failed. See table 8.2.5.1.

Message type: AUTHENTICATION FAILURE

Significance: dual

Direction: UE to network

Table 8.2.5.1: AUTHENTICATION FAILURE message content

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| IEI | Information element | Type/Reference | Presence | Format | Length |
|  | Protocol discriminator | Protocol discriminator  9.2 | M | V | 1/2 |
|  | Security header type | Security header type  9.3.1 | M | V | 1/2 |
|  | Authentication failure  message type | Message type  9.8 | M | V | 1 |
|  | EMM cause | EMM cause  9.9.3.9 | M | V | 1 |
| 30 | Authentication failure parameter | Authentication failure parameter  9.9.3.1 | O | TLV | 16 |

#### 8.2.5.2 Authentication failure parameter

This IE shall be sent if and only if the EMM cause was #21 "synch failure". It shall include the response to the authentication challenge from the USIM, which is made up of the AUTS parameter (see 3GPP TS 33.102 [18]).

### 8.2.6 Authentication reject

This message is sent by the network to the UE to indicate that the authentication procedure has failed and that the UE shall abort all activities. See table 8.2.6.1.

Message type: AUTHENTICATION REJECT

Significance: dual

Direction: network to UE

Table 8.2.6.1: AUTHENTICATION REJECT message content

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| IEI | Information element | Type/Reference | Presence | Format | Length |
|  | Protocol discriminator | Protocol discriminator  9.2 | M | V | 1/2 |
|  | Security header type | Security header type  9.3.1 | M | V | 1/2 |
|  | Authentication reject message type | Message type  9.8 | M | V | 1 |

### 8.2.7 Authentication request

This message is sent by the network to the UE to initiate authentication of the UE identity. See table 8.2.7.1.

Message type: AUTHENTICATION REQUEST

Significance: dual

Direction: network to UE

Table 8.2.7.1: AUTHENTICATION REQUEST message content

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| IEI | Information element | Type/Reference | Presence | Format | Length |
|  | Protocol discriminator | Protocol discriminator  9.2 | M | V | 1/2 |
|  | Security header type | Security header type  9.3.1 | M | V | 1/2 |
|  | Authentication request message type | Message type  9.8 | M | V | 1 |
|  | NAS key set identifierASME | NAS key set identifier  9.9.3.21 | M | V | 1/2 |
|  | Spare half octet | Spare half octet  9.9.2.9 | M | V | 1/2 |
|  | Authentication parameter RAND (EPS challenge) | Authentication parameter RAND  9.9.3.3 | M | V | 16 |
|  | Authentication parameter AUTN (EPS challenge) | Authentication parameter AUTN  9.9.3.2 | M | LV | 17 |

### 8.2.8 Authentication response

This message is sent by the UE to the network to deliver a calculated authentication response to the network. See table 8.2.8.1.

Message type: AUTHENTICATION RESPONSE

Significance: dual

Direction: UE to network

Table 8.2.8.1: AUTHENTICATION RESPONSE message content

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| IEI | Information element | Type/Reference | Presence | Format | Length |
|  | Protocol discriminator | Protocol discriminator  9.2 | M | V | 1/2 |
|  | Security header type | Security header type  9.3.1 | M | V | 1/2 |
|  | Authentication response message type | Message type  9.8 | M | V | 1 |
|  | Authentication response parameter | Authentication response parameter  9.9.3.4 | M | LV | 5-17 |

### 8.2.9 CS service notification

#### 8.2.9.1 Message definition

This message is sent by the network when a paging request with CS call indicator was received via SGs for a UE, and a NAS signalling connection is already established for the UE. See table 8.2.9.1.

Message type: CS SERVICE NOTIFICATION

Significance: dual

Direction: network to UE

Table 8.2.9.1: CS SERVICE NOTIFICATION message content

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | IEI | | Information Element | | Type/Reference | | Presence | | Format | | Length | |
|  | | Protocol discriminator | | Protocol discriminator  9.2 | | M | | V | | 1/2 | |  |
|  | | Security header type | | Security header type  9.3.1 | | M | | V | | 1/2 | |  |
|  | | CS service notification message identity | | Message type  9.8 | | M | | V | | 1 | |  |
|  | | Paging identity | | Paging identity  9.9.3.25A | | M | | V | | 1 | |  |
| 60 | | CLI | | CLI  9.9.3.38 | | O | | TLV | | 3-14 | |  |
| 61 | | SS Code | | SS Code  9.9.3.39 | | O | | TV | | 2 | |  |
| 62 | | LCS indicator | | LCS indicator  9.9.3.40 | | O | | TV | | 2 | |  |
| 63 | | LCS client identity | | LCS client identity  9.9.3.41 | | O | | TLV | | 3-257 | |  |

#### 8.2.9.2 CLI

The network shall send this IE if it was received via SGs. It contains the identification of the calling line for the mobile terminating call in the CS domain, which triggered the paging via SGs.

#### 8.2.9.3 SS Code

The network shall send this IE if it was received via SGs. It contains information on the supplementary service transaction in the CS domain, which triggered the paging via SGs.

#### 8.2.9.4 LCS indicator

The network shall send this IE if it was received via SGs. It indicates that the paging was triggered by a terminating LCS request in the CS domain.

#### 8.2.9.5 LCS client identity

The network shall send this IE if received via SGs. It contains information related to the requestor of the terminating LCS request in the CS domain.

### 8.2.10 Detach accept

#### 8.2.10.1 Detach accept (UE originating detach)

This message is sent by the network to indicate that the detach procedure has been completed. See table 8.2.10.1.1.

Message type: DETACH ACCEPT

Significance: dual

Direction: network to UE

Table 8.2.10.1.1: DETACH ACCEPT message content

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| IEI | Information Element | Type/Reference | Presence | Format | Length |
|  | Protocol discriminator | Protocol discriminator  9.2 | M | V | 1/2 |
|  | Security header type | Security header type  9.3.1 | M | V | 1/2 |
|  | Detach accept message identity | Message type  9.8 | M | V | 1 |

#### 8.2.10.2 Detach accept (UE terminated detach)

This message is sent by the UE to indicate that the detach procedure has been completed. See table 8.2.10.2.1.

Message type: DETACH ACCEPT

Significance: dual

Direction: UE to network

Table 8.2.10.2.1: DETACH ACCEPT message content

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| IEI | Information Element | Type/Reference | Presence | Format | Length |
|  | Protocol discriminator | Protocol discriminator  9.2 | M | V | 1/2 |
|  | Security header type | Security header type  9.3.1 | M | V | 1/2 |
|  | Detach accept message identity | Message type  9.8 | M | V | 1 |

### 8.2.11 Detach request

#### 8.2.11.1 Detach request (UE originating detach)

This message is sent by the UE to request the release of an EMM context. See table 8.2.11.1.1.

Message type: DETACH REQUEST

Significance: dual

Direction: UE to network

Table 8.2.11.1.1: DETACH REQUEST message content

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| IEI | Information Element | Type/Reference | Presence | Format | Length |
|  | Protocol discriminator | Protocol discriminator  9.2 | M | V | 1/2 |
|  | Security header type | Security header type  9.3.1 | M | V | 1/2 |
|  | Detach request message identity | Message type  9.8 | M | V | 1 |
|  | Detach type | Detach type  9.9.3.7 | M | V | 1/2 |
|  | NAS key set identifier | NAS key set identifier  9.9.3.21 | M | V | 1/2 |
|  | EPS mobile identity | EPS mobile identity  9.9.3.12 | M | LV | 5-12 |

#### 8.2.11.2 Detach request (UE terminated detach)

##### 8.2.11.2.1 Message definition

This message is sent by the network to request the release of an EMM context. See table 8.2.11.2.1.

Message type: DETACH REQUEST

Significance: dual

Direction: network to UE

Table 8.2.11.2.1: DETACH REQUEST message content

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| IEI | Information Element | Type/Reference | Presence | Format | Length |
|  | Protocol discriminator | Protocol discriminator  9.2 | M | V | 1/2 |
|  | Security header type | Security header type  9.3.1 | M | V | 1/2 |
|  | Detach request message identity | Message type  9.8 | M | V | 1 |
|  | Detach type | Detach type  9.9.3.7 | M | V | 1/2 |
|  | Spare half octet | Spare half octet  9.9.2.9 | M | V | 1/2 |
| 53 | EMM cause | EMM cause  9.9.3.9 | O | TV | 2 |

##### 8.2.11.2.2 EMM cause

This information element is included if an EMM cause is provided.

### 8.2.12 Downlink NAS Transport

This message is sent by the network to the UE in order to carry an SMS message in encapsulated format. See table 8.2.12.1.

Message type: DOWNLINK NAS TRANSPORT

Significance: dual

Direction: network to UE

Table 8.2.12.1: DOWNLINK NAS TRANSPORT message content

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | IEI | | Information Element | | Type/Reference | | Presence | | Format | | Length | |
|  | | Protocol discriminator | | Protocol discriminator  9.2 | | M | | V | | 1/2 | |  |
|  | | Security header type | | Security header type  9.3.1 | | M | | V | | 1/2 | |  |
|  |  | | Downlink NAS transport message identity | | Message type  9.8 | | M | | V | | 1 | |
|  |  | | NAS message container | | NAS message container  9.9.3.22 | | M | | LV | | 3-252 | |

### 8.2.13 EMM information

#### 8.2.13.1 Message definition

This message is sent by the network at any time during EMM context is established to send certain information to the UE. See table 8.2.13.1.

Message type: EMM INFORMATION

Significance: local

Direction: network to UE

Table 8.2.13.1: EMM INFORMATION message content

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | IEI | | Information Element | | Type/Reference | | Presence | | Format | | Length | |
|  | | Protocol discriminator | | Protocol discriminator  9.2 | | M | | V | | 1/2 | |  |
|  | | Security header type | | Security header type  9.3.1 | | M | | V | | 1/2 | |  |
|  | | EMM information message identity | | Message type  9.8 | | M | | V | | 1 | |  |
| 43 | | Full name for network | | Network name  9.9.3.24 | | O | | TLV | | 3-n | |  |
| 45 | | Short name for network | | Network name  9.9.3.24 | | O | | TLV | | 3-n | |  |
| 46 | | Local time zone | | Time zone  9.9.3.29 | | O | | TV | | 2 | |  |
| 47 | | Universal time and local time zone | | Time zone and time  9.9.3.30 | | O | | TV | | 8 | |  |
| 49 | | Network daylight saving time | | Daylight saving time  9.9.3.6 | | O | | TLV | | 3 | |  |

#### 8.2.13.2 Full name for network

This IE may be sent by the network. If this IE is sent, the contents of this IE indicate the "full length name of the network" that the network wishes the UE to associate with the MCC and MNC contained in the last visited tracking area identification.

#### 8.2.13.3 Short name for network

This IE may be sent by the network. If this IE is sent, the contents of this IE indicate the "abbreviated name of the network" that the network wishes the UE to associate with the MCC and MNC contained in the last visited tracking area identification.

#### 8.2.13.4 Local time zone

This IE may be sent by the network. The UE should assume that this time zone applies to the tracking area of the current cell, and also applies to the tracking area list if available in the UE.

NOTE: The time information can be inaccurate, especially when the TAI list includes tracking areas belonging to different time zones.

If the local time zone has been adjusted for daylight saving time, the network shall indicate this by including the Network daylight saving time IE.

#### 8.2.13.5 Universal time and local time zone

This IE may be sent by the network. The UE should assume that this time zone applies to the tracking area the UE is currently in, and also applies to the tracking area list if available in the UE. The UE shall not assume that the time information is accurate.

NOTE: The time information can be inaccurate, especially when the TAI list includes tracking areas belonging to different time zones.

If the local time zone has been adjusted for daylight saving time, the network shall indicate this by including the Network daylight saving time IE.

#### 8.2.13.6 Network daylight saving time

This IE may be sent by the network. If this IE is sent, the contents of this IE indicates the value that has been used to adjust the local time zone.

### 8.2.14 EMM status

This message is sent by the UE or by the network at any time to report certain error conditions listed in clause 7. See table 8.2.14.1.

Message type: EMM STATUS

Significance: local

Direction: both

Table 8.2.14.1: EMM STATUS message content

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | IEI | | Information Element | | Type/Reference | | Presence | | Format | | Length | |
|  | | Protocol discriminator | | Protocol discriminator  9.2 | | M | | V | | 1/2 | |  |
|  | | Security header type | | Security header type  9.3.1 | | M | | V | | 1/2 | |  |
|  |  | | EMM status message identity | | Message type  9.8 | | M | | V | | 1 | |
|  |  | | EMM cause | | EMM cause  9.9.3.9 | | M | | V | | 1 | |

### 8.2.15 Extended service request

#### 8.2.15.1 Message definition

This message is sent by the UE to the network

- to initiate a CS fallback or 1xCS fallback call or respond to a mobile terminated CS fallback or 1xCS fallback request from the network; or

- to request the establishment of a NAS signalling connection and of the radio and S1 bearers for packet services, if the UE needs to provide additional information that cannot be provided via a SERVICE REQUEST message.

See table 8.2.15.1.

Message type: EXTENDED SERVICE REQUEST

Significance: dual

Direction: UE to network

Table 8.2.15.1: EXTENDED SERVICE REQUEST message content

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | IEI | | Information Element | | Type/Reference | | Presence | | Format | | Length | |
|  | | Protocol discriminator | | Protocol discriminator  9.2 | | M | | V | | 1/2 | |  |
|  | | Security header type | | Security header type  9.3.1 | | M | | V | | 1/2 | |  |
|  | | Extended service request message identity | | Message type  9.8 | | M | | V | | 1 | |  |
|  | | Service type | | Service type  9.9.3.27 | | M | | V | | 1/2 | |  |
|  | | NAS key set identifier | | NAS key set identifier  9.9.3.21 | | M | | V | | 1/2 | |  |
|  | | M-TMSI | | Mobile identity  9.9.2.3 | | M | | LV | | 6 | |  |
| B- | | CSFB response | | CSFB response  9.9.3.5 | | C | | TV | | 1 | |  |
| 57 | | EPS bearer context status | | EPS bearer context status  9.9.2.1 | | O | | TLV | | 4 | |  |
| D- | | Device properties | | Device properties  9.9.2.0A | | O | | TV | | 1 | |  |

#### 8.2.15.2 CSFB response

The UE shall include this IE only if the Service type information element indicates "mobile terminating CS fallback or 1xCS fallback".

NOTE: The UE does not include this IE for mobile terminating 1xCS fallback.

#### 8.2.15.3 EPS bearer context status

This IE shall be included if the UE wants to indicate the EPS bearer contexts that are active within the UE.

#### 8.2.15.4 Device properties

The UE shall include this IE if the UE is configured for NAS signalling low priority.

### 8.2.16 GUTI reallocation command

#### 8.2.16.1 Message definition

This message is sent by the network to the UE to reallocate a GUTI and optionally to provide a new TAI list. See table 8.2.16.1.

Message type: GUTI REALLOCATION COMMAND

Significance: dual

Direction: network to UE

Table 8.2.16.1: GUTI REALLOCATION COMMAND message content

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| IEI | Information Element | Type/Reference | Presence | Format | Length |
|  | Protocol discriminator | Protocol discriminator  9.2 | M | V | 1/2 |
|  | Security header type | Security header type  9.3.1 | M | V | 1/2 |
|  | GUTI reallocation command message identity | Message type  9.8 | M | V | 1 |
|  | GUTI | EPS mobile identity  9.9.3.12 | M | LV | 12 |
| 54 | TAI list | Tracking area identity list  9.9.3.33 | O | TLV | 8-98 |

#### 8.2.16.2 TAI list

This IE may be included to assign a TAI list to the UE.

### 8.2.17 GUTI reallocation complete

This message is sent by the UE to the network to indicate that reallocation of a GUTI has taken place. See table 8.2.17.1.

Message type: GUTI REALLOCATION COMPLETE

Significance: dual

Direction: UE to network

Table 8.2.17.1: GUTI REALLOCATION COMPLETE message content

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| IEI | Information Element | Type/Reference | Presence | Format | Length |
|  | Protocol discriminator | Protocol discriminator  9.2 | M | V | 1/2 |
|  | Security header type | Security header type  9.3.1 | M | V | 1/2 |
|  | GUTI reallocation complete message identity | Message type  9.8 | M | V | 1 |

### 8.2.18 Identity request

This message is sent by the network to the UE to request the UE to provide the specified identity. See table 8.2.18.1.

Message type: IDENTITY REQUEST

Significance: dual

Direction: network to UE

Table 8.2.18.1: IDENTITY REQUEST message content

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| IEI | Information Element | Type/Reference | Presence | Format | Length |
|  | Protocol discriminator | Protocol discriminator  9.2 | M | V | 1/2 |
|  | Security header type | Security header type  9.3.1 | M | V | 1/2 |
|  | Identity request message identity | Message type  9.8 | M | V | 1 |
|  | Identity type | Identity type 2  9.9.3.17 | M | V | 1/2 |
|  | Spare half octet | Spare half octet  9.9.2.9 | M | V | 1/2 |

### 8.2.19 Identity response

This message is sent by the UE to the network in response to an IDENTITY REQUEST message and provides the requested identity. See table 8.2.19.1.

Message type: IDENTITY RESPONSE

Significance: dual

Direction: UE to network

Table 8.2.19.1: IDENTITY RESPONSE message content

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| IEI | Information Element | Type/Reference | Presence | Format | Length |
|  | Protocol discriminator | Protocol discriminator  9.2 | M | V | 1/2 |
|  | Security header type | Security header type  9.3.1 | M | V | 1/2 |
|  | Identity response message | Message type  9.8 | M | V | 1 |
|  | Mobile identity | Mobile identity  9.9.2.3 | M | LV | 4-10 |

### 8.2.20 Security mode command

#### 8.2.20.1 Message definition

This message is sent by the network to the UE to establish NAS signalling security. See table 8.2.20.1.

Message type: SECURITY MODE COMMAND

Significance: dual

Direction: network to UE

Table 8.2.20.1: SECURITY MODE COMMAND message content

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| IEI | Information Element | Type/Reference | Presence | Format | Length |
|  | Protocol discriminator | Protocol discriminator  9.2 | M | V | 1/2 |
|  | Security header type | Security header type  9.3.1 | M | V | 1/2 |
|  | Security mode command message identity | Message type  9.8 | M | V | 1 |
|  | Selected NAS security algorithms | NAS security algorithms  9.9.3.23 | M | V | 1 |
|  | NAS key set identifier | NAS key set identifier  9.9.3.21 | M | V | 1/2 |
|  | Spare half octet | Spare half octet  9.9.2.9 | M | V | 1/2 |
|  | Replayed UE security capabilities | UE security capability  9.9.3.36 | M | LV | 3-6 |
| C- | IMEISV request | IMEISV request  9.9.3.18 | O | TV | 1 |
| 55 | Replayed nonceUE | Nonce  9.9.3.25 | O | TV | 5 |
| 56 | NonceMME | Nonce  9.9.3.25 | O | TV | 5 |

#### 8.2.20.2 IMEISV request

The MME may include this information element to request the UE to send its IMEISV with the corresponding SECURITY MODE COMPLETE message.

#### 8.2.20.3 Replayed nonceUE

The MME may include this information element to indicate to the UE to use the replayed nonceUE.

#### 8.2.20.4 NonceMME

The MME may include this information element to indicate to the UE to use the nonceMME.

### 8.2.21 Security mode complete

#### 8.2.21.1 Message definition

This message is sent by the UE to the network in response to a SECURITY MODE COMMAND message. See table 8.2.21.1.

Message type: SECURITY MODE COMPLETE

Significance: dual

Direction: UE to network

Table 8.2.21.1: SECURITY MODE COMPLETE message content

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| IEI | Information Element | Type/Reference | Presence | Format | Length |
|  | Protocol discriminator | Protocol discriminator  9.2 | M | V | 1/2 |
|  | Security header type | Security header type  9.3.1 | M | V | 1/2 |
|  | Security mode complete message identity | Message type  9.8 | M | V | 1 |
| 23 | IMEISV | Mobile identity  9.9.2.3 | O | TLV | 11 |

#### 8.2.21.2 IMEISV

The UE shall include this information element, if the IMEISV was requested within the corresponding SECURITY MODE COMMAND message.

### 8.2.22 Security mode reject

This message is sent by the UE to the network to indicate that the corresponding security mode command has been rejected. See table 8.2.22.1.

Message type: SECURITY MODE REJECT

Significance: dual

Direction: UE to network

Table 8.2.22.1: SECURITY MODE REJECT message content

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| IEI | Information Element | Type/Reference | Presence | Format | Length |
|  | Protocol discriminator | Protocol discriminator  9.2 | M | V | 1/2 |
|  | Security header type | Security header type  9.3.1 | M | V | 1/2 |
|  | Security mode reject message identity | Message type  9.8 | M | V | 1 |
|  | EMM cause | EMM cause  9.9.3.9 | M | V | 1 |

### 8.2.23 Security protected NAS message

This message is sent by the UE or the network to transfer a NAS message together with the sequence number and the message authentication code protecting the message. See table 8.2.23.1.

Message type: SECURITY PROTECTED NAS MESSAGE

Significance: dual

Direction: both

Table 8.2.23.1: SECURITY PROTECTED NAS MESSAGE message content

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| IEI | Information Element | Type/Reference | Presence | Format | Length |
|  | Protocol discriminator | Protocol discriminator  9.2 | M | V | 1/2 |
|  | Security header type | Security header type  9.3.1 | M | V | 1/2 |
|  | Message authentication code | Message authentication code  9.5 | M | V | 4 |
|  | Sequence number | Sequence number  9.6 | M | V | 1 |
|  | NAS message | NAS message  9.7 | M | V | 1-n |

### 8.2.24 Service reject

#### 8.2.24.1 Message definition

This message is sent by the network to the UE in order to reject the service request procedure. See table 8.2.24.1.

Message type: SERVICE REJECT

Significance: dual

Direction: network to UE

Table 8.2.24.1: SERVICE REJECT message content

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | IEI | | Information Element | | Type/Reference | | Presence | | Format | | Length | |
|  | | Protocol discriminator | | Protocol discriminator  9.2 | | M | | V | | 1/2 | |  |
|  | | Security header type | | Security header type  9.3.1 | | M | | V | | 1/2 | |  |
|  |  | | Service reject message identity | | Message type  9.8 | | M | | V | | 1 | |
|  | | EMM cause | | EMM cause  9.9.3.9 | | M | | V | | 1 | |  |
| 5B | | T3442 value | | GPRS timer  9.9.3.16 | | C | | TV | | 2 | |  |
| 5F | | T3346 value | | GPRS timer 2  9.9.3.16A | | O | | TLV | | 3 | |  |

#### 8.2.24.2 T3442 value

The MME shall include this IE when the EMM cause value is #39 "CS service temporarily not available".

#### 8.2.24.3 T3346 value

The MME may include this IE when the general NAS level mobility management congestion control is active.

### 8.2.25 Service request

This message is sent by the UE to the network to request the establishment of a NAS signalling connection and of the radio and S1 bearers. Its structure does not follow the structure of a standard layer 3 message. See table 8.2.25.1.

Message type: SERVICE REQUEST

Significance: dual

Direction: UE to network

Table 8.2.25.1: SERVICE REQUEST message content

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | IEI | | Information Element | | Type/Reference | | Presence | | Format | | Length | |
|  | | Protocol discriminator | | Protocol discriminator  9.2 | | M | | V | | 1/2 | |  |
|  | | Security header type | | Security header type  9.3.1 | | M | | V | | 1/2 | |  |
|  | | KSI and sequence number | | KSI and sequence number  9.9.3.19 | | M | | V | | 1 | |  |
|  | | Message authentication code (short) | | Short MAC  9.9.3.28 | | M | | V | | 2 | |  |

### 8.2.26 Tracking area update accept

#### 8.2.26.1 Message definition

This message is sent by the network to the UE to provide the UE with EPS mobility management related data in response to a tracking area update request message. See table 8.2.26.1.

Message type: TRACKING AREA UPDATE ACCEPT

Significance: dual

Direction: network to UE

Table 8.2.26.1: TRACKING AREA UPDATE ACCEPT message content

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| IEI | Information Element | Type/Reference | Presence | Format | Length |
|  | Protocol discriminator | Protocol discriminator  9.2 | M | V | 1/2 |
|  | Security header type | Security header type  9.3.1 | M | V | 1/2 |
|  | Tracking area update accept message identity | Message type  9.8 | M | V | 1 |
|  | EPS update result | EPS update result  9.9.3.13 | M | V | 1/2 |
|  | Spare half octet | Spare half octet  9.9.2.9 | M | V | 1/2 |
| 5A | T3412 value | GPRS timer  9.9.3.16 | O | TV | 2 |
| 50 | GUTI | EPS mobile identity  9.9.3.12 | O | TLV | 13 |
| 54 | TAI list | Tracking area identity list  9.9.3.33 | O | TLV | 8-98 |
| 57 | EPS bearer context status | EPS bearer context status  9.9.2.1 | O | TLV | 4 |
| 13 | Location area identification | Location area identification  9.9.2.2 | O | TV | 6 |
| 23 | MS identity | Mobile identity  9.9.2.3 | O | TLV | 7-10 |
| 53 | EMM cause | EMM cause  9.9.3.9 | O | TV | 2 |
| 17 | T3402 value | GPRS timer  9.9.3.16 | O | TV | 2 |
| 59 | T3423 value | GPRS timer  9.9.3.16 | O | TV | 2 |
| 4A | Equivalent PLMNs | PLMN list  9.9.2.8 | O | TLV | 5-47 |
| 34 | Emergency number list | Emergency number list  9.9.3.37 | O | TLV | 5-50 |
| 64 | EPS network feature support | EPS network feature support  9.9.3.12A | O | TLV | 3 |
| F- | Additional update result | Additional update result  9.9.3.0A | O | TV | 1 |
| 5E | T3412 extended value | GPRS timer 3  9.9.3.16B | O | TLV | 3 |
| 6A | T3324 value | GPRS timer 2  9.9.3.16A | O | TLV | 3 |
| 6E | Extended DRX parameters | Extended DRX parameters  9.9.3.46 | O | TLV | 3 |
| 68 | Header compression configuration status | Header compression configuration status  9.9.4.27 | O | TLV | 4 |

#### 8.2.26.2 T3412 value

The MME shall include this IE during normal and combined tracking area updating procedure, and may include this IE during periodic tracking area updating procedure.

The MME shall include this IE if it includes the T3412 extended value IE.

#### 8.2.26.3 GUTI

This IE may be included to assign a GUTI to a UE.

#### 8.2.26.4 TAI list

This IE may be included to assign a TAI list to a UE.

#### 8.2.26.5 EPS bearer context status

This IE shall be included if the network wants to indicate the EPS bearer contexts that are active for the UE in the network.

#### 8.2.26.6 Location area identification

This IE may be included to assign a new location area identification to a UE during a combined TA/LA update.

#### 8.2.26.7 MS identity

This IE may be included to assign or unassign a new TMSI to a UE during a combined TA/LA update.

#### 8.2.26.8 EMM cause

This IE shall be included if the combined tracking area updating procedure was successful for EPS services only.

#### 8.2.26.9 T3402 value

This IE may be included to indicate a value for timer T3402.

#### 8.2.26.10 T3423 value

This IE may be included to indicate a value for timer T3423.

If this IE is not included, the UE shall use the default value.

#### 8.2.26.11 Equivalent PLMNs

This IE may be included in order to assign a new equivalent PLMNs list to a UE.

#### 8.2.26.12 Emergency number list

This IE may be sent by the network. If this IE is sent, the contents of this IE indicates a list of emergency numbers valid within the same country as in the cell on which this IE is received.

#### 8.2.26.13 EPS network feature support

The network may include this IE to inform the UE of the support of certain features. If this IE is not included then the UE shall interpret this as a receipt of an information element with all bits of the value part coded as zero.

#### 8.2.26.14 Additional update result

The network may include this IE to provide the UE with additional information about the result of a combined tracking area updating procedure if the procedure was successful for EPS services and non-EPS services, or for EPS services and "SMS only".

#### 8.2.26.15 T3412 extended value

The network may include this IE to provide the UE with a longer periodic tracking area update timer.

#### 8.2.26.16 T3324 value

The network shall include the T3324 value IE if:

- the UE included the T3324 value IE in the TRACKING AREA UPDATE REQUEST message; and

- the network supports PSM and accepts the use of PSM.

#### 8.2.26.17 Extended DRX parameters

The network shall include the Extended DRX parameters IE if:

- the UE included the Extended DRX parameters IE in the TRACKING AREA UPDATE REQUEST message; and

- the network supports eDRX and accepts the use of eDRX.

### 8.2.27 Tracking area update complete

This message shall be sent by the UE to the network in response to a tracking area update accept message if a GUTI has been changed or a new TMSI has been assigned. See table 8.2.27.1.

Message type: TRACKING AREA UPDATE COMPLETE

Significance: dual

Direction: UE to network

Table 8.2.27.1: TRACKING AREA UPDATE COMPLETE message content

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| IEI | Information Element | Type/Reference | Presence | Format | Length |
|  | Protocol discriminator | Protocol discriminator  9.2 | M | V | 1/2 |
|  | Security header type | Security header type  9.3.1 | M | V | 1/2 |
|  | Tracking area update complete message identity | Message type  9.8 | M | V | 1 |

### 8.2.28 Tracking area update reject

#### 8.2.28.1 Message definition

This message is sent by the network to the UE in order to reject the tracking area updating procedure. See table 8.2.28.1.

Message type: TRACKING AREA UPDATE REJECT

Significance: dual

Direction: network to UE

Table 8.2.28.1: TRACKING AREA UPDATE REJECT message content

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | IEI | | Information Element | | Type/Reference | | Presence | | Format | | Length | |
|  | | Protocol discriminator | | Protocol discriminator  9.2 | | M | | V | | 1/2 | |  |
|  | | Security header type | | Security header type  9.3.1 | | M | | V | | 1/2 | |  |
|  |  | | Tracking area update reject  message identity | | Message type  9.8 | | M | | V | | 1 | |
|  | | EMM cause | | EMM cause  9.9.3.9 | | M | | V | | 1 | |  |
| 5F | | T3346 value | | GPRS timer 2  9.9.3.16A | | O | | TLV | | 3 | |  |
| A- | | Extended EMM cause | | Extended EMM cause  9.9.3.26A | | O | | TV | | 1 | |  |

#### 8.2.28.2 T3346 value

The MME may include this IE when the general NAS level mobility management congestion control is active.

#### 8.2.28.3 Extended EMM cause

This IE may be included by the network to indicate additional information associated with the EMM cause.

### 8.2.29 Tracking area update request

#### 8.2.29.1 Message definition

The purposes of sending the tracking area update request by the UE to the network are described in subclause 5.5.3.1. See table 8.2.29.1.

Message type: TRACKING AREA UPDATE REQUEST

Significance: dual

Direction: UE to network

Table 8.2.29.1: TRACKING AREA UPDATE REQUEST message content

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| IEI | Information Element | Type/Reference | Presence | Format | Length |
|  | Protocol discriminator | Protocol discriminator  9.2 | M | V | 1/2 |
|  | Security header type | Security header type  9.3.1 | M | V | 1/2 |
|  | Tracking area update request message identity | Message type  9.8 | M | V | 1 |
|  | EPS update type | EPS update type  9.9.3.14 | M | V | 1/2 |
|  | NAS key set identifier | NAS key set identifier  9.9.3.21 | M | V | 1/2 |
|  | Old GUTI | EPS mobile identity  9.9.3.12 | M | LV | 12 |
| B- | Non-current native NAS key set identifier | NAS key set identifier  9.9.3.21 | O | TV | 1 |
| 8- | GPRS ciphering key sequence number | Ciphering key sequence number  9.9.3.4a | O | TV | 1 |
| 19 | Old P-TMSI signature | P-TMSI signature  9.9.3.26 | O | TV | 4 |
| 50 | Additional GUTI | EPS mobile identity  9.9.3.12 | O | TLV | 13 |
| 55 | NonceUE | Nonce  9.9.3.25 | O | TV | 5 |
| 58 | UE network capability | UE network capability  9.9.3.34 | O | TLV | 4-15 |
| 52 | Last visited registered TAI | Tracking area identity  9.9.3.32 | O | TV | 6 |
| 5C | DRX parameter | DRX parameter  9.9.3.8 | O | TV | 3 |
| A- | UE radio capability information update needed | UE radio capability information update needed  9.9.3.35 | O | TV | 1 |
| 57 | EPS bearer context status | EPS bearer context status  9.9.2.1 | O | TLV | 4 |
| 31 | MS network capability | MS network capability  9.9.3.20 | O | TLV | 4-10 |
| 13 | Old location area identification | Location area identification  9.9.2.2 | O | TV | 6 |
| 9- | TMSI status | TMSI status  9.9.3.31 | O | TV | 1 |
| 11 | Mobile station classmark 2 | Mobile station classmark 2  9.9.2.4 | O | TLV | 5 |
| 20 | Mobile station classmark 3 | Mobile station classmark 3  9.9.2.5 | O | TLV | 2-34 |
| 40 | Supported Codecs | Supported Codec List  9.9.2.10 | O | TLV | 5-n |
| F- | Additional update type | Additional update type  9.9.3.0B | O | TV | 1 |
| 5D | Voice domain preference and UE's usage setting | Voice domain preference and UE's usage setting  9.9.3.44 | O | TLV | 3 |
| E- | Old GUTI type | GUTI type  9.9.3.45 | O | TV | 1 |
| D- | Device properties | Device properties  9.9.2.0A | O | TV | 1 |
| C- | MS network feature support | MS network feature support  9.9.3.20A | O | TV | 1 |
| 10 | TMSI based NRI container | Network resource identifier container  9.9.3.24A | O | TLV | 4 |
| 6A | T3324 value | GPRS timer 2  9.9.3.16 | O | TLV | 3 |
| 5E | T3412 extended value | GPRS timer 3  9.9.3.16B | O | TLV | 3 |
| 6E | Extended DRX parameters | Extended DRX parameters  9.9.3.46 | O | TLV | 3 |

#### 8.2.29.2 Non-current native NAS key set identifier

The UE shall include this IE if the UE has a valid non-current native EPS security context when the UE performs an A/Gb mode or Iu mode to S1 mode inter-system change in EMM-CONNECTED mode and the UE uses a mapped EPS security context to protect the TRACKING AREA UPDATE REQUEST message.

#### 8.2.29.3 GPRS ciphering key sequence number

The UE shall include this IE if the UE performs an A/Gb mode or Iu mode to S1 mode inter-system change in EMM-IDLE mode and the TIN indicates "P-TMSI".

#### 8.2.29.4 Old P-TMSI signature

The UE shall include this IE if the TIN indicates "P-TMSI" and the UE holds a valid P-TMSI signature, P-TMSI and RAI.

#### 8.2.29.5 Additional GUTI

The UE shall include this IE if the TIN indicates "P-TMSI" and the UE holds a valid GUTI, P-TMSI and RAI.

#### 8.2.29.6 NonceUE

This IE is included if the UE performs an A/Gb mode or Iu mode to S1 mode inter-system change in idle mode and the TIN is set to "P-TMSI".

#### 8.2.29.7 UE network capability

The UE shall include this IE, unless the UE performs a periodic tracking area updating procedure.

#### 8.2.29.8 Last visited registered TAI

This IE shall be included if the UE holds a valid last visited registered TAI.

#### 8.2.29.9 DRX parameter

This IE is included by the UE to indicate a change of UE specific DRX parameters to the network.

#### 8.2.29.10 UE radio capability information update needed

The UE shall include this IE if the UE radio capability information in the network needs to be updated.

#### 8.2.29.11 EPS bearer context status

This IE shall be included if the UE wants to indicate the EPS bearer contexts that are active within the UE.

#### 8.2.29.12 MS network capability

A UE supporting A/Gb mode or Iu mode shall include this IE, unless the UE performs a periodic tracking area updating procedure.

#### 8.2.29.13 Old location area identification

The UE shall include this IE during a combined tracking area updating procedure if it has a valid location area identification.

#### 8.2.29.14 TMSI status

The UE shall include this IE during a combined tracking area updating procedure if it has no valid TMSI available.

#### 8.2.29.15 Mobile station classmark 2

This IE shall be included if the UE supports SRVCC to GERAN or UTRAN or supports vSRVCC to UTRAN (see 3GPP TS 23.216 [8]), or if the UE is performing a combined tracking area updating procedure.

#### 8.2.29.16 Mobile station classmark 3

This IE shall be included if the UE supports SRVCC to GERAN.

#### 8.2.29.17 Supported Codecs

This IE shall be included if the UE supports SRVCC to GERAN or UTRAN or supports vSRVCC to UTRAN to indicate its supported speech codecs for CS speech calls.

#### 8.2.29.18 Additional update type

The UE shall include this IE if the UE requests "SMS only".

#### 8.2.29.19 Voice domain preference and UE's usage setting

This IE shall be included in WB-S1 mode if the UE supports:

- CS fallback and SMS over SGs; or

- if the UE is configured to support IMS voice, but does not support 1xCS fallback.

#### 8.2.29.20 Old GUTI type

The UE shall include this IE.

#### 8.2.29.21 Device properties

This IE shall be included if the UE is configured for NAS signalling low priority.

#### 8.2.29.22 MS network feature support

This IE shall be included if the UE supports extended periodic timer T3412.

#### 8.2.29.23 TMSI based NRI container

The UE shall include this IE if it has a valid TMSI.

#### 8.2.29.24 T3324 value

The UE may include this IE to request the use of PSM.

#### 8.2.29.25 T3412 extended value

The UE may include this IE to request a particular T3412 value if the T3324 value IE is included.

#### 8.2.29.26 Extended DRX parameters

The UE may include this IE to request the use of eDRX.

### 8.2.30 Uplink NAS Transport

This message is sent by the UE to the network in order to carry an SMS message in encapsulated format. See table 8.2.30.1.

Message type: UPLINK NAS TRANSPORT

Significance: dual

Direction: UE to network

Table 8.2.30.1: UPLINK NAS TRANSPORT message content

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | IEI | | Information Element | | Type/Reference | | Presence | | Format | | Length | |
|  | | Protocol discriminator | | Protocol discriminator  9.2 | | M | | V | | 1/2 | |  |
|  | | Security header type | | Security header type  9.3.1 | | M | | V | | 1/2 | |  |
|  |  | | Uplink NAS transport message identity | | Message type  9.8 | | M | | V | | 1 | |
|  |  | | NAS message container | | NAS message container  9.9.3.22 | | M | | LV | | 3-252 | |

### 8.2.31 Downlink generic NAS transport

#### 8.2.31.1 Message definition

This message is sent by the network to the UE in order to carry an application message in encapsulated format. See table 8.2.31.1.

Message type: DOWNLINK GENERIC NAS TRANSPORT

Significance: dual

Direction: network to UE

Table 8.2.31.1: DOWNLINK GENERIC NAS TRANSPORT message content

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | IEI | | Information Element | | Type/Reference | | Presence | | Format | | Length | |
|  | | Protocol discriminator | | Protocol discriminator  9.2 | | M | | V | | 1/2 | |  |
|  | | Security header type | | Security header type  9.3.1 | | M | | V | | 1/2 | |  |
|  |  | | Downlink generic NAS transport message identity | | Message type  9.8 | | M | | V | | 1 | |
|  |  | | Generic message container type | | Generic message container type  9.9.3.42 | | M | | V | | 1 | |
|  |  | | Generic message container | | Generic message container  9.9.3.43 | | M | | LV-E | | 3-n | |
|  | 65 | | Additional information | | Additional information  9.9.2.0 | | O | | TLV | | 3-n | |

#### 8.2.31.2 Additional information

The MME may include this information element if the application wants to send any additional information.

### 8.2.32 Uplink generic NAS transport

#### 8.2.32.1 Message definition

This message is sent by the UE to the network in order to carry an application protocol message in encapsulated format. See table 8.2.32.1.

Message type: UPLINK GENERIC NAS TRANSPORT

Significance: dual

Direction: UE to network

Table 8.2.32.1: UPLINK GENERIC NAS TRANSPORT message content

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | IEI | | Information Element | | Type/Reference | | Presence | | Format | | Length | |
|  | | Protocol discriminator | | Protocol discriminator  9.2 | | M | | V | | 1/2 | |  |
|  | | Security header type | | Security header type  9.3.1 | | M | | V | | 1/2 | |  |
|  |  | | Uplink generic NAS transport message identity | | Message type  9.8 | | M | | V | | 1 | |
|  |  | | Generic message container type | | Generic message container type  9.9.3.42 | | M | | V | | 1 | |
|  |  | | Generic message container | | Generic message container  9.9.3.43 | | M | | LV-E | | 3-n | |
|  | 65 | | Additional information | | Additional information  9.9.2.0 | | O | | TLV | | 3-n | |

#### 8.2.32.2 Additional information

The UE may include this information element if the application wants to send any additional information.

### 8.2.33 CONTROL PLANE SERVICE REQUEST

#### 8.2.33.1 Message definition

This message is sent by the UE to the network when the UE is using EPS services with control plane CIoT EPS optimization. See table 8.2.33.1.

Message type: CONTROL PLANE SERVICE REQUEST

Significance: dual

Direction: UE to network

Table 8.2.33.1: CONTROL PLANE SERVICE REQUEST message content

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| IEI | Information Element | Type/Reference | Presence | Format | Length |
|  | Protocol discriminator | Protocol discriminator  9.2 | M | V | 1/2 |
|  | Security header type | Security header type  9.3.1 | M | V | 1/2 |
|  | Control plane service request message identity | Message type  9.8 | M | V | 1 |
|  | Control plane service type | Control plane service type  9.9.3.47 | M | V | 1/2 |
|  | NAS key set identifier | NAS key set identifier  9.9.3.21 | M | V | 1/2 |
| 78 | ESM message container | ESM message container  9.9.3.15 | O | TLV-E | 3-n |
| 67 | NAS message container | NAS message container  9.9.3.22 | O | TLV | 4-253 |
| 57 | EPS bearer context status | EPS bearer context status  9.9.2.1 | O | TLV | 4 |
| D- | Device properties | Device properties  9.9.2.0A | O | TV | 1 |

#### 8.2.33.2 ESM message container

The UE shall include this IE, if it wants to send an ESM message to the network.

#### 8.2.33.3 NAS message container

The UE shall include this IE, if it is in EMM-IDLE mode and has pending SMS messages to be sent.

#### 8.2.33.4 EPS bearer context status

The UE shall include this IE, if it wants to indicate the EPS bearer contexts that are active within the UE.

#### 8.2.33.5 Device properties

The UE shall include this IE if the UE is configured for NAS signalling low priority.

### 8.2.34 Service Accept

#### 8.2.34.1 Message definition

This message is sent by the network in response to the CONTROL PLANE SERVICE REQUEST message. See table 8.2.34.1.

Message type: SERVICE ACCEPT

Significance: dual

Direction: network to UE

Table 8.2.34.1: SERVICE ACCEPT message content

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| IEI | Information Element | Type/Reference | Presence | Format | Length |
|  | Protocol discriminator | Protocol discriminator  9.2 | M | V | 1/2 |
|  | Security header type | Security header type  9.3.1 | M | V | 1/2 |
|  | Service accept message identity | Message type  9.8 | M | V | 1 |
| 57 | EPS bearer context status | EPS bearer context status  9.9.2.1 | O | TLV | 4 |

#### 8.2.34.2 EPS bearer context status

This IE shall be included if the network wants to indicate the EPS bearer contexts that are active for the UE in the network.

## 8.3 EPS session management messages

### 8.3.1 Activate dedicated EPS bearer context accept

#### 8.3.1.1 Message definition

This message is sent by the UE to the network to acknowledge activation of a dedicated EPS bearer context associated with the same PDN address(es) and APN as an already active EPS bearer context. See table 8.3.1.1.

Message type: ACTIVATE DEDICATED EPS BEARER CONTEXT ACCEPT

Significance: dual

Direction: UE to network

Table 8.3.1.1: ACTIVATE DEDICATED EPS BEARER CONTEXT ACCEPT message content

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | IEI | | Information Element | | Type/Reference | | Presence | | Format | | Length | |
|  | | Protocol discriminator | | Protocol discriminator  9.2 | | M | | V | | 1/2 | |  |
|  |  | | EPS bearer identity | | EPS bearer identity  9.3.2 | | M | | V | | 1/2 | |
|  | | Procedure transaction identity | | Procedure transaction identity  9.4 | | M | | V | | 1 | |  |
|  |  | | Activate dedicated EPS bearer context accept message identity | | Message type  9.8 | | M | | V | | 1 | |
|  | 27 | | Protocol configuration options | | Protocol configuration options  9.9.4.11 | | O | | TLV | | 3-253 | |
|  | 33 | | NBIFOM container | | NBIFOM container  9.9.4.19 | | O | | TLV | | 3-257 | |
|  | 7B | | Extended protocol configuration options | | Extended protocol configuration options  9.9.4.26 | | O | | TLV-E | | 4-65538 | |

#### 8.3.1.2 Protocol configuration options

This IE is included in the message when the UE wishes to transmit (protocol) data (e.g. configuration parameters, error codes or messages/events) to the network and the extended protocol configuration options is not supported by the UE or the network.

#### 8.3.1.3 NBIFOM container

This information element is used to transfer information associated with network-based IP flow mobility, see 3GPP TS 24.161 [36].

#### 8.3.1.4 Extended protocol configuration options

This IE is included in the message when the UE wishes to transmit (protocol) data (e.g. configuration parameters, error codes or messages/events) to the network and the extended protocol configuration options is supported by both the UE and the network.

NOTE: The extended protocol configuration options is supported by the network if the network has indicated support of the extended protocol configuration options IE in the mobility management messages and the network has included the extended protocol configuration options IE in the session management messages to the UE.

### 8.3.2 Activate dedicated EPS bearer context reject

#### 8.3.2.1 Message definition

This message is sent by UE to the network to reject activation of a dedicated EPS bearer context. See table 8.3.2.1.

Message type: ACTIVATE DEDICATED EPS BEARER CONTEXT REJECT

Significance: dual

Direction: UE to network

Table 8.3.2.1: ACTIVATE DEDICATED EPS BEARER CONTEXT REJECT message content

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | IEI | | Information Element | | Type/Reference | | Presence | | Format | | Length | |
|  |  | | Protocol discriminator | | Protocol discriminator  9.2 | | M | | V | | 1/2 | |
|  |  | | EPS bearer identity | | EPS bearer identity  9.3.2 | | M | | V | | 1/2 | |
|  | | Procedure transaction identity | | Procedure transaction identity  9.4 | | M | | V | | 1 | |  |
|  |  | | Activate dedicated EPS bearer context reject message identity | | Message type  9.8 | | M | | V | | 1 | |
|  |  | | ESM cause | | ESM cause  9.9.4.4 | | M | | V | | 1 | |
|  | 27 | | Protocol configuration options | | Protocol configuration options  9.9.4.11 | | O | | TLV | | 3-253 | |
|  | 33 | | NBIFOM container | | NBIFOM container  9.9.4.19 | | O | | TLV | | 3-257 | |
|  | 7B | | Extended protocol configuration options | | Extended protocol configuration options  9.9.4.26 | | O | | TLV-E | | 4-65538 | |

#### 8.3.2.2 Protocol configuration options

This IE is included in the message when the UE wishes to transmit (protocol) data (e.g. configuration parameters, error codes or messages/events) to the network and the extended protocol configuration options is not supported by the UE or the network.

#### 8.3.2.3 NBIFOM container

This information element is used to transfer information associated with network-based IP flow mobility, see 3GPP TS 24.161 [36].

#### 8.3.2.4 Extended protocol configuration options

This IE is included in the message when the UE wishes to transmit (protocol) data (e.g. configuration parameters, error codes or messages/events) to the network and the extended protocol configuration options is supported by both the UE and the network.

NOTE: The extended protocol configuration options is supported by the network if the network has indicated support of the extended protocol configuration options IE in the mobility management messages and the network has included the extended protocol configuration options IE in the session management messages to the UE.

### 8.3.3 Activate dedicated EPS bearer context request

#### 8.3.3.1 Message definition

This message is sent by the network to the UE to request activation of a dedicated EPS bearer context associated with the same PDN address(es) and APN as an already active default EPS bearer context. See table 8.3.3.1.

Message type: ACTIVATE DEDICATED EPS BEARER CONTEXT REQUEST

Significance: dual

Direction: network to UE

Table 8.3.3.1: ACTIVATE DEDICATED EPS BEARER CONTEXT REQUEST message content

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | IEI | | | Information Element | | | Type/Reference | | | Presence | | | Format | | | Length | | |  |
|  |  | | | Protocol discriminator | | | Protocol discriminator  9.2 | | | M | | | V | | | 1/2 | | |  |
|  |  | | | EPS bearer identity | | | EPS bearer identity  9.3.2 | | | M | | | V | | | 1/2 | | |  |
|  | | | Procedure transaction identity | | | Procedure transaction identity  9.4 | | | M | | | V | | | 1 | | |  | |
|  |  | | | Activate dedicated EPS bearer context request message identity | | | Message type  9.8 | | | M | | | V | | | 1 | | |  |
|  | |  | | | Linked EPS bearer identity | | | Linked EPS bearer identity  9.9.4.6 | | | M | | | V | | | 1/2 | | |
|  | |  | | | Spare half octet | | | Spare half octet  9.9.2.9 | | | M | | | V | | | 1/2 | | |
|  | |  | | | EPS QoS | | | EPS quality of service  9.9.4.3 | | | M | | | LV | | | 2-14 | | |
|  | |  | | | TFT | | | Traffic flow template  9.9.4.16 | | | M | | | LV | | | 2-256 | | |
|  | | 5D | | | Transaction identifier | | | Transaction identifier  9.9.4.17 | | | O | | | TLV | | | 3-4 | | |
|  | | 30 | | | Negotiated QoS | | | Quality of service  9.9.4.12 | | | O | | | TLV | | | 14-22 | | |
|  | 32 | | | Negotiated LLC SAPI | | | LLC service access point identifier  9.9.4.7 | | | O | | | TV | | | 2 | | |  |
|  | | 8- | | | Radio priority | | | Radio priority  9.9.4.13 | | | O | | | TV | | | 1 | | |
|  | | 34 | | | Packet flow Identifier | | | Packet flow Identifier  9.9.4.8 | | | O | | | TLV | | | 3 | | |
|  | | 27 | | | Protocol configuration options | | | Protocol configuration options  9.9.4.11 | | | O | | | TLV | | | 3-253 | | |
|  | | C- | | | WLAN offload indication | | | WLAN offload acceptability  9.9.4.18 | | | O | | | TV | | | 1 | | |
|  | | 33 | | | NBIFOM container | | | NBIFOM container  9.9.4.19 | | | O | | | TLV | | | 3-257 | | |
|  | | 7B | | | Extended protocol configuration options | | | Extended protocol configuration options  9.9.4.26 | | | O | | | TLV-E | | | 4-65538 | | |

#### 8.3.3.2 Transaction identifier

If the UE supports A/Gb mode or Iu mode or both, a network supporting mobility from S1 mode to A/Gb mode or Iu mode or both shall include this IE

#### 8.3.3.3 Negotiated QoS

If the UE supports A/Gb mode or Iu mode or both, a network supporting mobility from S1 mode to A/Gb mode or Iu mode or both shall include the corresponding R99 QoS parameter values of a PDP context.

#### 8.3.3.4 Negotiated LLC SAPI

If the UE supports A/Gb mode, a network supporting mobility from S1 mode to A/Gb mode shall include this IE.

#### 8.3.3.5 Radio priority

If the UE supports A/Gb mode, a network supporting mobility from S1 mode to A/Gb mode shall include this IE.

#### 8.3.3.6 Packet flow identifier

If the UE supports A/Gb mode and BSS packet flow procedures, a network supporting mobility from S1 mode to A/Gb mode shall include this IE.

#### 8.3.3.7 Protocol configuration options

This IE is included in the message when the network wishes to transmit (protocol) data (e.g. configuration parameters, error codes or messages/events) to the UE and the extended protocol configuration options is not supported by the UE or the network.

#### 8.3.3.8 WLAN offload indication

This IE shall be included in the message when the network wishes to indicate if the UE is allowed to offload the traffic of the associated PDN connection to WLAN(s), as specified in subclause 9.9.4.18.

#### 8.3.3.9 NBIFOM container

This information element is used to transfer information associated with network-based IP flow mobility, see 3GPP TS 24.161 [36].

#### 8.3.3.10 Extended protocol configuration options

This IE is included in the message when the network wishes to transmit (protocol) data (e.g. configuration parameters, error codes or messages/events) to the UE and the extended protocol configuration options is supported by both the UE and the network.

NOTE: The extended protocol configuration options is supported by the network if the network has indicated support of the extended protocol configuration options IE in the mobility management messages and the network has included the extended protocol configuration options IE in the session management messages to the UE.

### 8.3.4 Activate default EPS bearer context accept

#### 8.3.4.1 Message definition

This message is sent by the UE to the network to acknowledge activation of a default EPS bearer context. See table 8.3.4.1.

Message type: ACTIVATE DEFAULT EPS BEARER CONTEXT ACCEPT

Significance: dual

Direction: UE to network

Table 8.3.4.1: ACTIVATE DEFAULT EPS BEARER CONTEXT ACCEPT message content

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| IEI | Information Element | Type/Reference | Presence | Format | Length |  |
|  | Protocol discriminator | Protocol discriminator  9.2 | M | V | 1/2 |  |
|  | EPS bearer identity | EPS bearer identity  9.3.2 | M | V | 1/2 |  |
|  | Procedure transaction identity | Procedure transaction identity  9.4 | M | V | 1 |  |
|  | Activate default EPS bearer context accept message identity | Message type  9.8 | M | V | 1 |  |
| 27 | Protocol configuration options | Protocol configuration options  9.9.4.11 | O | TLV | 3-253 |  |
| 7B | Extended protocol configuration options | Extended protocol configuration options  9.9.4.26 | O | TLV-E | 4-65538 |  |

#### 8.3.4.2 Protocol configuration options

This IE is included in the message when the UE wishes to transmit (protocol) data (e.g. configuration parameters, error codes or messages/events) to the network and the extended protocol configuration options is not supported by the UE or the network.

#### 8.3.4.3 Extended protocol configuration options

This IE is included in the message when the UE wishes to transmit (protocol) data (e.g. configuration parameters, error codes or messages/events) to the network and the extended protocol configuration options is supported by both the UE and the network.

NOTE: The extended protocol configuration options is supported by the network if the network has indicated support of the extended protocol configuration options IE in the mobility management messages and the network has included the extended protocol configuration options IE in the session management messages to the UE.

### 8.3.5 Activate default EPS bearer context reject

#### 8.3.5.1 Message definition

This message is sent by UE to the network to reject activation of a default EPS bearer context. See table 8.3.5.1.

Message type: ACTIVATE DEFAULT EPS BEARER CONTEXT REJECT

Significance: dual

Direction: UE to network

Table 8.3.5.1: ACTIVATE DEFAULT EPS BEARER CONTEXT REJECT message content

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| IEI | Information Element | Type/Reference | Presence | Format | Length |  |
|  | Protocol discriminator | Protocol discriminator  9.2 | M | V | 1/2 |  |
|  | EPS bearer identity | EPS bearer identity  9.3.2 | M | V | 1/2 |  |
|  | Procedure transaction identity | Procedure transaction identity  9.4 | M | V | 1 |  |
|  | Activate default EPS bearer context reject message identity | Message type  9.8 | M | V | 1 |  |
|  | ESM cause | ESM cause  9.9.4.4 | M | V | 1 |  |
| 27 | Protocol configuration options | Protocol configuration options  9.9.4.11 | O | TLV | 3-253 |  |
| 7B | Extended protocol configuration options | Extended protocol configuration options  9.9.4.26 | O | TLV-E | 4-65538 |  |

#### 8.3.5.2 Protocol configuration options

This IE is included in the message when the UE wishes to transmit (protocol) data (e.g. configuration parameters, error codes or messages/events) to the network and the extended protocol configuration options is not supported by the UE or the network.

#### 8.3.5.3 Extended protocol configuration options

This IE is included in the message when the UE wishes to transmit (protocol) data (e.g. configuration parameters, error codes or messages/events) to the network and the extended protocol configuration options is supported by both the UE and the network.

NOTE: The extended protocol configuration options is supported by the network if the network has indicated support of the extended protocol configuration options IE in the mobility management messages and the network has included the extended protocol configuration options IE in the session management messages to the UE.

### 8.3.6 Activate default EPS bearer context request

#### 8.3.6.1 Message definition

This message is sent by the network to the UE to request activation of a default EPS bearer context. See table 8.3.6.1.

Message type: ACTIVATE DEFAULT EPS BEARER CONTEXT REQUEST

Significance: dual

Direction: network to UE

Table 8.3.6.1: ACTIVATE DEFAULT EPS BEARER CONTEXT REQUEST message content

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| IEI | Information Element | Type/Reference | Presence | Format | Length |
|  | Protocol discriminator | Protocol discriminator  9.2 | M | V | 1/2 |
|  | EPS bearer identity | EPS bearer identity  9.3.2 | M | V | 1/2 |
|  | Procedure transaction identity | Procedure transaction identity  9.4 | M | V | 1 |
|  | Activate default EPS bearer context request message identity | Message type  9.8 | M | V | 1 |
|  | EPS QoS | EPS quality of service  9.9.4.3 | M | LV | 2-14 |
|  | Access point name | Access point name  9.9.4.1 | M | LV | 2-101 |
|  | PDN address | PDN address  9.9.4.9 | M | LV | 6-14 |
| 5D | Transaction identifier | Transaction identifier  9.9.4.17 | O | TLV | 3-4 |
| 30 | Negotiated QoS | Quality of service  9.9.4.12 | O | TLV | 14-22 |
| 32 | Negotiated LLC SAPI | LLC service access point identifier  9.9.4.7 | O | TV | 2 |
| 8- | Radio priority | Radio priority  9.9.4.13 | O | TV | 1 |
| 34 | Packet flow Identifier | Packet flow Identifier  9.9.4.8 | O | TLV | 3 |
| 5E | APN-AMBR | APN aggregate maximum bit rate  9.9.4.2 | O | TLV | 4-8 |
| 58 | ESM cause | ESM cause  9.9.4.4 | O | TV | 2 |
| 27 | Protocol configuration options | Protocol configuration options  9.9.4.11 | O | TLV | 3-253 |
| B- | Connectivity type | Connectivity type  9.9.4.2A | O | TV | 1 |
| C- | WLAN offload indication | WLAN offload acceptability  9.9.4.18 | O | TV | 1 |
| 33 | NBIFOM container | NBIFOM container  9.9.4.19 | O | TLV | 3-257 |
| 66 | Header compression configuration | Header compression configuration  9.9.4.22 | O | TLV | 5-257 |
| 9- | Control plane only indication | Control plane only indication  9.9.4.23 | O | TV | 1 |
| 7B | Extended protocol configuration options | Extended protocol configuration options  9.9.4.26 | O | TLV-E | 4-65538 |
| 6E | Serving PLMN rate control | Serving PLMN rate control  9.9.4.28 | O | TLV | 4 |

#### 8.3.6.2 Transaction identifier

If the UE supports A/Gb mode or Iu mode or both, a network supporting mobility from S1 mode to A/Gb mode or Iu mode or both shall include this IE.

#### 8.3.6.3 Negotiated QoS

If the UE supports A/Gb mode or Iu mode or both, a network supporting mobility from S1 mode to A/Gb mode or Iu mode or both shall include the corresponding R99 QoS parameter values of a PDP context.

#### 8.3.6.4 Negotiated LLC SAPI

If the UE supports A/Gb mode, a network supporting mobility from S1 mode to A/Gb mode shall include this IE.

#### 8.3.6.5 Radio priority

If the UE supports A/Gb mode, a network supporting mobility from S1 mode to A/Gb mode shall include this IE.

#### 8.3.6.6 Packet flow identifier

If the UE supports A/Gb mode and BSS packet flow procedures, a network supporting mobility from S1 mode to A/Gb mode shall include this IE.

#### 8.3.6.7 APN-AMBR

This IE is included in the message when the network wishes to transmit the APN-AMBR to the UE for possible uplink policy enforcement.

#### 8.3.6.8 ESM cause

The network shall include this IE, if the network allocated a PDN address of a PDN type which is different from the PDN type requested by the UE.

#### 8.3.6.9 Protocol configuration options

This IE is included in the message when the network wishes to transmit (protocol) data (e.g. configuration parameters, error codes or messages/events) to the UE and the extended protocol configuration options is not supported by the UE or the network.

This IE shall be included if the network supports Local IP address in the traffic flow aggregate description and TFT filter and the extended protocol configuration options is not supported by the UE or the network.

#### 8.3.6.10 Connectivity type

The network shall include the Connectivity type IE if:

- the network is configured to indicate when a PDN connection is a LIPA PDN connection; and

- the present PDN connection is a LIPA PDN connection.

#### 8.3.6.11 WLAN offload indication

This IE shall be included in the message when the network wishes to indicate if the UE is allowed to offload the traffic of the associated PDN connection to WLAN(s), as specified in subclause 9.9.4.18.

#### 8.3.6.12 NBIFOM container

This information element is used to transfer information associated with network-based IP flow mobility, see 3GPP TS 24.161 [36].

#### 8.3.6.13 Header compression configuration

The network may include the Header compression configuration IE if:

- the network accepts an IP PDN type; and

- control plane CIoT EPS optimization is selected.

#### 8.3.6.14 Control plane only indication

The network shall include the Control plane only indication IE if the associated PDN connection is only for control plane CIoT EPS optimization.

#### 8.3.6.15 Extended protocol configuration options

This IE is included in the message when the network wishes to transmit (protocol) data (e.g. configuration parameters, error codes or messages/events) to the UE and the extended protocol configuration options is supported by both the UE and the network.

This IE shall be included if the network supports Local IP address in the traffic flow aggregate description and TFT filter and the extended protocol configuration options is supported by both the UE and the network.

NOTE: The extended protocol configuration options is supported by the network if the network has indicated support of the extended protocol configuration options IE in the mobility management messages and the network has included the extended protocol configuration options IE in the session management messages to the UE.

#### 8.3.6.16 Serving PLMN rate control

This IE shall be included when the network wishes to indicate the maximum number of uplink ESM DATA TRANSPORT messages including User data container IEs the UE is allowed to send per 6 minute interval.

### 8.3.7 Bearer resource allocation reject

#### 8.3.7.1 Message definition

This message is sent by the network to the UE to reject the allocation of a dedicated bearer resource. See table 8.3.7.1.

Message type: BEARER RESOURCE ALLOCATION REJECT

Significance: dual

Direction: network to UE

Table 8.3.7.1: BEARER RESOURCE ALLOCATION REJECT message content

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| IEI | Information Element | Type/Reference | Presence | Format | Length |
|  | Protocol discriminator | Protocol discriminator  9.2 | M | V | 1/2 |
|  | EPS bearer identity | EPS bearer identity  9.3.2 | M | V | 1/2 |
|  | Procedure transaction identity | Procedure transaction identity  9.4 | M | V | 1 |
|  | Bearer resource allocation reject message identity | Message type  9.8 | M | V | 1 |
|  | ESM cause | ESM cause  9.9.4.4 | M | V | 1 |
| 27 | Protocol configuration options | Protocol configuration options  9.9.4.11 | O | TLV | 3-253 |
| 37 | Back-off timer value | GPRS timer 3  9.9.3.16B | O | TLV | 3 |
| 6B | Re-attempt indicator | Re-attempt indicator  9.9.4.13A | O | TLV | 3 |
| 33 | NBIFOM container | NBIFOM container  9.9.4.19 | O | TLV | 3-257 |
| 7B | Extended protocol configuration options | Extended protocol configuration options  9.9.4.26 | O | TLV-E | 4-65538 |

#### 8.3.7.2 Protocol configuration options

This IE is included in the message when the network wishes to transmit (protocol) data (e.g. configuration parameters, error codes or messages/events) to the UE and the extended protocol configuration options is not supported by the UE or the network.

#### 8.3.7.3 Back-off timer value

The network may include this IE if the ESM cause is not #65 "maximum number of EPS bearers reached", to request a minimum time interval before procedure retry is allowed.

#### 8.3.7.4 Re-attempt indicator

The network may include this IE only if it includes the Back-off timer value IE and the ESM cause value is not #26 "insufficient resources".

#### 8.3.7.5 NBIFOM container

This information element is used to transfer information associated with network-based IP flow mobility, see 3GPP TS 24.161 [36].

#### 8.3.7.6 Extended protocol configuration options

This IE is included in the message when the network wishes to transmit (protocol) data (e.g. configuration parameters, error codes or messages/events) to the UE and the extended protocol configuration options is supported by both the UE and the network.

NOTE: The extended protocol configuration options is supported by the network if the network has indicated support of the extended protocol configuration options IE in the mobility management messages and the network has included the extended protocol configuration options IE in the session management messages to the UE.

### 8.3.8 Bearer resource allocation request

#### 8.3.8.1 Message definition

This message is sent by the UE to the network to request the allocation of a dedicated bearer resource. See table 8.3.8.1.

Message type: BEARER RESOURCE ALLOCATION REQUEST

Significance: dual

Direction: UE to network

Table 8.3.8.1: BEARER RESOURCE ALLOCATION REQUEST message content

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| IEI | Information Element | Type/Reference | Presence | Format | Length |
|  | Protocol discriminator | Protocol discriminator  9.2 | M | V | 1/2 |
|  | EPS bearer identity | EPS bearer identity  9.3.2 | M | V | 1/2 |
|  | Procedure transaction identity | Procedure transaction identity  9.4 | M | V | 1 |
|  | Bearer resource allocation request message identity | Message type  9.8 | M | V | 1 |
|  | Linked EPS bearer identity | Linked EPS bearer identity  9.9.4.6 | M | V | 1/2 |
|  | Spare half octet | Spare half octet  9.9.2.9 | M | V | 1/2 |
|  | Traffic flow aggregate | Traffic flow aggregate description  9.9.4.15 | M | LV | 2-256 |
|  | Required traffic flow QoS | EPS quality of service  9.9.4.3 | M | LV | 2-14 |
| 27 | Protocol configuration options | Protocol configuration options  9.9.4.11 | O | TLV | 3-253 |
| C- | Device properties | Device properties  9.9.2.0A | O | TV | 1 |
| 33 | NBIFOM container | NBIFOM container  9.9.4.19 | O | TLV | 3-257 |
| 7B | Extended protocol configuration options | Extended protocol configuration options  9.9.4.26 | O | TLV-E | 4-65538 |

#### 8.3.8.2 Protocol configuration options

This IE is included in the message when the UE wishes to transmit (protocol) data (e.g. configuration parameters, error codes or messages/events) to the network and the extended protocol configuration options is not supported by the network.

#### 8.3.8.3 Device properties

The UE shall include this IE if the UE is configured for NAS signalling low priority.

#### 8.3.8.4 NBIFOM container

This information element is used to transfer information associated with network-based IP flow mobility, see 3GPP TS 24.161 [36].

#### 8.3.8.5 Extended protocol configuration options

This IE is included in the message when the UE wishes to transmit (protocol) data (e.g. configuration parameters, error codes or messages/events) to the network and the extended protocol configuration options is supported by both the UE and the network.

NOTE: The extended protocol configuration options is supported by the network if the network has indicated support of the extended protocol configuration options IE in the mobility management messages and the network has included the extended protocol configuration options IE in the session management messages to the UE.

### 8.3.9 Bearer resource modification reject

#### 8.3.9.1 Message definition

This message is sent by the network to the UE to reject the modification of a dedicated bearer resource. See table 8.3.9.1.

Message type: BEARER RESOURCE MODIFICATION REJECT

Significance: dual

Direction: network to UE

Table 8.3.9.1: BEARER RESOURCE MODIFICATION REJECT message content

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| IEI | Information Element | Type/Reference | Presence | Format | Length |
|  | Protocol discriminator | Protocol discriminator  9.2 | M | V | 1/2 |
|  | EPS bearer identity | EPS bearer identity  9.3.2 | M | V | 1/2 |
|  | Procedure transaction identity | Procedure transaction identity  9.4 | M | V | 1 |
|  | Bearer resource modification reject message identity | Message type  9.8 | M | V | 1 |
|  | ESM cause | ESM cause  9.9.4.4 | M | V | 1 |
| 27 | Protocol configuration options | Protocol configuration options  9.9.4.11 | O | TLV | 3-253 |
| 37 | Back-off timer value | GPRS timer 3  9.9.3.16B | O | TLV | 3 |
| 6B | Re-attempt indicator | Re-attempt indicator  9.9.4.13A | O | TLV | 3 |
| 33 | NBIFOM container | NBIFOM container  9.9.4.19 | O | TLV | 3-257 |
| 7B | Extended protocol configuration options | Extended protocol configuration options  9.9.4.26 | O | TLV-E | 4-65538 |

#### 8.3.9.2 Protocol configuration options

This IE is included in the message when the network wishes to transmit (protocol) data (e.g. configuration parameters, error codes or messages/events) to the UE and the extended protocol configuration options is not supported by the UE or the network.

#### 8.3.9.3 Back-off timer value

The network may include this IE to request a minimum time interval before procedure retry is allowed.

#### 8.3.9.4 Re-attempt indicator

The network may include this IE only if it includes the Back-off timer value IE and the ESM cause value is not #26 "insufficient resources".

#### 8.3.9.5 NBIFOM container

This information element is used to transfer information associated with network-based IP flow mobility, see 3GPP TS 24.161 [36].

#### 8.3.9.6 Extended protocol configuration options

This IE is included in the message when the network wishes to transmit (protocol) data (e.g. configuration parameters, error codes or messages/events) to the UE and the extended protocol configuration options is supported by both the UE and the network.

NOTE: The extended protocol configuration options is supported by the network if the network has indicated support of the extended protocol configuration options IE in the mobility management messages and the network has included the extended protocol configuration options IE in the session management messages to the UE.

### 8.3.10 Bearer resource modification request

#### 8.3.10.1 Message definition

This message is sent by the UE to the network to request the modification of a dedicated bearer resource. See table 8.3.10.1.

Message type: BEARER RESOURCE MODIFICATION REQUEST

Significance: dual

Direction: UE to network

Table 8.3.10.1: BEARER RESOURCE MODIFICATION REQUEST message content

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| IEI | Information Element | Type/Reference | Presence | Format | Length |
|  | Protocol discriminator | Protocol discriminator  9.2 | M | V | 1/2 |
|  | EPS bearer identity | EPS bearer identity  9.3.2 | M | V | 1/2 |
|  | Procedure transaction identity | Procedure transaction identity  9.4 | M | V | 1 |
|  | Bearer resource modification request message identity | Message type  9.8 | M | V | 1 |
|  | EPS bearer identity for packet filter | Linked EPS bearer identity  9.9.4.6 | M | V | 1/2 |
|  | Spare half octet | Spare half octet  9.9.2.9 | M | V | 1/2 |
|  | Traffic flow aggregate | Traffic flow aggregate description  9.9.4.15 | M | LV | 2-256 |
| 5B | Required traffic flow QoS | EPS quality of service  9.9.4.3 | O | TLV | 3-15 |
| 58 | ESM cause | ESM cause  9.9.4.4 | O | TV | 2 |
| 27 | Protocol configuration options | Protocol configuration options  9.9.4.11 | O | TLV | 3-253 |
| C- | Device properties | Device properties  9.9.2.0A | O | TV | 1 |
| 33 | NBIFOM container | NBIFOM container  9.9.4.19 | O | TLV | 3-257 |
| 66 | Header compression configuration | Header compression configuration  9.9.4.22 | O | TLV | 5-257 |
| 7B | Extended protocol configuration options | Extended protocol configuration options  9.9.4.26 | O | TLV-E | 4-65538 |

#### 8.3.10.2 Required traffic flow QoS

This IE is included in the message when the UE requests a change of QoS for the indicated traffic flows and does not request to release all bearer resources for the EPS bearer context.

#### 8.3.10.3 ESM cause

This IE is included in the message when the UE requests the release of a dedicated bearer resource.

#### 8.3.10.4 Protocol configuration options

This IE is included in the message when the UE wishes to transmit (protocol) data (e.g. configuration parameters, error codes or messages/events) to the network and the extended protocol configuration options is not supported by the UE or the network.

#### 8.3.10.5 Device properties

The UE shall include this IE if the UE is configured for NAS signalling low priority.

#### 8.3.10.6 NBIFOM container

This information element is used to transfer information associated with network-based IP flow mobility, see 3GPP TS 24.161 [36].

#### 8.3.10.7 Header compression configuration

This IE is included in the message when the UE wishes to re-negotiate header compression configuration associated to an EPS bearer context.

#### 8.3.10.8 Extended protocol configuration options

This IE is included in the message when the UE wishes to transmit (protocol) data (e.g. configuration parameters, error codes or messages/events) to the network and the extended protocol configuration options is supported by both the UE and the network.

NOTE: The extended protocol configuration options is supported by the network if the network has indicated support of the extended protocol configuration options IE in the mobility management messages and the network has included the extended protocol configuration options IE in the session management messages to the UE.

### 8.3.11 Deactivate EPS bearer context accept

#### 8.3.11.1 Message definition

This message is sent by the UE to acknowledge deactivation of the EPS bearer context requested in the corresponding Deactivate EPS bearer context request message. See table 8.3.11.1.

Message type: DEACTIVATE EPS BEARER CONTEXT ACCEPT

Significance: dual

Direction: UE to network

Table 8.3.11.1: DEACTIVATE EPS BEARER CONTEXT ACCEPT message content

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | IEI | | Information Element | | Type/Reference | | Presence | | Format | | Length | |
|  |  | | Protocol discriminator | | Protocol discriminator  9.2 | | M | | V | | 1/2 | |
|  |  | | EPS bearer identity | | EPS bearer identity  9.3.2 | | M | | V | | 1/2 | |
|  | | Procedure transaction identity | | Procedure transaction identity  9.4 | | M | | V | | 1 | |  |
|  |  | | Deactivate EPS bearer context accept message identity | | Message type  9.8 | | M | | V | | 1 | |
|  | 27 | | Protocol configuration options | | Protocol configuration options  9.9.4.11 | | O | | TLV | | 3-253 | |
|  | 7B | | Extended protocol configuration options | | Extended protocol configuration options  9.9.4.26 | | O | | TLV-E | | 4-65538 | |

#### 8.3.11.2 Protocol configuration options

This IE is included in the message when the UE wishes to transmit (protocol) data (e.g. configuration parameters, error codes or messages/events) to the network and the extended protocol configuration options is not supported by the UE or the network.

#### 8.3.11.3 Void

#### 8.3.11.4 Extended protocol configuration options

This IE is included in the message when the UE wishes to transmit (protocol) data (e.g. configuration parameters, error codes or messages/events) to the network and the extended protocol configuration options is supported by both the UE and the network.

NOTE: The extended protocol configuration options is supported by the network if the network has indicated support of the extended protocol configuration options IE in the mobility management messages and the network has included the extended protocol configuration options IE in the session management messages to the UE.

### 8.3.12 Deactivate EPS bearer context request

#### 8.3.12.1 Message definition

This message is sent by the network to request deactivation of an active EPS bearer context. See table 8.3.12.1.

Message type: DEACTIVATE EPS BEARER CONTEXT REQUEST

Significance: dual

Direction: network to UE

Table 8.3.12.1: DEACTIVATE EPS BEARER CONTEXT REQUEST message content

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | IEI | | Information Element | | Type/Reference | | Presence | | Format | | Length | |
|  |  | | Protocol discriminator | | Protocol discriminator  9.2 | | M | | V | | 1/2 | |
|  |  | | EPS bearer identity | | EPS bearer identity  9.3.2 | | M | | V | | 1/2 | |
|  | | Procedure transaction identity | | Procedure transaction identity  9.4 | | M | | V | | 1 | |  |
|  |  | | Deactivate EPS bearer context request message identity | | Message type  9.8 | | M | | V | | 1 | |
|  |  | | ESM cause | | ESM cause  9.9.4.4 | | M | | V | | 1 | |
|  | 27 | | Protocol configuration options | | Protocol configuration options  9.9.4.11 | | O | | TLV | | 3-253 | |
|  | 37 | | T3396 value | | GPRS timer 3  9.9.3.16B | | O | | TLV | | 3 | |
|  | C- | | WLAN offload indication | | WLAN offload acceptability  9.9.4.18 | | O | | TV | | 1 | |
|  | 33 | | NBIFOM container | | NBIFOM container  9.9.4.19 | | O | | TLV | | 3-257 | |
|  | 7B | | Extended protocol configuration options | | Extended protocol configuration options  9.9.4.26 | | O | | TLV-E | | 4-65538 | |

#### 8.3.12.2 Protocol configuration options

This IE is included in the message when the network wishes to transmit (protocol) data (e.g. configuration parameters, error codes or messages/events) to the UE and the extended protocol configuration options is not supported by the UE or the network.

#### 8.3.12.3 T3396 value

The network may include this IE if the ESM cause is #26 "insufficient resources".

#### 8.3.12.4 WLAN offload indication

This IE shall be included in the message when the network wishes to indicate if the UE is allowed to offload the traffic of the associated PDN connection to WLAN(s), as specified in subclause 9.9.4.18. If the MME wishes to deactivate all EPS bearer contexts of a PDN connection, MME shall not include this IE.

#### 8.3.12.5 NBIFOM container

This information element is used to transfer information associated with network-based IP flow mobility, see 3GPP TS 24.161 [36].

#### 8.3.12.6 Extended protocol configuration options

This IE is included in the message when the network wishes to transmit (protocol) data (e.g. configuration parameters, error codes or messages/events) to the UE and the extended protocol configuration options is supported by both the UE and the network.

NOTE: The extended protocol configuration options is supported by the network if the network has indicated support of the extended protocol configuration options IE in the mobility management messages and the network has included the extended protocol configuration options IE in the session management messages to the UE.

### 8.3.12A ESM dummy message

This message is sent by the UE or the network included in an ESM message container information element during an attach procedure, if the UE does not request for PDN connection. See table 8.3.12A.1.

Message type: ESM DUMMY MESSAGE

Significance: dual

Direction: both

Table 8.3.12A.1: ESM DUMMY MESSAGE message content

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| IEI | Information Element | Type/Reference | Presence | Format | Length |
|  | Protocol discriminator | Protocol discriminator  9.2 | M | V | 1/2 |
|  | EPS bearer identity | EPS bearer identity  9.3.2 | M | V | 1/2 |
|  | Procedure transaction identity | Procedure transaction identity  9.4 | M | V | 1 |
|  | ESM dummy message  message identity | Message type  9.8 | M | V | 1 |

### 8.3.13 ESM information request

This message is sent by the network to the UE to request the UE to provide ESM information, i.e. protocol configuration options or APN or both. See table 8.3.13.1.

Message type: ESM INFORMATION REQUEST

Significance: dual

Direction: network to UE

Table 8.3.13.1: ESM INFORMATION REQUEST message content

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| IEI | Information Element | Type/Reference | Presence | Format | Length |
|  | Protocol discriminator | Protocol discriminator  9.2 | M | V | 1/2 |
|  | EPS bearer identity | EPS bearer identity  9.3.2 | M | V | 1/2 |
|  | Procedure transaction identity | Procedure transaction identity  9.4 | M | V | 1 |
|  | ESM information request message identity | Message type  9.8 | M | V | 1 |

### 8.3.14 ESM information response

#### 8.3.14.1 Message definition

This message is sent by the UE to the network in response to an ESM INFORMATION REQUEST message and provides the requested ESM information. See table 8.3.14.1.

Message type: ESM INFORMATION RESPONSE

Significance: dual

Direction: UE to network

Table 8.3.14.1: ESM INFORMATION RESPONSE message content

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| IEI | Information Element | Type/Reference | Presence | Format | Length |  |
|  | Protocol discriminator | Protocol discriminator  9.2 | M | V | 1/2 |  |
|  | EPS bearer identity | EPS bearer identity  9.3.2 | M | V | 1/2 |  |
|  | Procedure transaction identity | Procedure transaction identity  9.4 | M | V | 1 |  |
|  | ESM information response message identity | Message type  9.8 | M | V | 1 |  |
| 28 | Access point name | Access point name  9.9.4.1 | O | TLV | 3-102 |  |
| 27 | Protocol configuration options | Protocol configuration options  9.9.4.11 | O | TLV | 3-253 |  |
| 7B | Extended protocol configuration options | Extended protocol configuration options  9.9.4.26 | O | TLV-E | 4-65538 |  |

#### 8.3.14.2 Access point name

This IE is included in the message when the UE wishes to request network connectivity as defined by a certain access point name during the attach procedure.

#### 8.3.14.3 Protocol configuration options

This IE is included in the message when, during the attach procedure, the UE wishes to transmit security protected (protocol) data (e.g. configuration parameters, error codes or messages/events) to the network, in WB-S1 mode, or when the PDN Type requested is different from Non-IP.

This IE shall be included if the UE supports local IP address in traffic flow aggregate description and TFT filter, in WB-S1 mode, or when the PDN Type requested is different from Non-IP.

This IE shall not be included if the Extended protocol configuration options IE is included in the message.

#### 8.3.14.4 Extended protocol configuration options

This IE is included in the message when, during the attach procedure, the UE wishes to transmit security protected (protocol) data (e.g. configuration parameters, error codes or messages/events) to the network, in NB-S1 mode or when Non-IP PDN Type is requested.

This IE shall be included if the UE supports local IP address in traffic flow aggregate description and TFT filter, in NB-S1 mode or when Non-IP PDN Type is requested.

This IE shall not be included if the Protocol configuration options IE is included in the message.

### 8.3.15 ESM status

This message is sent by the network or the UE to pass information on the status of the indicated EPS bearer context and report certain error conditions (e.g. as listed in clause 7). See table 8.3.15.1.

Message type: ESM STATUS

Significance: dual

Direction: both

Table 8.3.15.1: ESM STATUS message content

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| IEI | Information Element | Type/Reference | Presence | Format | Length |
|  | Protocol discriminator | Protocol discriminator  9.2 | M | V | 1/2 |
|  | EPS bearer identity | EPS bearer identity  9.3.2 | M | V | 1/2 |
|  | Procedure transaction identity | Procedure transaction identity  9.4 | M | V | 1 |
|  | ESM status message identity | Message type  9.8 | M | V | 1 |
|  | ESM cause | ESM cause  9.9.4.4 | M | V | 1 |

### 8.3.16 Modify EPS bearer context accept

#### 8.3.16.1 Message definition

This message is sent by the UE to the network to acknowledge the modification of an active EPS bearer context. See table 8.3.16.1.

Message type: MODIFY EPS BEARER CONTEXT ACCEPT

Significance: dual

Direction: UE to network

Table 8.3.16.1: MODIFY EPS BEARER CONTEXT ACCEPT message content

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | IEI | | Information Element | | Type/Reference | | Presence | | Format | | Length | |
|  |  | | Protocol discriminator | | Protocol discriminator  9.2 | | M | | V | | 1/2 | |
|  |  | | EPS bearer identity | | EPS bearer identity  9.3.2 | | M | | V | | 1/2 | |
|  | | Procedure transaction identity | | Procedure transaction identity  9.4 | | M | | V | | 1 | |  |
|  |  | | Modify EPS bearer context accept message identity | | Message type  9.8 | | M | | V | | 1 | |
|  | 27 | | Protocol configuration options | | Protocol configuration options  9.9.4.11 | | O | | TLV | | 3-253 | |
|  | 33 | | NBIFOM container | | NBIFOM container  9.9.4.19 | | O | | TLV | | 3-257 | |
|  | 7B | | Extended protocol configuration options | | Extended protocol configuration options  9.9.4.26 | | O | | TLV-E | | 4-65538 | |

#### 8.3.16.2 Protocol configuration options

This IE is included in the message when the UE wishes to transmit (protocol) data (e.g. configuration parameters, error codes or messages/events) to the network and the extended protocol configuration options is not supported by the UE or the network.

#### 8.3.16.3 NBIFOM container

This information element is used to transfer information associated with network-based IP flow mobility, see 3GPP TS 24.161 [36].

#### 8.3.16.4 Extended protocol configuration options

This IE is included in the message when the UE wishes to transmit (protocol) data (e.g. configuration parameters, error codes or messages/events) to the network and the extended protocol configuration options is supported by both the UE and the network.

NOTE: The extended protocol configuration options is supported by the network if the network has indicated support of the extended protocol configuration options IE in the mobility management messages and the network has included the extended protocol configuration options IE in the session management messages to the UE.

### 8.3.17 Modify EPS bearer context reject

#### 8.3.17.1 Message definition

This message is sent by the UE or the network to reject a modification of an active EPS bearer context. See table 8.3.17.1.

Message type: MODIFY EPS BEARER CONTEXT REJECT

Significance: dual

Direction: UE to network

Table 8.3.17.1: MODIFY EPS BEARER CONTEXT REJECT message content

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | IEI | | Information Element | | Type/Reference | | Presence | | Format | | Length | |
|  |  | | Protocol discriminator | | Protocol discriminator  9.2 | | M | | V | | 1/2 | |
|  |  | | EPS bearer identity | | EPS bearer identity  9.3.2 | | M | | V | | 1/2 | |
|  | | Procedure transaction identity | | Procedure transaction identity  9.4 | | M | | V | | 1 | |  |
|  |  | | Modify EPS bearer context reject message identity | | Message type  9.8 | | M | | V | | 1 | |
|  |  | | ESM cause | | ESM cause  9.9.4.4 | | M | | V | | 1 | |
|  | 27 | | Protocol configuration options | | Protocol configuration options  9.9.4.11 | | O | | TLV | | 3-253 | |
|  | 33 | | NBIFOM container | | NBIFOM container  9.9.4.19 | | O | | TLV | | 3-257 | |
|  | 7B | | Extended protocol configuration options | | Extended protocol configuration options  9.9.4.26 | | O | | TLV-E | | 4-65538 | |

#### 8.3.17.2 Protocol configuration options

This IE is included in the message when the UE wishes to transmit (protocol) data (e.g. configuration parameters, error codes or messages/events) to the network and the extended protocol configuration options is not supported by the UE or the network.

#### 8.3.17.3 NBIFOM container

This information element is used to transfer information associated with network-based IP flow mobility, see 3GPP TS 24.161 [36].

#### 8.3.17.4 Extended protocol configuration options

This IE is included in the message when the UE wishes to transmit (protocol) data (e.g. configuration parameters, error codes or messages/events) to the network and the extended protocol configuration options is supported by both the UE and the network.

NOTE: The extended protocol configuration options is supported by the network if the network has indicated support of the extended protocol configuration options IE in the mobility management messages and the network has included the extended protocol configuration options IE in the session management messages to the UE.

### 8.3.18 Modify EPS bearer context request

#### 8.3.18.1 Message definition

This message is sent by the network to the UE to request modification of an active EPS bearer context. See table 8.3.18.1.

Message type: MODIFY EPS BEARER CONTEXT REQUEST

Significance: dual

Direction: network to UE

Table 8.3.18.1: MODIFY EPS BEARER CONTEXT REQUEST message content

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | IEI | | | Information Element | | | Type/Reference | | | Presence | | | Format | | | Length | | |  |
|  |  | | | Protocol discriminator | | | Protocol discriminator  9.2 | | | M | | | V | | | 1/2 | | |  |
|  |  | | | EPS bearer identity | | | EPS bearer identity  9.3.2 | | | M | | | V | | | 1/2 | | |  |
|  | | | Procedure transaction identity | | | Procedure transaction identity  9.4 | | | M | | | V | | | 1 | | |  | |
|  |  | | | Modify EPS bearer context request message identity | | | Message type  9.8 | | | M | | | V | | | 1 | | |  |
|  | 5B | | | New EPS QoS | | | EPS quality of service  9.9.4.3 | | | O | | | TLV | | | 3-15 | | |  |
|  | 36 | | | TFT | | | Traffic flow template  9.9.4.16 | | | O | | | TLV | | | 3-257 | | |  |
|  | | 30 | | | New QoS | | | Quality of service  9.9.4.12 | | | O | | | TLV | | | 14-22 | | |
|  | 32 | | | Negotiated LLC SAPI | | | LLC service access point identifier  9.9.4.7 | | | O | | | TV | | | 2 | | |  |
|  | | 8- | | | Radio priority | | | Radio priority  9.9.4.13 | | | O | | | TV | | | 1 | | |
|  | | 34 | | | Packet flow Identifier | | | Packet flow Identifier  9.9.4.8 | | | O | | | TLV | | | 3 | | |
|  | | 5E | | | APN-AMBR | | | APN aggregate maximum bit rate  9.9.4.2 | | | O | | | TLV | | | 4-8 | | |
|  | 27 | | | Protocol configuration options | | | Protocol configuration options  9.9.4.11 | | | O | | | TLV | | | 3-253 | | |  |
|  | C- | | | WLAN offload indication | | | WLAN offload acceptability  9.9.4.18 | | | O | | | TV | | | 1 | | |  |
|  | 33 | | | NBIFOM container | | | NBIFOM container  9.9.4.19 | | | O | | | TLV | | | 3-257 | | |  |
|  | 66 | | | Header compression configuration | | | Header compression configuration  9.9.4.22 | | | O | | | TLV | | | 5-257 | | |  |
|  | 7B | | | Extended protocol configuration options | | | Extended protocol configuration options  9.9.4.26 | | | O | | | TLV-E | | | 4-65538 | | |  |

#### 8.3.18.2 New EPS QoS

When the EPS QoS of the EPS bearer context is modified, the network shall include the modified EPS QoS assigned to the EPS bearer context.

#### 8.3.18.3 TFT

This IE provides the UE with packet filters.

#### 8.3.18.4 New QoS

If the UE supports A/Gb mode or Iu mode or both and when the corresponding R99 QoS of the EPS bearer context is modified, a network supporting mobility from S1 mode to A/Gb mode or Iu mode or both shall include the corresponding R99 QoS parameter values of a PDP context.

#### 8.3.18.5 Negotiated LLC SAPI

If the UE supports A/Gb mode and when the negotiated LLC SAPI is modified, a network supporting mobility from S1 mode to A/Gb mode shall include this IE.

#### 8.3.18.6 Radio priority

If the UE supports A/Gb mode and when the radio priority is modified, a network supporting mobility from S1 mode to A/Gb mode shall include this IE.

#### 8.3.18.7 Packet flow identifier

If the UE supports A/Gb mode and BSS packet flow procedures, a network supporting mobility from S1 mode to A/Gb mode shall include this IE.

#### 8.3.18.8 APN-AMBR

This IE is included when the APN-AMBR has been changed by the network.

#### 8.3.18.9 Protocol configuration options

This IE is included in the message when the network wishes to transmit (protocol) data (e.g. configuration parameters, error codes or messages/events) to the UE and the extended protocol configuration options is not supported by the UE or the network.

#### 8.3.18.10 WLAN offload indication

This IE shall be included in the message when the network wishes to indicate if the UE is allowed to offload the traffic of the associated PDN connection to WLAN(s), as specified in subclause 9.9.4.18.

#### 8.3.18.11 NBIFOM container

This information element is used to transfer information associated with network-based IP flow mobility, see 3GPP TS 24.161 [36].

#### 8.3.18.12 Header compression configuration

This IE is included in the message when the network wishes to re-negotiate header compression configuration associated to an EPS bearer context.

#### 8.3.18.13 Extended protocol configuration options

This IE is included in the message when the network wishes to transmit (protocol) data (e.g. configuration parameters, error codes or messages/events) to the UE and the extended protocol configuration options is supported by both the UE and the network.

NOTE: The extended protocol configuration options is supported by the network if the network has indicated support of the extended protocol configuration options IE in the mobility management messages and the network has included the extended protocol configuration options IE in the session management messages to the UE.

### 8.3.18A Notification

This message is sent by the network to inform the UE about events which are relevant for the upper layer using an EPS bearer context or having requested a procedure transaction. See table 8.3.18A.1.

Message type: NOTIFICATION

Significance: local

Direction: network to UE

Table 8.3.18A.1: NOTIFICATION message content

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| IEI | Information Element | Type/Reference | Presence | Format | Length |
|  | Protocol discriminator | Protocol discriminator  9.2 | M | V | 1/2 |
|  | EPS bearer identity | EPS bearer identity  9.3.2 | M | V | 1/2 |
|  | Procedure transaction identity | Procedure transaction identity  9.4 | M | V | 1 |
|  | Notification message identity | Message type  9.8 | M | V | 1 |
|  | Notification indicator | Notification indicator  9.9.4.7A | M | LV | 2 |

### 8.3.19 PDN connectivity reject

#### 8.3.19.1 Message definition

This message is sent by the network to the UE to reject establishment of a PDN connection. See table 8.3.19.1.

Message type: PDN CONNECTIVITY REJECT

Significance: dual

Direction: network to UE

Table 8.3.19.1: PDN CONNECTIVITY REJECT message content

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| IEI | Information Element | Type/Reference | Presence | Format | Length |
|  | Protocol discriminator | Protocol discriminator  9.2 | M | V | 1/2 |
|  | EPS bearer identity | EPS bearer identity  9.3.2 | M | V | 1/2 |
|  | Procedure transaction identity | Procedure transaction identity  9.4 | M | V | 1 |
|  | PDN connectivity reject message identity | Message type  9.8 | M | V | 1 |
|  | ESM cause | ESM cause  9.9.4.4 | M | V | 1 |
| 27 | Protocol configuration options | Protocol configuration options  9.9.4.11 | O | TLV | 3-253 |
| 37 | Back-off timer value | GPRS timer 3  9.9.3.16B | O | TLV | 3 |
| 6B | Re-attempt indicator | Re-attempt indicator  9.9.4.13A | O | TLV | 3 |
| 33 | NBIFOM container | NBIFOM container  9.9.4.19 | O | TLV | 3-257 |
| 7B | Extended protocol configuration options | Extended protocol configuration options  9.9.4.26 | O | TLV-E | 4-65538 |

#### 8.3.19.2 Protocol configuration options

This IE is included in the message when the network wishes to transmit (protocol) data (e.g. configuration parameters, error codes or messages/events) to the UE and the extended protocol configuration options is not supported by the UE or the network.

#### 8.3.19.3 Back-off timer value

The network may include this IE if the ESM cause is not #50 "PDN type IPv4 only allowed", #51 "PDN type IPv6 only allowed", #54 "PDN connection does not exist", #57 "PDN type IPv4v6 only allowed", #58 "PDN type non IP only allowed", nor #65 "maximum number of EPS bearers reached", to request a minimum time interval before procedure retry is allowed.

#### 8.3.19.4 Re-attempt indicator

The network may include this IE only if the ESM cause value is #50 "PDN type IPv4 only allowed", #51 "PDN type IPv6 only allowed", #57 "PDN type IPv4v6 only allowed", #58 "PDN type non IP only allowed", or #66 "requested APN not supported in current RAT and PLMN combination", or if the network includes the Back-off timer value IE and the ESM cause value is not #26 "insufficient resources".

#### 8.3.19.5 Extended protocol configuration options

This IE is included in the message when the network wishes to transmit (protocol) data (e.g. configuration parameters, error codes or messages/events) to the UE and the extended protocol configuration options is supported by both the UE and the network.

NOTE: The extended protocol configuration options is supported by the network if the network has indicated support of the extended protocol configuration options IE in the mobility management messages and the network has included the extended protocol configuration options IE in the session management messages to the UE.

### 8.3.20 PDN connectivity request

#### 8.3.20.1 Message definition

This message is sent by the UE to the network to initiate establishment of a PDN connection. See table 8.3.20.1.

Message type: PDN CONNECTIVITY REQUEST

Significance: dual

Direction: UE to networks

Table 8.3.20.1: PDN CONNECTIVITY REQUEST message content

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| IEI | Information Element | Type/Reference | Presence | Format | Length |  |
|  | Protocol discriminator | Protocol discriminator  9.2 | M | V | 1/2 |  |
|  | EPS bearer identity | EPS bearer identity  9.3.2 | M | V | 1/2 |  |
|  | Procedure transaction identity | Procedure transaction identity  9.4 | M | V | 1 |  |
|  | PDN connectivity request message identity | Message type  9.8 | M | V | 1 |  |
|  | Request type | Request type  9.9.4.14 | M | V | 1/2 |  |
|  | PDN type | PDN type  9.9.4.10 | M | V | 1/2 |  |
| D- | ESM information transfer flag | ESM information transfer flag  9.9.4.5 | O | TV | 1 |  |
| 28 | Access point name | Access point name  9.9.4.1 | O | TLV | 3-102 |  |
| 27 | Protocol configuration options | Protocol configuration options  9.9.4.11 | O | TLV | 3-253 |  |
| C- | Device properties | Device properties  9.9.2.0A | O | TV | 1 |  |
| 33 | NBIFOM container | NBIFOM container  9.9.4.19 | O | TLV | 3-257 |  |
| 66 | Header compression configuration | Header compression configuration  9.9.4.22 | O | TLV | 5-257 |  |
| 7B | Extended protocol configuration options | Extended protocol configuration options  9.9.4.26 | O | TLV-E | 4-65538 |  |

#### 8.3.20.2 ESM information transfer flag

The UE shall include this IE in the PDN CONNECTIVITY REQUEST message sent during the attach procedure if the UE has protocol configuration options that need to be transferred security protected or wishes to provide an access point name for the PDN connection to be established during the attach procedure.

#### 8.3.20.3 Access point name

This IE is included in the message when the UE wishes to request network connectivity as defined by a certain access point name. This IE shall not be included when the PDN CONNECTIVITY REQUEST message is included in an ATTACH REQUEST message or if the request type indicates "emergency".

#### 8.3.20.4 Protocol configuration options

This IE is included in the message when the UE wishes to transmit (protocol) data (e.g. configuration parameters, error codes or messages/events) to the network, in WB-S1 mode, or when the PDN Type requested is different from Non-IP.

This IE shall be included if the UE supports local IP address in traffic flow aggregate description and TFT filter, in WB-S1 mode, or when the PDN Type requested is different from Non-IP.

This IE shall not be included if the Extended protocol configuration options IE is included in the message.

#### 8.3.20.5 Device properties

The UE shall include this IE if the UE is configured for NAS signalling low priority.

#### 8.3.20.6 NBIFOM container

This information element is used to transfer information associated with network-based IP flow mobility, see 3GPP TS 24.161 [36].

#### 8.3.20.7 Header compression configuration

The UE shall include the Header compression configuration IE if:

- the PDN type value of the PDN type IE is set to IPv4 or IPv6 or IPv4v6;

- the UE indicates "Control Plane CIoT EPS optimization supported" in the UE network capability IE of the ATTACH REQUEST message; and

- the UE supports header compression.

#### 8.3.20.8 Extended protocol configuration options

This IE is included in the message when, during the attach procedure, the UE wishes to transmit security protected (protocol) data (e.g. configuration parameters, error codes or messages/events) to the network, in NB-S1 mode or when Non-IP PDN Type is requested.

This IE shall be included if the UE supports local IP address in traffic flow aggregate description and TFT filter, in NB-S1 mode or when Non-IP PDN Type is requested.

This IE shall not be included if the Protocol configuration options IE is included in the message.

### 8.3.21 PDN disconnect reject

#### 8.3.21.1 Message definition

This message is sent by the network to the UE to reject release of a PDN connection. See table 8.3.21.1.

Message type: PDN DISCONNECT REJECT

Significance: dual

Direction: network to UE

Table 8.3.21.1: PDN DISCONNECT REJECT message content

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| IEI | Information Element | Type/Reference | Presence | Format | Length |
|  | Protocol discriminator | Protocol discriminator  9.2 | M | V | 1/2 |
|  | EPS bearer identity | EPS bearer identity  9.3.2 | M | V | 1/2 |
|  | Procedure transaction identity | Procedure transaction identity  9.4 | M | V | 1 |
|  | PDN disconnect reject message identity | Message type  9.8 | M | V | 1 |
|  | ESM cause | ESM cause  9.9.4.4 | M | V | 1 |
| 27 | Protocol configuration options | Protocol configuration options  9.9.4.11 | O | TLV | 3-253 |
| 7B | Extended protocol configuration options | Extended protocol configuration options  9.9.4.26 | O | TLV-E | 4-65538 |

#### 8.3.21.2 Protocol configuration options

This IE is included in the message when the network wishes to transmit (protocol) data (e.g. configuration parameters, error codes or messages/events) to the UE and the extended protocol configuration options is not supported by the UE or the network.

#### 8.3.21.3 Extended protocol configuration options

This IE is included in the message when the network wishes to transmit (protocol) data (e.g. configuration parameters, error codes or messages/events) to the UE and the extended protocol configuration options is supported by both the UE and the network.

NOTE: The extended protocol configuration options is supported by the network if the network has indicated support of the extended protocol configuration options IE in the mobility management messages and the network has included the extended protocol configuration options IE in the session management messages to the UE.

### 8.3.22 PDN disconnect request

#### 8.3.22.1 Message definition

This message is sent by the UE to the network to initiate release of a PDN connection. See table 8.3.22.1.

Message type: PDN DISCONNECT REQUEST

Significance: dual

Direction: UE to network

Table 8.3.22.1: PDN DISCONNECT REQUEST message content

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| IEI | Information Element | Type/Reference | Presence | Format | Length |
|  | Protocol discriminator | Protocol discriminator  9.2 | M | V | 1/2 |
|  | EPS bearer identity | EPS bearer identity  9.3.2 | M | V | 1/2 |
|  | Procedure transaction identity | Procedure transaction identity  9.4 | M | V | 1 |
|  | PDN disconnect request message identity | Message type  9.8 | M | V | 1 |
|  | Linked EPS bearer identity | Linked EPS bearer identity  9.9.4.6 | M | V | 1/2 |
|  | Spare half octet | Spare half octet  9.9.2.9 | M | V | 1/2 |
| 27 | Protocol configuration options | Protocol configuration options  9.9.4.11 | O | TLV | 3-253 |
| 7B | Extended protocol configuration options | Extended protocol configuration options  9.9.4.26 | O | TLV-E | 4-65538 |

#### 8.3.22.2 Protocol configuration options

This IE is included in the message when the UE wishes to transmit (protocol) data (e.g. configuration parameters, error codes or messages/events) to the network and the extended protocol configuration options is not supported by the UE or the network.

#### 8.3.22.3 Extended protocol configuration options

This IE is included in the message when the UE wishes to transmit (protocol) data (e.g. configuration parameters, error codes or messages/events) to the network and the extended protocol configuration options is supported by both the UE and the network.

NOTE: The extended protocol configuration options is supported by the network if the network has indicated support of the extended protocol configuration options IE in the mobility management messages and the network has included the extended protocol configuration options IE in the session management messages to the UE.

### 8.3.23 Remote UE report

#### 8.3.23.1 Message definition

This message is sent by the UE to the network to report connection or disconnection of remote UE(s). See table 8.3.23.1.

Message type: REMOTE UE REPORT

Significance: dual

Direction: UE to network

Table 8.3.23.1: REMOTE UE REPORT message content

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| IEI | Information Element | Type/Reference | Presence | Format | Length |
|  | Protocol discriminator | Protocol discriminator  9.2 | M | V | 1/2 |
|  | EPS bearer identity | EPS bearer identity  9.3.2 | M | V | 1/2 |
|  | Procedure transaction identity | Procedure transaction identity  9.4 | M | V | 1 |
|  | Remote UE report message identity | Message type  9.8 | M | V | 1 |
| 79 | Remote UE Context Connected | Remote UE context list IE  9.9.4.20 | O | TLV-E | 3-65538 |
| 7A | Remote UE Context Disconnected | Remote UE context list IE  9.9.4.20 | O | TLV-E | 3-65538 |
| 6F | ProSe Key Management Function address | PKMF address IE  9.9.4.21 | O | TLV | 3-19 |

#### 8.3.23.2 Remote UE Context Connected

This IE is included in the message by the UE acting as ProSe UE-to-network relay to provide the network with newly connected remote UE information as specified in 3GPP TS 23.303 [31].

#### 8.3.23.3 Remote UE Context Disconnected

This IE is included in the message by the UE acting as ProSe UE-to-Network Relay to provide the network with disconnected remote UE information as specified in 3GPP TS 23.303 [31].

#### 8.3.23.4 ProSe Key Management Function Address

This IE is included in the message by the UE acting as ProSe UE-to-network relay to provide the network with the address of the ProSe Key Management Function associated with the remote UEs connected to or disconnected from the ProSe UE-to-network relay.

### 8.3.24 Remote UE report response

#### 8.3.24.1 Message definition

This message is sent by the network to the UE to acknowledge receipt of a Remote UE report message. See table 8.3.24.1.

Message type: REMOTE UE REPORT RESPONSE

Significance: dual

Direction: network to UE

Table 8.3.24.1: REMOTE UE REPORT RESPONSE message content

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| IEI | Information Element | Type/Reference | Presence | Format | Length |
|  | Protocol discriminator | Protocol discriminator  9.2 | M | V | 1/2 |
|  | EPS bearer identity | EPS bearer identity  9.3.2 | M | V | 1/2 |
|  | Procedure transaction identity | Procedure transaction identity  9.4 | M | V | 1 |
|  | Remote UE report response message identity | Message type  9.8 | M | V | 1 |

### 8.3.25 ESM DATA TRANSPORT

#### 8.3.25.1 Message definition

This message is sent by the UE or the network in order to carry user data in an encapsulated format. See table 8.3.25.1.

Message type: ESM DATA TRANSPORT

Significance: dual

Direction: both

Table 8.3.25.1: ESM DATA TRANSPORT message content

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| IEI | Information Element | Type/Reference | Presence | Format | Length |
|  | Protocol discriminator | Protocol discriminator  9.2 | M | V | 1/2 |
|  | EPS bearer identity | EPS bearer identity  9.3.2 | M | V | 1/2 |
|  | Procedure transaction identity | Procedure transaction identity  9.4 | M | V | 1 |
|  | ESM data transport message identity | Message type  9.8 | M | V | 1 |
|  | User data container | User data container  9.9.4.24 | M | LV-E | 2-n |
| F- | Release assistance indication | Release assistance indication  9.9.4.25 | O | TV | 1 |

#### 8.3.25.2 Release assistance indication

The UE may include this IE to inform the network whether

- no further uplink or downlink data transmission is expected; or

- only a single downlink data transmission (e.g. acknowledgement or response to uplink data) and no further uplink data transmission subsequent to the uplink data transmission is expected.

# 9 General message format and information elements coding

## 9.1 Overview

Within the protocols defined in the present document, every message, except the SERVICE REQUEST message, is a standard L3 message as defined in 3GPP TS 24.007 [12]. This means that the message consists of the following parts:

1) if the message is a plain NAS message:

a) protocol discriminator;

b) EPS bearer identity or security header type;

c) procedure transaction identity;

d) message type;

e) other information elements, as required.

2) if the message is a security protected NAS message:

a) protocol discriminator;

b) security header type;

c) message authentication code;

d) sequence number;

e) plain NAS message, as defined in item 1.

The organization of a plain NAS message is illustrated in the example shown in figure 9.1.1.

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 |  |
| EPS bearer identity  or Security header type | | | | Protocol discriminator | | | | octet 1 |
| Procedure transaction identity | | | | | | | | octet 1a\* |
| Message type | | | | | | | | octet 2 |
|  | | | | | | | | octet 3 |
| Other information elements as required | | | | | | | |  |
|  | | | | | | | | octet n |

Figure 9.1.1: General message organization example for a plain NAS message

The organization of a security protected NAS message is illustrated in the example shown in figure 9.1.2.

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 |  |
| Security header type | | | | Protocol discriminator | | | | octet 1 |
|  | | | | | | | | octet 2 |
| Message authentication code | | | | | | | |  |
|  | | | | | | | |  |
|  | | | | | | | | octet 5 |
| Sequence number | | | | | | | | octet 6 |
|  | | | | | | | | octet 7 |
| NAS message | | | | | | | |  |
|  | | | | | | | | octet n |

Figure 9.1.2: General message organization example for a security protected NAS message

The EPS bearer identity and the procedure transaction identity are only used in messages with protocol discriminator EPS session management. Octet 1a with the procedure transaction identity shall only be included in these messages.

Unless specified otherwise in the message descriptions of clause 8, a particular information element shall not be present more than once in a given message.

When a field extends over more than one octet, the order of bit values progressively decreases as the octet number increases. The least significant bit of the field is represented by the lowest numbered bit of the highest numbered octet of the field.

## 9.2 Protocol discriminator

The Protocol Discriminator (PD) and its use are defined in 3GPP TS 24.007 [12]. The protocol discriminator in the header (see 3GPP TS 24.007 [12]) of a security protected NAS message is encoded as "EPS mobility management messages".

## 9.3 Security header type and EPS bearer identity

### 9.3.1 Security header type

Bits 5 to 8 of the first octet of every EPS Mobility Management (EMM) message contain the Security header type IE. This IE includes control information related to the security protection of a NAS message. The total size of the Security header type IE is 4 bits.

The Security header type IE can take the values shown in table 9.3.1.

Table 9.3.1: Security header type

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Security header type (octet 1) | | | | |
|  | | | | |
| 8 | 7 | 6 | 5 |  |
| 0 | 0 | 0 | 0 | Plain NAS message, not security protected |
|  |  |  |  |  |
|  |  |  |  | Security protected NAS message: |
| 0 | 0 | 0 | 1 | Integrity protected |
| 0 | 0 | 1 | 0 | Integrity protected and ciphered |
| 0 | 0 | 1 | 1 | Integrity protected with new EPS security context (NOTE 1) |
| 0 | 1 | 0 | 0 | Integrity protected and ciphered with new EPS security context (NOTE 2) |
| 0 | 1 | 0 | 1 | Integrity protected and partially ciphered NAS message (NOTE 4) |
|  |  |  |  |  |
|  |  |  |  | Non-standard L3 message: |
| 1 | 1 | 0 | 0 | Security header for the SERVICE REQUEST message |
|  |  |  |  |  |
| 1 | 1 | 0 | 1 | These values are not used in this version of the protocol. |
| to | | | | If received they shall be interpreted as '1100'. (NOTE 3) |
| 1 | 1 | 1 | 1 |  |
|  |  |  |  |  |
| All other values are reserved. | | | | |
|  | | | | |
| NOTE 1: This codepoint may be used only for a SECURITY MODE COMMAND message.  NOTE 2: This codepoint may be used only for a SECURITY MODE COMPLETE message.  NOTE 3: When bits 7 and 8 are set to '11', bits 5 and 6 can be used for future extensions of the SERVICE REQUEST message.  NOTE 4: This codepoint may be used only for a CONTROL PLANE SERVICE REQUEST message. | | | | |

An EMM message received with the security header type encoded as 0000 shall be treated as not security protected, plain NAS message. A protocol entity sending a not security protected EMM message shall send the message as plain NAS message and encode the security header type as 0000.

### 9.3.2 EPS bearer identity

Bits 5 to 8 of the first octet of every EPS Session Management (ESM) message contain the EPS bearer identity. The EPS bearer identity and its use to identify a message flow are defined in 3GPP TS 24.007 [12].

## 9.4 Procedure transaction identity

Bits 1 to 8 of the second octet (octet 1a) of every EPS Session Management (ESM) message contain the procedure transaction identity. The procedure transaction identity and its use are defined in 3GPP TS 24.007 [12].

## 9.5 Message authentication code

The Message authentication code (MAC) information element contains the integrity protection information for the message. The MAC IE shall be included in the security protected NAS message if a valid EPS security context exists and security functions are started. The usage of MAC is specified in subclause 4.4.3.3.

## 9.6 Sequence number

This IE includes the NAS message sequence number (SN) which consists of the eight least significant bits of the NAS COUNT for a security protected NAS message The usage of SN is specified in subclause 4.4.3.

## 9.7 NAS message

This IE includes a complete plain NAS message as specified in subclause 8.2 and 8.3. The SECURITY PROTECTED NAS MESSAGE and the SERVICE REQUEST message are not plain NAS messages and shall not be included in this IE.

## 9.8 Message type

The message type IE and its use are defined in 3GPP TS 24.007 [12]. Tables 9.8.1 and 9.8.2 define the value part of the message type IE used in the EPS mobility management protocol and EPS session management protocol.

Table 9.8.1: Message types for EPS mobility management

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Bits | | | | | | | |  |  |
| 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 |  |  |
|  |  |  |  |  |  |  |  |  |  |
| 0 | 1 | - | - | - | - | - | - |  | EPS mobility management messages |
|  |  |  |  |  |  |  |  |  |  |
| 0 | 1 | 0 | 0 | 0 | 0 | 0 | 1 |  | Attach request |
| 0 | 1 | 0 | 0 | 0 | 0 | 1 | 0 |  | Attach accept |
| 0 | 1 | 0 | 0 | 0 | 0 | 1 | 1 |  | Attach complete |
| 0 | 1 | 0 | 0 | 0 | 1 | 0 | 0 |  | Attach reject |
| 0 | 1 | 0 | 0 | 0 | 1 | 0 | 1 |  | Detach request |
| 0 | 1 | 0 | 0 | 0 | 1 | 1 | 0 |  | Detach accept |
|  |  |  |  |  |  |  |  |  |  |
| 0 | 1 | 0 | 0 | 1 | 0 | 0 | 0 |  | Tracking area update request |
| 0 | 1 | 0 | 0 | 1 | 0 | 0 | 1 |  | Tracking area update accept |
| 0 | 1 | 0 | 0 | 1 | 0 | 1 | 0 |  | Tracking area update complete |
| 0 | 1 | 0 | 0 | 1 | 0 | 1 | 1 |  | Tracking area update reject |
|  |  |  |  |  |  |  |  |  |  |
| 0 | 1 | 0 | 0 | 1 | 1 | 0 | 0 |  | Extended service request |
| 0 | 1 | 0 | 0 | 1 | 1 | 0 | 1 |  | Control plane service request |
| 0 | 1 | 0 | 0 | 1 | 1 | 1 | 0 |  | Service reject |
| 0 | 1 | 0 | 0 | 1 | 1 | 1 | 1 |  | Service accept |
|  |  |  |  |  |  |  |  |  |  |
| 0 | 1 | 0 | 1 | 0 | 0 | 0 | 0 |  | GUTI reallocation command |
| 0 | 1 | 0 | 1 | 0 | 0 | 0 | 1 |  | GUTI reallocation complete |
| 0 | 1 | 0 | 1 | 0 | 0 | 1 | 0 |  | Authentication request |
| 0 | 1 | 0 | 1 | 0 | 0 | 1 | 1 |  | Authentication response |
| 0 | 1 | 0 | 1 | 0 | 1 | 0 | 0 |  | Authentication reject |
| 0 | 1 | 0 | 1 | 1 | 1 | 0 | 0 |  | Authentication failure |
| 0 | 1 | 0 | 1 | 0 | 1 | 0 | 1 |  | Identity request |
| 0 | 1 | 0 | 1 | 0 | 1 | 1 | 0 |  | Identity response |
| 0 | 1 | 0 | 1 | 1 | 1 | 0 | 1 |  | Security mode command |
| 0 | 1 | 0 | 1 | 1 | 1 | 1 | 0 |  | Security mode complete |
| 0 | 1 | 0 | 1 | 1 | 1 | 1 | 1 |  | Security mode reject |
|  |  |  |  |  |  |  |  |  |  |
| 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 |  | EMM status |
| 0 | 1 | 1 | 0 | 0 | 0 | 0 | 1 |  | EMM information |
| 0 | 1 | 1 | 0 | 0 | 0 | 1 | 0 |  | Downlink NAS transport |
| 0 | 1 | 1 | 0 | 0 | 0 | 1 | 1 |  | Uplink NAS transport |
| 0 | 1 | 1 | 0 | 0 | 1 | 0 | 0 |  | CS Service notification |
| 0 | 1 | 1 | 0 | 1 | 0 | 0 | 0 |  | Downlink generic NAS transport |
| 0 | 1 | 1 | 0 | 1 | 0 | 0 | 1 |  | Uplink generic NAS transport |

Table 9.8.2: Message types for EPS session management

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Bits | | | | | | | |  |  |
| 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 |  |  |
|  |  |  |  |  |  |  |  |  |  |
| 1 | 1 | - | - | - | - | - | - |  | EPS session management messages |
|  |  |  |  |  |  |  |  |  |  |
| 1 | 1 | 0 | 0 | 0 | 0 | 0 | 1 |  | Activate default EPS bearer context request |
| 1 | 1 | 0 | 0 | 0 | 0 | 1 | 0 |  | Activate default EPS bearer context accept |
| 1 | 1 | 0 | 0 | 0 | 0 | 1 | 1 |  | Activate default EPS bearer context reject |
|  |  |  |  |  |  |  |  |  |  |
| 1 | 1 | 0 | 0 | 0 | 1 | 0 | 1 |  | Activate dedicated EPS bearer context request |
| 1 | 1 | 0 | 0 | 0 | 1 | 1 | 0 |  | Activate dedicated EPS bearer context accept |
| 1 | 1 | 0 | 0 | 0 | 1 | 1 | 1 |  | Activate dedicated EPS bearer context reject |
|  |  |  |  |  |  |  |  |  |  |
| 1 | 1 | 0 | 0 | 1 | 0 | 0 | 1 |  | Modify EPS bearer context request |
| 1 | 1 | 0 | 0 | 1 | 0 | 1 | 0 |  | Modify EPS bearer context accept |
| 1 | 1 | 0 | 0 | 1 | 0 | 1 | 1 |  | Modify EPS bearer context reject |
|  |  |  |  |  |  |  |  |  |  |
| 1 | 1 | 0 | 0 | 1 | 1 | 0 | 1 |  | Deactivate EPS bearer context request |
| 1 | 1 | 0 | 0 | 1 | 1 | 1 | 0 |  | Deactivate EPS bearer context accept |
|  |  |  |  |  |  |  |  |  |  |
| 1 | 1 | 0 | 1 | 0 | 0 | 0 | 0 |  | PDN connectivity request |
| 1 | 1 | 0 | 1 | 0 | 0 | 0 | 1 |  | PDN connectivity reject |
|  |  |  |  |  |  |  |  |  |  |
| 1 | 1 | 0 | 1 | 0 | 0 | 1 | 0 |  | PDN disconnect request |
| 1 | 1 | 0 | 1 | 0 | 0 | 1 | 1 |  | PDN disconnect reject |
|  |  |  |  |  |  |  |  |  |  |
| 1 | 1 | 0 | 1 | 0 | 1 | 0 | 0 |  | Bearer resource allocation request |
| 1 | 1 | 0 | 1 | 0 | 1 | 0 | 1 |  | Bearer resource allocation reject |
|  |  |  |  |  |  |  |  |  |  |
| 1 | 1 | 0 | 1 | 0 | 1 | 1 | 0 |  | Bearer resource modification request |
| 1 | 1 | 0 | 1 | 0 | 1 | 1 | 1 |  | Bearer resource modification reject |
|  |  |  |  |  |  |  |  |  |  |
| 1 | 1 | 0 | 1 | 1 | 0 | 0 | 1 |  | ESM information request |
| 1 | 1 | 0 | 1 | 1 | 0 | 1 | 0 |  | ESM information response |
|  |  |  |  |  |  |  |  |  |  |
| 1 | 1 | 0 | 1 | 1 | 0 | 1 | 1 |  | Notification |
|  |  |  |  |  |  |  |  |  |  |
| 1 | 1 | 0 | 1 | 1 | 1 | 0 | 0 |  | ESM dummy message |
|  |  |  |  |  |  |  |  |  |  |
| 1 | 1 | 1 | 0 | 1 | 0 | 0 | 0 |  | ESM status |
|  |  |  |  |  |  |  |  |  |  |
| 1 | 1 | 1 | 0 | 1 | 0 | 0 | 1 |  | Remote UE report |
| 1 | 1 | 1 | 0 | 1 | 0 | 1 | 0 |  | Remote UE report response |
|  |  |  |  |  |  |  |  |  |  |
| 1 | 1 | 1 | 0 | 1 | 0 | 1 | 1 |  | ESM data transport |

## 9.9 Other information elements

### 9.9.1 General

The different formats (V, LV, T, TV, TLV, LV-E, TLV-E) and the five categories of information elements (type 1, 2, 3, 4 and 6) are defined in 3GPP TS 24.007 [12].

The first octet of an information element in the non-imperative part contains the IEI of the information element. If this octet does not correspond to an IEI known in the message, the receiver shall determine whether this IE is of type 1 or 2 (i.e. it is an information element of one octet length) or an IE of type 4 (i.e. that the next octet is the length indicator indicating the length of the remaining of the information element) (see 3GPP TS 24.007 [12]).

This allows the receiver to jump over unknown information elements and to analyse any following information elements.

The definitions of information elements which are common for the EMM and ESM protocols or which are used by access stratum protocols are described in subclause 9.9.2.

The information elements of the EMM or ESM protocols can be defined by reference to an appropriate specification, e.g., "see subclause 10.5.6.3 in 3GPP TS 24.008 [13]".

### 9.9.2 Common information elements

#### 9.9.2.0 Additional information

The purpose of the Additional information information element is to provide additional information to upper layers in relation to the generic NAS message transport mechanism.

The Additional information information element is coded as shown in figure 9.9.2.0.1 and table 9.9.2.0.1.

The Additional information is a type 4 information element with a minimum length of 3 octets.

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 |  |
| Additional information IEI | | | | | | | | octet 1 |
| Additional information length | | | | | | | | octet 2 |
| Additional information value | | | | | | | | octets 3-n |

Figure 9.9.2.0.1: Additional information information element

Table 9.9.2.0.1: Additional information information element

|  |
| --- |
| Additional information value (octet 3 to octet n) |
|  |
| The coding of the additional information value is dependent on the generic message container type. |

#### 9.9.2.0A Device properties

See subclause 10.5.7.8 in 3GPP TS 24.008 [13].

#### 9.9.2.1 EPS bearer context status

The purpose of the EPS bearer context status information element is to indicate the state of each EPS bearer context that can be identified by an EPS bearer identity.

The EPS bearer context status information element is coded as shown in figure 9.9.2.1.1 and table 9.9.2.1.1.

The EPS bearer context status information element is a type 4 information element with 4 octets length.

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 |  |
| EPS bearer context status IEI | | | | | | | | octet 1 |
| Length of EPS bearer context status contents | | | | | | | | octet 2 |
| EBI  (7) | EBI  (6) | EBI  (5) | EBI  (4) | EBI  (3) | EBI  (2) | EBI  (1) | EBI  (0) | octet 3 |
| EBI  (15) | EBI  (14) | EBI  (13) | EBI  (12) | EBI  (11) | EBI  (10) | EBI  (9) | EBI  (8) | octet 4 |

Figure 9.9.2.1.1: EPS bearer context status information element

Table 9.9.2.1.1: EPS bearer context status information element

|  |
| --- |
| EBI(x) shall be coded as follows:  EBI(0) - EBI(4):  Bits 0 to 4 of octet 3 are spare and shall be coded as zero.  EBI(5) – EBI(15):  0 indicates that the ESM state of the corresponding EPS bearer context is BEARER CONTEXT-INACTIVE.  1 indicates that the ESM state of the corresponding EPS bearer context is not BEARER CONTEXT-INACTIVE |

#### 9.9.2.2 Location area identification

See subclause 10.5.1.3 in 3GPP TS 24.008 [13].

#### 9.9.2.3 Mobile identity

See subclause 10.5.1.4 in 3GPP TS 24.008 [13].

#### 9.9.2.4 Mobile station classmark 2

See subclause 10.5.1.6 in 3GPP TS 24.008 [13].

#### 9.9.2.5 Mobile station classmark 3

See subclause 10.5.1.7 in 3GPP TS 24.008 [13].

#### 9.9.2.6 NAS security parameters from E-UTRA

The purpose of the NAS security parameters from E-UTRA information element is to provide the UE with information that enables the UE to create a mapped UMTS security context.

The NAS security parameters from E-UTRA information element is coded as shown in figure 9.9.2.6.1 and table 9.9.2.6.1.

The NAS security parameters from E-UTRA is a type 3 information element with a length of 2 octets.

The value part of the NAS security parameters from E-UTRA information element is included in specific information elements within some RRC messages sent to the UE; see 3GPP TS 36.331 [22]. For these cases the coding of the information element identifier and length information is defined in 3GPP TS 36.331 [22].

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 |  |
| NAS security parameters from E-UTRA IEI | | | | | | | | octet 1 |
| 0 | 0 | 0 | 0 | DL NAS COUNT value  (short) | | | | octet 2 |
| Spare | | | |

Figure 9.9.2.6.1: NAS security parameters from E-UTRA information element

Table 9.9.2.6.1: NAS security parameters from E-UTRA information element

|  |
| --- |
| DL NAS COUNT value (short) (octet 2, bit 1 to 4) |
|  |
| This field contains the 4 least significant bits of the binary representation of the downlink NAS COUNT value applicable when this information element is sent. |
| Bit 5 to 8 of octet 2 are spare and shall be coded as zero. |

#### 9.9.2.7 NAS security parameters to E-UTRA

The purpose of the NAS security parameters to E-UTRA information element is to provide the UE with parameters that enable the UE to create a mapped EPS security context and take this context into use after inter-system handover to S1 mode.

The NAS security parameters to E-UTRA information element is coded as shown in figure 9.9.2.7.1 and table 9.9.2.7.1.

The NAS security parameters to E-UTRA is a type 3 information element with a length of 7 octets.

The value part of the NAS security parameters to E-UTRA information element is included in specific information elements within some RRC messages sent to the UE; see 3GPP TS 36.331 [22]. For these cases the coding of the information element identifier and length information is defined in 3GPP TS 36.331 [22].

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 |  |
| NAS security parameters to E-UTRA IEI | | | | | | | | octet 1 |
| NonceMME value | | | | | | | | octet 2  octet 5 |
| 0  spare | Type of ciphering algorithm | | | 0  spare | Type of integrity protection algorithm | | | octet 6 |
| 0 | 0 | 0 | 0 | TSC | NAS key set identifier | | | octet 7 |
| spare | | | |

Figure 9.9.2.7.1: NAS security parameters to E-UTRA information element

Table 9.9.2.7.1: NAS security parameters to E-UTRA information element

|  |
| --- |
| NonceMME value (octet 2 to 5) |
|  |
| This field is coded as the nonce value in the Nonce information element (see subclause 9.9.3.25). |
|  |
| Type of integrity protection algorithm (octet 6, bit 1 to 3) and  type of ciphering algorithm (octet 6, bit 5 to 7) |
|  |
| These fields are coded as the type of integrity protection algorithm and type of ciphering algorithm in the NAS security algorithms information element (see subclause 9.9.3.23). |
|  |
| Bit 4 and 8 of octet 6 are spare and shall be coded as zero. |
|  |
| NAS key set identifier (octet 7, bit 1 to 3) and  type of security context flag (TSC) (octet 7, bit 4) |
|  |
| These fields are coded as the NAS key set identifier and type of security context flag in the NAS key set identifier information element (see subclause 9.9.3.21). |
|  |
| Bit 5 to 8 of octet 7 are spare and shall be coded as zero. |
|  |

#### 9.9.2.8 PLMN list

See subclause 10.5.1.13 in 3GPP TS 24.008 [13].

#### 9.9.2.9 Spare half octet

This element is used in the description of EMM and ESM messages when an odd number of half octet type 1 information elements are used. This element is filled with spare bits set to zero and is placed in bits 5 to 8 of the octet unless otherwise specified.

#### 9.9.2.10 Supported codec list

See subclause 10.5.4.32 in 3GPP TS 24.008 [13].

### 9.9.3 EPS Mobility Management (EMM) information elements

#### 9.9.3.0A Additional update result

The purpose of the Additional update result information element is to provide additional information about the result of a combined attach procedure or a combined tracking area updating procedure.

The Additional update result information element is coded as shown in figure 9.9.3.0A.1 and table 9.9.3.0A.1.

The Additional update result is a type 1 information element.

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 |  |
| Additional update result IEI | | | | 0  Spare | 0  Spare | Additional update result value | | Octet 1 |

Figure 9.9.3.0A.1: Additional update result information element

Table 9.9.3.0A.1: Additional update result information element

|  |  |  |
| --- | --- | --- |
| Additional update result value (octet 1) | | |
|  | | |
| Bits | | |
| 2 | 1 |  |
| 0 | 0 | no additional information |
| 0 | 1 | CS Fallback not preferred |
| 1 | 0 | SMS only |
| 1 | 1 | reserved |
|  | | |
| Bits 4 and 3 of octet 1 are spare and shall all be coded as zero. | | |
|  | | |
| NOTE: Bits 4 and 3 of octet 1 were allocated but never used in earlier versions of this specification. | | |

#### 9.9.3.0B Additional update type

The purpose of the Additional update type information element is to provide additional information about the type of request for a attach or a tracking area updating procedure.

The Additional update type information element is coded as shown in figure 9.9.3.0B.1 and table 9.9.3.0B.1.

The Additional update type is a type 1 information element.

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 8 | 7 | 6 | 5 | 4 | 3 | 2 | | 1 | |  |
| Additional update type  IEI | | | | PNB-CIoT | | | SAF | | AUTV | octet 1 |

Figure 9.9.3.0B.1: Additional update type information element

Table 9.9.3.0B.1: Additional update type information element

|  |  |  |
| --- | --- | --- |
| Additional update type value (AUTV) (octet 1) | | |
|  | | |
| Bit | | |
| 1 |  | |
| 0 | no additional information. If received it shall be interpreted as request for combined attach or combined tracking area updating. | |
| 1 | SMS only | |
|  | | |
| "Signalling active" flag (SAF) (octet 1) | | |
|  | | |
| Bit | | |
| 2 |  | |
| 0 | keeping the NAS signalling connection is not required after the completion of the tracking area updating procedure | |
| 1 | keeping the NAS signalling connection is required after the completion of the tracking area updating procedure | |
|  | | |
| Preferred CIoT network behaviour (PNB-CIoT) (octet 1) | | |
|  | | |
| Bit | | |
| 4 | 3 |  |
| 0 | 0 | no additional information |
| 0 | 1 | control plane CIoT EPS optimization |
| 1 | 0 | user plane CIoT EPS optimization |
| 1 | 1 | reserved |
|  | | |
|  | | |
|  | | |

#### 9.9.3.1 Authentication failure parameter

See subclause 10.5.3.2.2 in 3GPP TS 24.008 [13].

#### 9.9.3.2 Authentication parameter AUTN

See subclause 10.5.3.1.1 in 3GPP TS 24.008 [13].

#### 9.9.3.3 Authentication parameter RAND

See subclause 10.5.3.1 in 3GPP TS 24.008 [13].

#### 9.9.3.4 Authentication response parameter

The purpose of the Authentication response parameter information element is to provide the network with the authentication response calculated in the USIM.

The Authentication response parameter information element is coded as shown in figure 9.9.3.4.1 and table 9.9.3.4.1.

The Authentication response parameter is a type 4 information element with a minimum length of 6 octets and a maximum length of 18 octets.

In an EPS authentication challenge, the response calculated in the USIM (RES) is minimum 4 octets and may be up to 16 octets in length.

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 |  |
| Authentication response parameter IEI | | | | | | | | octet 1 |
| Length of Authentication response parameter contents | | | | | | | | octet 2 |
| RES | | | | | | | | octet 3 |
|  | | | | | | | | octet 18 |

Figure 9.9.3.4.1: Authentication response parameter information element

Table 9.9.3.4.1: Authentication response parameter information element

|  |
| --- |
| RES value (octet 3 to 18)  This contains the RES. |

#### 9.9.3.4A Ciphering key sequence number

See subclause 10.5.1.2 in 3GPP TS 24.008 [13].

#### 9.9.3.5 CSFB response

The purpose of the CSFB response information element is to indicate whether the UE accepts or rejects a paging for CS fallback.

The CSFB response information element is coded as shown in figure 9.9.3.5.1 and table 9.9.3.5.1.

The CSFB response is a type 1 information element.

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 |  |
| CSFB response  IEI | | | | 0  spare | CSFB response value | | | octet 1 |

Figure 9.9.3.5.1: CSFB response information element

Table 9.9.3.5.1: CSFB response information element

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| CSFB response value (octet 1) | | | | |
|  | | | | |
| Bits | | | | |
| 3 | 2 | 1 |  |  |
| 0 | 0 | 0 |  | CS fallback rejected by the UE |
| 0 | 0 | 1 |  | CS fallback accepted by the UE |
|  |  |  |  |  |
| All other values are reserved. | | | | |
|  | | | | |

#### 9.9.3.6 Daylight saving time

See subclause 10.5.3.12 in 3GPP TS 24.008 [13].

#### 9.9.3.7 Detach type

The purpose of the Detach type information element is to indicate the type of detach.

The Detach type information element is coded as shown in figure 9.9.3.7.1 and table 9.9.3.7.1.

The Detach type is a type 1 information element.

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 8 | 7 | 6 | 5 | | 4 | 3 | | 2 | 1 |  |
| Detach type  IEI | | | | Switch  off | | | Type of detach | | | octet 1 |

Figure 9.9.3.7.1: Detach type information element

Table 9.9.3.7.1: Detach type information element

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Type of detach (octet 1) | | | | |
|  | | | | |
| In the UE to network direction: | | | | |
| Bits | | | | |
| 3 | 2 | 1 |  |  |
| 0 | 0 | 1 |  | EPS detach |
| 0 | 1 | 0 |  | IMSI detach |
| 0 | 1 | 1 |  | combined EPS/IMSI detach |
| 1 | 1 | 0 |  | reserved |
| 1 | 1 | 1 |  | reserved |
|  | | | | |
| All other values are interpreted as "combined EPS/IMSI detach" in this version of the protocol. | | | | |
|  | | | | |
| In the network to UE direction: | | | | |
| Bits | | | | |
| 3 | 2 | 1 |  |  |
| 0 | 0 | 1 |  | re-attach required |
| 0 | 1 | 0 |  | re-attach not required |
| 0 | 1 | 1 |  | IMSI detach |
| 1 | 1 | 0 |  | reserved |
| 1 | 1 | 1 |  | reserved |
|  | | | | |
| All other values are interpreted as "re-attach not required" in this version of the protocol. | | | | |
|  | | | | |
| Switch off (octet 1) | | | | |
|  | | | | |
| In the UE to network direction: | | | | |
| Bit | | | | |
| 4 |  |  |  |  |
| 0 |  |  |  | normal detach |
| 1 |  |  |  | switch off |
|  | | | | |
| In the network to UE direction bit 4 is spare. The network shall set this bit to zero. | | | | |

#### 9.9.3.8 DRX parameter

See subclause 10.5.5.6 in 3GPP TS 24.008 [13].

#### 9.9.3.9 EMM cause

The purpose of the EMM cause information element is to indicate the reason why an EMM request from the UE is rejected by the network.

The EMM cause information element is coded as shown in figure 9.9.3.9.1 and table 9.9.3.9.1.

The EMM cause is a type 3 information element with 2 octets length.

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 |  |
| EMM cause IEI | | | | | | | | octet 1 |
| Cause value | | | | | | | | octet 2 |

Figure 9.9.3.9.1: EMM cause information element

Table 9.9.3.9.1: EMM cause information element

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Cause value (octet 2) | | | | | | | | | |
|  | | | | | | | | | |
| Bits | | | | | | | | | |
| 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 |  |  |
| 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 |  | IMSI unknown in HSS |
| 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 |  | Illegal UE |
| 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 |  | IMEI not accepted |
| 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0 |  | Illegal ME |
| 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 |  | EPS services not allowed |
| 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 |  | EPS services and non-EPS services not allowed |
| 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 |  | UE identity cannot be derived by the network |
| 0 | 0 | 0 | 0 | 1 | 0 | 1 | 0 |  | Implicitly detached |
| 0 | 0 | 0 | 0 | 1 | 0 | 1 | 1 |  | PLMN not allowed |
| 0 | 0 | 0 | 0 | 1 | 1 | 0 | 0 |  | Tracking Area not allowed |
| 0 | 0 | 0 | 0 | 1 | 1 | 0 | 1 |  | Roaming not allowed in this tracking area |
| 0 | 0 | 0 | 0 | 1 | 1 | 1 | 0 |  | EPS services not allowed in this PLMN |
| 0 | 0 | 0 | 0 | 1 | 1 | 1 | 1 |  | No Suitable Cells In tracking area |
| 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 |  | MSC temporarily not reachable |
| 0 | 0 | 0 | 1 | 0 | 0 | 0 | 1 |  | Network failure |
| 0 | 0 | 0 | 1 | 0 | 0 | 1 | 0 |  | CS domain not available |
| 0 | 0 | 0 | 1 | 0 | 0 | 1 | 1 |  | ESM failure |
| 0 | 0 | 0 | 1 | 0 | 1 | 0 | 0 |  | MAC failure |
| 0 | 0 | 0 | 1 | 0 | 1 | 0 | 1 |  | Synch failure |
| 0 | 0 | 0 | 1 | 0 | 1 | 1 | 0 |  | Congestion |
| 0 | 0 | 0 | 1 | 0 | 1 | 1 | 1 |  | UE security capabilities mismatch |
| 0 | 0 | 0 | 1 | 1 | 0 | 0 | 0 |  | Security mode rejected, unspecified |
| 0 | 0 | 0 | 1 | 1 | 0 | 0 | 1 |  | Not authorized for this CSG |
| 0 | 0 | 0 | 1 | 1 | 0 | 1 | 0 |  | Non-EPS authentication unacceptable |
| 0 | 0 | 1 | 0 | 0 | 0 | 1 | 1 |  | Requested service option not authorized in this PLMN |
| 0 | 0 | 1 | 0 | 0 | 1 | 1 | 1 |  | CS service temporarily not available |
| 0 | 0 | 1 | 0 | 1 | 0 | 0 | 0 |  | No EPS bearer context activated |
| 0 | 0 | 1 | 0 | 1 | 0 | 1 | 0 |  | Severe network failure |
| 0 | 1 | 0 | 1 | 1 | 1 | 1 | 1 |  | Semantically incorrect message |
| 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 |  | Invalid mandatory information |
| 0 | 1 | 1 | 0 | 0 | 0 | 0 | 1 |  | Message type non-existent or not implemented |
| 0 | 1 | 1 | 0 | 0 | 0 | 1 | 0 |  | Message type not compatible with the protocol state |
| 0 | 1 | 1 | 0 | 0 | 0 | 1 | 1 |  | Information element non-existent or not implemented |
| 0 | 1 | 1 | 0 | 0 | 1 | 0 | 0 |  | Conditional IE error |
| 0 | 1 | 1 | 0 | 0 | 1 | 0 | 1 |  | Message not compatible with the protocol state |
| 0 | 1 | 1 | 0 | 1 | 1 | 1 | 1 |  | Protocol error, unspecified |
|  |  |  |  |  |  |  |  |  |  |
| Any other value received by the mobile station shall be treated as 0110 1111, "protocol error, unspecified". Any other value received by the network shall be treated as 0110 1111, "protocol error, unspecified". | | | | | | | | | |
|  | | | | | | | | | |

#### 9.9.3.10 EPS attach result

The purpose of the EPS attach result information element is to specify the result of an attach procedure.

The EPS attach result information element is coded as shown in figure 9.9.3.10.1 and table 9.9.3.10.1.

The EPS attach result is a type 1 information element.

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 |  |
| EPS attach result IEI | | | | 0  Spare | EPS attach result value | | | octet 1 |

Figure 9.9.3.10.1: EPS attach result information element

Table 9.9.3.10.1: EPS attach result information element

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| EPS attach result value (octet 1) | | | | |
| Bits | | | | |
| 3 | 2 | 1 |  |  |
| 0 | 0 | 1 |  | EPS only |
| 0 | 1 | 0 |  | combined EPS/IMSI attach |
|  | | | | |
| All other values are reserved. | | | | |
|  | | | | |
| Bit 4 of octet 1 is spare and shall be coded as zero. | | | | |
|  | | | | |

#### 9.9.3.11 EPS attach type

The purpose of the EPS attach type information element is to indicate the type of the requested attach.

The EPS attach type information element is coded as shown in figure 9.9.3.11.1 and table 9.9.3.11.1.

The EPS attach type is a type 1 information element.

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 |  |
| EPS attach type IEI | | | | 0  Spare | EPS attach type value | | | octet 1 |

Figure 9.9.3.11.1: EPS attach type information element

Table 9.9.3.11.1: EPS attach type information element

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| EPS attach type value (octet 1) | | | | |
| Bits | | | | |
| 3 | 2 | 1 |  |  |
| 0 | 0 | 1 |  | EPS attach |
| 0 | 1 | 0 |  | combined EPS/IMSI attach |
| 1 | 1 | 0 |  | EPS emergency attach |
| 1 | 1 | 1 |  | reserved |
|  | | | | |
| All other values are unused and shall be interpreted as "EPS attach", if received by the network. | | | | |
|  | | | | |
| Bit 4 of octet 1 is spare and shall be coded as zero. | | | | |
|  | | | | |

#### 9.9.3.12 EPS mobile identity

The purpose of the EPS mobile identity information element is to provide either the IMSI, the GUTI or the IMEI.

The EPS mobile identity information element is coded as shown in figures 9.9.3.12.1 and 9.9.3.12.2 and table 9.9.3.12.1.

The EPS mobile identity is a type 4 information element with a minimum length of 3 octets and a maximum length of 13 octets.

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 |  |
| EPS mobile identity IEI | | | | | | | | octet 1 |
| Length of EPS mobile identity contents | | | | | | | | octet 2 |
| 1 | 1 | 1 | 1 | odd/  even  indic | Type of identity | | | octet 3 |
| MCC digit 2 | | | | MCC digit 1 | | | | octet 4 |
| MNC digit 3 | | | | MCC digit 3 | | | | octet 5 |
| MNC digit 2 | | | | MNC digit 1 | | | | octet 6 |
| MME Group ID | | | | | | | | octet 7 |
| MME Group ID (continued) | | | | | | | | octet 8 |
| MME Code | | | | | | | | octet 9 |
| M-TMSI | | | | | | | | octet 10 |
| M-TMSI (continued) | | | | | | | | octet 11 |
| M-TMSI (continued) | | | | | | | | octet 12 |
| M-TMSI (continued) | | | | | | | | octet 13 |

Figure 9.9.3.12.1: EPS mobile identity information element for type of identity "GUTI"

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 |  |
| EPS mobile identity IEI | | | | | | | | octet 1 |
| Length of EPS mobile identity contents | | | | | | | | octet 2 |
| Identity digit 1 | | | | odd/  even  indic | Type of identity | | | octet 3 |
| Identity digit p+1 | | | | Identity digit p | | | | octet 4\* |

Figure 9.9.3.12.2: EPS mobile identity information element for type of identity "IMSI" or "IMEI"

Table 9.9.3.12.1: EPS mobile identity information element

|  |  |  |  |
| --- | --- | --- | --- |
| Type of identity (octet 3)  Bits | | | |
| 3 | 2 | 1 |  |
| 0 | 0 | 1 | IMSI |
| 1 | 1 | 0 | GUTI |
| 0 | 1 | 1 | IMEI |
| All other values are reserved. | | | |
|  | | | |
| Odd/even indication (octet 3)  Bit | | | |
| 4 |  |  |  |
| 0 |  |  | even number of identity digits and also when the GUTI is used |
| 1 |  |  | odd number of identity digits |
|  | | | |
| Identity digits (octet 4 etc)  For the IMSI, this field is coded using BCD coding. If the number of identity digits is even then bits 5 to 8 of the last octet shall be filled with an end mark coded as "1111". | | | |
|  | | | |
| For the GUTI, then bits 5 to 8 of octet 3 are coded as "1111", octet 4 through 6 contain the MCC and MNC values as specified below, and bit 8 of octet 7 is the most significant bit and bit 1 of the last octet the least significant bit for the subsequent fields. The required fields for the GUTI are as defined in 3GPP TS 23.003 [2]. | | | |
| MCC, Mobile country code (octet 4, octet 5 bits 1 to 4)  The MCC field is coded as in ITU-T Recommendation E.212 [30], annex A. | | | |
|  | | | |
| MNC, Mobile network code (octet 5 bits 5 to 8, octet 6)  The coding of this field is the responsibility of each administration but BCD coding shall be used. The MNC shall consist of 2 or 3 digits. If a network operator decides to use only two digits in the MNC, bits 5 to 8 of octet 5 shall be coded as "1111".  The contents of the MCC and MNC digits are coded as octets 6 to 8 of the Temporary Mobile Group Identity IE in figure 10.5.154 of 3GPP TS 24.008 [13]. | | | |
|  | | | |
| For the IMEI, this field is coded using BCD coding. The format of the IMEI is described in 3GPP TS 23.003 [2]. | | | |
|  | | | |

#### 9.9.3.12A EPS network feature support

The purpose of the EPS network feature support information element is to indicate whether certain features are supported by the network.

The EPS network feature support information element is coded as shown in figure 9.9.3.12A.1 and table 9.9.3.12A.1.

The EPS network feature support is a type 4 information element with a minimum length of 3 octets and a maximum length of 4 octets.

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | 8 | | 7 | | 6 | | 5 | | 4 | | 3 | | 2 | | 1 | |  | |
| EPS network feature support IEI | | | | | | | | | | | | | | | | octet 1 | |  |
| Length of EPS network feature support contents | | | | | | | | | | | | | | | | octet 2 | |  |
| CP CIoT | | ERw/oPDN | | ESR  PS | | CS-LCS | | | | EPC-LCS | | EMC BS | | IMS VoPS | | octet 3 | |  |
| 0  Spare | | 0  Spare | | 0  Spare | | 0  Spare | | ePCO | | HC-CP CIoT | | S1-U data | | UP CIoT | | octet 4 | |  |

Figure 9.9.3.12A.1: EPS network feature support information element

Editor’s note [WI CIoT-CT; CR#2381]: It is FFS which procedures for using some or all of the new CIoT related capabilities need to be updated.

Table 9.9.3.12A.1: EPS network feature support information element

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| IMS voice over PS session indicator (IMS VoPS) (octet 3, bit 1) | | | | |
|  | | | | |
| Bit | | | | |
| 1 |  |  |  |  |
| 0 |  |  |  | IMS voice over PS session in S1 mode not supported |
| 1 |  |  |  | IMS voice over PS session in S1 mode supported |
|  | | | | |
| Emergency bearer services indicator (EMC BS) (octet 3, bit 2) | | | | |
|  | | | | |
| Bit | | | | |
| 2 |  |  |  |  |
| 0 |  |  |  | emergency bearer services in S1 mode not supported |
| 1 |  |  |  | emergency bearer services in S1 mode supported |
|  | | | | |
| Location services indicator in EPC (EPC-LCS) (octet 3, bit 3) | | | | |
|  | | | | |
| Bit | | | | |
| 3 |  |  |  |  |
| 0 |  |  |  | location services via EPC not supported |
| 1 |  |  |  | location services via EPC supported |
|  | | | | |
| Location services indicator in CS (CS-LCS) (octet 3, bit 4 to 5) | | | | |
|  | | | | |
| Bit | | | | |
| 5 | 4 |  |  |  |
| 0 | 0 |  |  | no information about support of location services via CS domain is available |
| 0 | 1 |  |  | location services via CS domain supported |
| 1 | 0 |  |  | location services via CS domain not supported |
| 1 | 1 |  |  | reserved |
|  | | | | |
| Support of EXTENDED SERVICE REQUEST for packet services (ESRPS)  (octet 3, bit 6) | | | | |
|  | | | | |
| Bit | | | | |
| 6 |  |  |  |  |
| 0 |  |  |  | network does not support use of EXTENDED SERVICE REQUEST to request for packet services |
| 1 |  |  |  | network supports use of EXTENDED SERVICE REQUEST to request for packet services |
|  | | | | |
| EMM REGISTERED without PDN connectivity (ERw/oPDN)  (octet 3, bit 7) | | | | |
| This bit indicates the capability for EMM-REGISTERED without PDN connection | | | | |
| Bit | | | | |
| 7 |  |  |  |  |
| 0 |  |  |  | EMM-REGISTERED without PDN connection not supported |
| 1 |  |  |  | EMM-REGISTERED without PDN connectionsupported |
|  | | | | |
| Control plane CIoT EPS optimization (CP CIoT)  (octet 3, bit 8) | | | | |
| This bit indicates the capability for control plane CIoT EPS optimization | | | | |
| Bit | | | | |
| **8** | | | | |
| 0 |  |  |  | Control plane CIoT EPS optimization not supported |
| 1 |  |  |  | Control plane CIoT EPS optimization supported |
|  | | | | |
| User plane CIoT EPS optimization (UP CIoT)  (octet 4, bit 1) | | | | |
| This bit indicates the capability for user plane CIoT EPS optimization | | | | |
| Bit | | | | |
| **1** | | | | |
| 0 |  |  |  | User plane CIoT EPS optimization not supported |
| 1 |  |  |  | User plane CIoT EPS optimization supported |
|  | | | | |
| S1-u data transfer (S1-U data)  (octet 4, bit 2) | | | | |
| This bit indicates the capability for S1-u data transfer | | | | |
| Bit | | | | |
| **2** | | | | |
| 0 |  |  |  | S1-u data transfer not supported |
| 1 |  |  |  | S1-u data transfer supported |
|  | | | | |
| Header compression for control plane CIoT EPS optimization (HC-CP CIoT)  (octet 4, bit 3) | | | | |
| This bit indicates the capability for header compression for control plane CIoT EPS optimization | | | | |
| Bit | | | | |
| **3** | | | | |
| 0 |  |  |  | Header compression for control plane CIoT EPS optimization not supported |
| 1 |  |  |  | Header compression for control plane CIoT EPS optimization supported |
|  | | | | |
| Extended protocol configuration options (ePCO) (octet 4, bit 4)  This bit indicates the support of the extended protocol configuration options IE. | | | | |
| Bit | | | | |
| **4** | | | | |
| 0 |  |  |  | Extended protocol configuration options IE not supported |
| 1 |  |  |  | Extended protocol configuration options IE supported |
|  | | | | |
| Bits 7 to 5 of octet 4 are spare and shall be coded as zeros. | | | | |
|  | | | | |

#### 9.9.3.13 EPS update result

The purpose of the EPS update result information element is to specify the result of the associated updating procedure.

The EPS update result information element is coded as shown in figure 9.9.3.13.1 and table 9.9.3.13.1.

The EPS update result is a type 1 information element.

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 |  |
| EPS update result  IEI | | | | 0  Spare | EPS update result  value | | | octet 1 |

Figure 9.9.3.13.1: EPS update result information element

Table 9.9.3.13.1: EPS update result information element

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| EPS update result value (octet 1, bit 1 to 3) | | | | |
| Bits | | | | |
| 3 | 2 | 1 |  |  |
| 0 | 0 | 0 |  | TA updated |
| 0 | 0 | 1 |  | combined TA/LA updated |
| 1 | 0 | 0 |  | TA updated and ISR activated (NOTE) |
| 1 | 0 | 1 |  | combined TA/LA updated and ISR activated (NOTE) |
|  | | | | |
| All other values are reserved. | | | | |
|  | | | | |
| Bit 4 of octet 1 is spare and shall be coded as zero. | | | | |
|  | | | | |
| NOTE: Values "TA updated and ISR activated" and "combined TA/LA updated and ISR activated" are used only for a UE supporting also A/Gb or Iu mode. | | | | |

#### 9.9.3.14 EPS update type

The purpose of the EPS update type information element is to specify the area the updating procedure is associated with.

The EPS update type information element is coded as shown in figure 9.9.3.14.1 and table 9.9.3.14.1.

The EPS update type is a type 1 information element.

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 |  |
| EPS update type  IEI | | | | "Active" flag | EPS update type  Value | | | octet 1 |

Figure 9.9.3.14.1: EPS update type information element

Table 9.9.3.14.1: EPS update type information element

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| EPS update type value (octet 1, bit 1 to 3) | | | | |
|  | | | | |
| Bits | | | | |
|  | | | | |
| 3 | 2 | 1 |  |  |
| 0 | 0 | 0 |  | TA updating |
| 0 | 0 | 1 |  | combined TA/LA updating |
| 0 | 1 | 0 |  | combined TA/LA updating with IMSI attach |
| 0 | 1 | 1 |  | periodic updating |
| 1 | 0 | 0 |  | unused; shall be interpreted as "TA updating", if received by the network. |
| 1 | 0 | 1 |  | unused; shall be interpreted as "TA updating", if received by the network. |
|  | | | | |
| All other values are reserved. | | | | |
|  | | | | |
| "Active" flag (octet 1, bit 4) | | | | |
| Bit | | | | |
|  | | | | |
| 4 |  |  |  |  |
| 0 |  |  |  | No bearer establishment requested |
| 1 |  |  |  | Bearer establishment requested |
|  | | | | |

#### 9.9.3.15 ESM message container

The purpose of the ESM message container information element is to enable piggybacked transfer of a single ESM message within an EMM message. The ESM message included in this IE shall be coded as specified in subclause 8.3, i.e. without NAS security header.

The ESM message container information element is coded as shown in figure 9.9.3.15.1 and table 9.9.3.15.1.

The ESM message container is a type 6 information element.

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 |  |
| ESM message container IEI | | | | | | | | octet 1 |
| Length of ESM message container contents | | | | | | | | octet 2 |
|  | | | | | | | | octet 3 |
|  | | | | | | | | octet 4 |
| ESM message container contents | | | | | | | |  |
|  | | | | | | | | octet n |

Figure 9.9.3.15.1: ESM message container information element

Table 9.9.3.15.1: ESM message container information element

|  |
| --- |
| ESM message container contents (octet 4 to octet n); Max value of 65535 octets |
|  |
| This IE can contain any ESM PDU as defined in subclause 8.3. |
|  |

#### 9.9.3.16 GPRS timer

See subclause 10.5.7.3 in 3GPP TS 24.008 [13].

#### 9.9.3.16A GPRS timer 2

See subclause 10.5.7.4 in 3GPP TS 24.008 [13].

#### 9.9.3.16B GPRS timer 3

See subclause 10.5.7.4a in 3GPP TS 24.008 [13].

#### 9.9.3.17 Identity type 2

See subclause 10.5.5.9 in 3GPP TS 24.008 [13].

#### 9.9.3.18 IMEISV request

See subclause 10.5.5.10 in 3GPP TS 24.008 [13].

#### 9.9.3.19 KSI and sequence number

The purpose of the KSI and sequence number information element is to provide the network with the key set identifier (KSI) value of the current EPS security context and the 5 least significant bits of the NAS COUNT value applicable for the message including this information element.

The KSI and sequence number information element is coded as shown in figure 9.9.3.19.1 and table 9.9.3.19.1.

The KSI and sequence number is a type 3 information element with a length of 2 octets.

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 8 | 7 | 6 | | 5 | 4 | 3 | 2 | 1 |  |
| KSI and sequence number IEI | | | | | | | | | octet 1 |
| KSI | | | Sequence number (short) | | | | | | octet 2 |

Figure 9.9.3.19.1: KSI and sequence number information element

Table 9.9.3.19.1: KSI and sequence number information element

|  |
| --- |
| Sequence number (short) (octet 2, bit 1 to 5) |
|  |
| This field contains the 5 least significant bits of the NAS COUNT value applicable when this message is sent. |
|  |
| KSI (octet 2, bit 6 to 8) |
|  |
| This field contains the key set identifier value, as specified in bit 1 to 3 of octet 1 of the NAS key set identifier information element. (see subclause 9.9.3.21.) |
|  |

#### 9.9.3.20 MS network capability

See subclause 10.5.5.12 in 3GPP TS 24.008 [13].

#### 9.9.3.20A MS network feature support

See subclause 10.5.1.15 in 3GPP TS 24.008 [13].

#### 9.9.3.21 NAS key set identifier

The NAS key set identifier is allocated by the network.

The NAS key set identifier information element is coded as shown in figure 9.9.3.21.1 and table 9.9.3.21.1.

The NAS key set identifier is a type 1 information element.

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 |  |
| NAS key set identifier IEI | | | | TSC | NAS key set identifier | | | octet 1 |

Figure 9.9.3.21.1: NAS key set identifier information element

Table 9.9.3.21.1: NAS key set identifier information element

|  |  |  |  |
| --- | --- | --- | --- |
| Type of security context flag (TSC) (octet 1) | | | |
|  | | | |
| Bit | | | |
| 4 |  |  |  |
| 0 |  |  | native security context (for KSIASME) |
| 1 |  |  | mapped security context (for KSISGSN) |
|  | | | |
| TSC does not apply for NAS key set identifier value "111". | | | |
|  | | | |
| NAS key set identifier (octet 1) | | | |
|  | | | |
| Bits | | | |
| 3 | 2 | 1 |  |
|  |  |  |  |
| 0 | 0 | 0 |  |
| through | | | possible values for the NAS key set identifier |
| 1 | 1 | 0 |  |
|  |  |  |  |
| 1 | 1 | 1 | no key is available (UE to network); |
|  |  |  | reserved (network to UE) |

#### 9.9.3.22 NAS message container

This information element is used to encapsulate the SMS messages transferred between the UE and the network.The NAS message container information element is coded as shown in figure 9.9.3.22.1 and table 9.9.3.22.1.

The NAS message container is a type 4 information element with a minimum length of 4 octets and a maximum length of 253 octets.

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 |  |
| NAS message container IEI | | | | | | | | octet 1 |
| Length of NAS message container contents | | | | | | | | octet 2 |
|  | | | | | | | | octet 3 |
| NAS message container contents | | | | | | | |  |
|  | | | | | | | | octet n |

Figure 9.9.3.22.1: NAS message container information element

Table 9.9.3.22.1: NAS message container information element

|  |
| --- |
| NAS message container contents (octet 3 to octet n) |
|  |
| This IE can contain an SMS message (i.e. CP-DATA, CP-ACK or CP-ERROR) as defined in subclause 7.2 in 3GPP TS 24.011 [13A]. |
|  |

#### 9.9.3.23 NAS security algorithms

The purpose of the NAS security algorithms information element is to indicate the algorithms to be used for ciphering and integrity protection.

The NAS security algorithms information element is coded as shown in figure 9.9.3.23.1 and table 9.9.3.23.1.

The NAS security algorithms is a type 3 information element with a length of 2 octets.

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 |  |
| NAS security algorithms IEI | | | | | | | | octet 1 |
| 0  spare | Type of ciphering algorithm | | | 0  spare | Type of integrity protection algorithm | | | octet 2 |

Figure 9.9.3.23.1: NAS security algorithms information element

Table 9.9.3.23.1: NAS security algorithms information element

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Type of integrity protection algorithm (octet 2, bit 1 to 3) | | | | |
| Bits | | | | |
| 3 | 2 | 1 |  |  |
| 0 | 0 | 0 |  | EPS integrity algorithm EIA0 (null integrity protection algorithm) |
| 0 | 0 | 1 |  | EPS integrity algorithm 128-EIA1 |
| 0 | 1 | 0 |  | EPS integrity algorithm 128-EIA2 |
| 0 | 1 | 1 |  | EPS integrity algorithm 128-EIA3 |
| 1 | 0 | 0 |  | EPS integrity algorithm EIA4 |
| 1 | 0 | 1 |  | EPS integrity algorithm EIA5 |
| 1 | 1 | 0 |  | EPS integrity algorithm EIA6 |
| 1 | 1 | 1 |  | EPS integrity algorithm EIA7 |
|  | | | | |
| Type of ciphering algorithm (octet 2, bit 5 to 7) | | | | |
| Bits | | | | |
| 7 | 6 | 5 |  |  |
| 0 | 0 | 0 |  | EPS encryption algorithm EEA0 (null ciphering algorithm) |
| 0 | 0 | 1 |  | EPS encryption algorithm 128-EEA1 |
| 0 | 1 | 0 |  | EPS encryption algorithm 128-EEA2 |
| 0 | 1 | 1 |  | EPS encryption algorithm 128-EEA3 |
| 1 | 0 | 0 |  | EPS encryption algorithm EEA4 |
| 1 | 0 | 1 |  | EPS encryption algorithm EEA5 |
| 1 | 1 | 0 |  | EPS encryption algorithm EEA6 |
| 1 | 1 | 1 |  | EPS encryption algorithm EEA7 |
|  | | | | |
| Bit 4 and 8 of octet 2 are spare and shall be coded as zero. | | | | |
|  | | | | |

#### 9.9.3.24 Network name

See subclause 10.5.3.5a in 3GPP TS 24.008 [13].

#### 9.9.3.24A Network resource identifier container

See subclause 10.5.5.31 in 3GPP TS 24.008 [13].

#### 9.9.3.25 Nonce

The purpose of the Nonce information element is to transfer a 32-bit nonce value to support deriving a new mapped EPS security context.

The Nonce information element is coded as shown in figure 9.9.3.25.1 and table 9.9.3.25.1.

The Nonce is a type 3 information element with a length of 5 octets.

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 |  |
| Nonce IEI | | | | | | | | octet 1 |
| Nonce value | | | | | | | | octet 2  octet 5 |

Figure 9.9.3.25.1: Nonce information element

Table 9.9.3.25.1: Nonce information element

|  |
| --- |
| Nonce value (octet 2 to 5) |
|  |
| This field contains the binary representation of the nonce. Bit 8 of octet 2 represents the most significant bit of the nonce and bit 1 of octet 5 the least significant bit. |
|  |

#### 9.9.3.25A Paging identity

The purpose of the Paging identity information element is to indicate the identity used for paging for non-EPS services.

The Paging identity information element is coded as shown in figure 9.9.3.25A.1 and table 9.9.3.25A.1.

The Paging identity is a type 3 information element with 2 octets length.

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 |  |
| Paging identity IEI | | | | | | | | octet 1 |
| 0 | 0 | 0 | 0 | 0 | 0 | 0 | Paging identity value | octet 2 |
| spare | | | | | | |

Figure 9.9.3.25A.1: Paging identity information element

Table 9.9.3.25A.1: Paging identity information element

|  |
| --- |
| Paging identity value (octet 2) |
|  |
| Bit |
| **1** |
| 0 IMSI |
| 1 TMSI |
|  |

#### 9.9.3.26 P-TMSI signature

See subclause 10.5.5.8 in 3GPP TS 24.008 [13].

#### 9.9.3.26A Extended EMM cause

The purpose of the extended EMM cause information element is to indicate additional information associated with the EMM cause.

The Extended EMM cause information element is coded as shown in figure 9.9.3.26A.1 and table 9.9.3.26A.1.

The Extended EMM cause is a type 1 information element.

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 8 | | 7 | 6 | 5 | 4 | 3 | | 2 | 1 | |  |  |
|  | Extended EMM cause IEI | | | | 0 | | 0 | EPS optimization info | | E-UTRAN allowed | octet 1 | |

Figure 9.9.3.26A.1: Extended EMM cause information element

Table 9.9.3.26A.1: Extended EMM cause information element

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| E-UTRAN allowed value (octet 1, bit 1) | | | | | | |  |
| Bit | | | | | | |  |
| 1 |  |  | |  | |  | |
| 0 |  |  | |  | | E-UTRAN allowed | |
| 1 |  |  | |  | | E-UTRAN not allowed | |
|  | | | | | | |  |
| EPS optimization info (octet 1, bit 2) | | | | | | |  |
| Bit | | | | | | |  |
| **2** |  |  |  | |  | |  |
| 0 |  |  |  | | No EPS optimization information | |  |
| 1 |  |  |  | | requested EPS optimization not supported | |  |
|  | | | | | | |  |
| Bits 3 to 4 of octet 1 are spare and shall be coded as zero. | | | | | | |  |
|  | | | | | | |  |

#### 9.9.3.27 Service type

The purpose of the Service type information element is to specify the purpose of the service request procedure.

The Service type information element is coded as shown in figure 9.9.3.27.1 and table 9.9.3.27.1.

The Service type is a type 1 information element.

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 |  |
| Service type  IEI | | | | Service type value | | | | octet 1 |

Figure 9.9.3.27.1: Service type information element

Table 9.9.3.27.1: Service type information element

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Service type value (octet 1) | | | | |
|  | | | | |
| Service type value | | | | |
| Bits | | | | |
| 4 | 3 | 2 | 1 |  |
| 0 | 0 | 0 | 0 | mobile originating CS fallback or 1xCS fallback |
| 0 | 0 | 0 | 1 | mobile terminating CS fallback or 1xCS fallback |
| 0 | 0 | 1 | 0 | mobile originating CS fallback emergency call or 1xCS fallback emergency call |
| 0 | 0 | 1 | 1 | unused; shall be interpreted as "mobile originating CS fallback or 1xCS fallback", if received by the network |
| 0 | 1 | 0 | 0 | unused; shall be interpreted as "mobile originating CS fallback or 1xCS fallback", if received by the network |
| 1 | 0 | 0 | 0 | packet services via S1 |
| 1 | 0 | 0 | 1 | unused; shall be interpreted as "packet services via S1", if received by the network |
| 1 | 0 | 1 | 0 | unused; shall be interpreted as "packet services via S1", if received by the network |
| 1 | 0 | 1 | 1 | unused; shall be interpreted as "packet services via S1", if received by the network |
|  | | | | |
| All other values are reserved. | | | | |
|  | | | | |

#### 9.9.3.28 Short MAC

The purpose of the Short MAC information element is to protect the integrity of a SERVICE REQUEST message.

The integrity protection shall include octet 1 and 2 of the SERVICE REQUEST message. For the used algorithm and other input parameters to the algorithm see subclause 9.5. Only the 2 least significant octets of the resulting message authentication code are included in the information element.

The Short MAC information element is coded as shown in figure 9.9.3.28.1 and table 9.9.3.28.1.

The Short MAC is a type 3 information element with a length of 3 octets.

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 |  |
| Short MAC IEI | | | | | | | | octet 1 |
| Short MAC value | | | | | | | | octet 2 |
| Short MAC value (continued) | | | | | | | | octet 3 |

Figure 9.9.3.28.1: Short MAC information element

Table 9.9.3.28.1: Short MAC information element

|  |
| --- |
| Short MAC value (octet 2 and 3) |
|  |
| This field contains the 2 least significant octets of the message authentication code calculated for the SERVICE REQUEST message. Bit 1 of octet 3 contains the least significant bit, and bit 8 of octet 2 the most significant bit of these 2 octets. |
|  |

#### 9.9.3.29 Time zone

See subclause 10.5.3.8 in 3GPP TS 24.008 [13].

#### 9.9.3.30 Time zone and time

See subclause 10.5.3.9 in 3GPP TS 24.008 [13].

#### 9.9.3.31 TMSI status

See subclause 10.5.5.4 in 3GPP TS 24.008 [13].

#### 9.9.3.32 Tracking area identity

The purpose of the Tracking area identity information element is to provide an unambiguous identification of tracking areas within the area covered by the 3GPP system.

The Tracking area identity information element is coded as shown in figure 9.9.3.32.1 and table 9.9.3.32.1.

The Tracking area identity is a type 3 information element with a length of 6 octets.

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 |  |
| Tracking area identity IEI | | | | | | | | octet 1 |
| MCC digit 2 | | | | MCC digit 1 | | | | octet 2 |
| MNC digit 3 | | | | MCC digit 3 | | | | octet 3 |
| MNC digit 2 | | | | MNC digit 1 | | | | octet 4 |
| TAC | | | | | | | | octet 5 |
| TAC (continued) | | | | | | | | octet 6 |

Figure 9.9.3.32.1: Tracking area identity information element

Table 9.9.3.32.1: Tracking area identity information element

|  |
| --- |
| MCC, Mobile country code (octet 2 and 3)  The MCC field is coded as in ITU-T Rec. E212 [30], annex A.  If the TAI is deleted the MCC and MNC shall take the value from the deleted TAI.  In abnormal cases, the MCC stored in the UE can contain elements not in the set {0, 1 ... 9}. In such cases the UE should transmit the stored values using full hexadecimal encoding. When receiving such an MCC, the network shall treat the TAI as deleted.  MNC, Mobile network code (octet 3 bits 5 to 8, octet 4)  The coding of this field is the responsibility of each administration, but BCD coding shall be used. The MNC shall consist of 2 or 3 digits. For PCS 1900 for NA, Federal regulation mandates that a 3-digit MNC shall be used. However a network operator may decide to use only two digits in the MNC in the TAI over the radio interface. In this case, bits 5 to 8 of octet 3 shall be coded as "1111". Mobile equipment shall accept a TAI coded in such a way.  In abnormal cases, the MNC stored in the UE can have:  - digit 1 or 2 not in the set {0, 1 ... 9}, or  - digit 3 not in the set {0, 1 ... 9, F} hex.  In such cases the UE shall transmit the stored values using full hexadecimal encoding. When receiving such an MNC, the network shall treat the TAI as deleted.  The same handling shall apply for the network, if a 3-digit MNC is sent by the UE to a network using only a 2-digit MNC.  TAC, Tracking area code (octet 5 and 6)  In the TAC field bit 8 of octet 5 is the most significant bit and bit 1 of octet 6 the least significant bit.  The coding of the tracking area code is the responsibility of each administration except that two values are used to mark the TAC, and hence the TAI, as deleted. Coding using full hexadecimal representation may be used. The tracking area code consists of 2 octets.  If a TAI has to be deleted then all bits of the tracking area code shall be set to one with the exception of the least significant bit which shall be set to zero. If a USIM is inserted in a mobile equipment with the tracking area code containing all zeros, then the mobile equipment shall recognise this TAC as part of a deleted TAI. |

#### 9.9.3.33 Tracking area identity list

The purpose of the Tracking area identity list information element is to transfer a list of tracking areas from the network to the UE.

The coding of the information element allows combining different types of lists. The lists of type "000" and "001" allow a more compact encoding, when the different TAIs are sharing the PLMN identity.

The Tracking area identity list information element is coded as shown in figure 9.9.3.33.1, figure 9.9.3.33.2, figure 9.9.3.33.3, figure 9.9.3.33.4 and table 9.9.3.33.1.

The Tracking area identity list is a type 4 information element, with a minimum length of 8 octets and a maximum length of 98 octets. The list can contain a maximum of 16 different tracking area identities.

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 |  |
| Tracking area identity list IEI | | | | | | | | octet 1 |
| Length of tracking area identity list contents | | | | | | | | octet 2 |
| Partial tracking area identity list 1 | | | | | | | | octet 3  octet i |
| Partial tracking area identity list 2 | | | | | | | | octet i+1\*  octet l\* |
| … | | | | | | | | octet l+1\*  octet m\* |
| Partial tracking area identity list p | | | | | | | | octet m+1\*  octet n\* |

Figure 9.9.3.33.1: Tracking area identity list information element

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 |  |
| 0  Spare | Type of list | | Number of elements | | | | | octet 1 |
| MCC digit 2 | | | | MCC digit 1 | | | | octet 2 |
| MNC digit 3 | | | | MCC digit 3 | | | | octet 3 |
| MNC digit 2 | | | | MNC digit 1 | | | | octet 4 |
| TAC 1 | | | | | | | | octet 5 |
| TAC 1 (continued) | | | | | | | | octet 6 |
| … | | | | | | | | … |
| … | | | | | | | | … |
| TAC k | | | | | | | | octet 2k+3\* |
| TAC k (continued) | | | | | | | | octet 2k+4\* |

Figure 9.9.3.33.2: Partial tracking area identity list – type of list = "000"

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 |  |
| 0  Spare | Type of list | | Number of elements | | | | | octet 1 |
| MCC digit 2 | | | | MCC digit 1 | | | | octet 2 |
| MNC digit 3 | | | | MCC digit 3 | | | | octet 3 |
| MNC digit 2 | | | | MNC digit 1 | | | | octet 4 |
| TAC 1 | | | | | | | | octet 5 |
| TAC 1 (continued) | | | | | | | | octet 6 |

Figure 9.9.3.33.3: Partial tracking area identity list – type of list = "001"

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 |  |
| 0  Spare | Type of list | | Number of elements | | | | | octet 1 |
| MCC digit 2 | | | | MCC digit 1 | | | | octet 2 |
| MNC digit 3 | | | | MCC digit 3 | | | | octet 3 |
| MNC digit 2 | | | | MNC digit 1 | | | | octet 4 |
| TAC 1 | | | | | | | | octet 5 |
| TAC 1 (continued) | | | | | | | | octet 6 |
| MCC digit 2 | | | | MCC digit 1 | | | | octet 7\* |
| MNC digit 3 | | | | MCC digit 3 | | | | octet 8\* |
| MNC digit 2 | | | | MNC digit 1 | | | | octet 9\* |
| TAC 2 | | | | | | | | octet 10\* |
| TAC 2 (continued) | | | | | | | | octet 11\* |
| … | | | | | | | |  |
| … | | | | | | | |  |
| MCC digit 2 | | | | MCC digit 1 | | | | octet 5k-3\* |
| MNC digit 3 | | | | MCC digit 3 | | | | octet 5k-2\* |
| MNC digit 2 | | | | MNC digit 1 | | | | octet 5k-1\* |
| TAC k | | | | | | | | octet 5k\* |
| TAC k (continued) | | | | | | | | octet 5k+1\* |

Figure 9.9.3.33.4: Partial tracking area identity list – type of list = "010"

Table 9.9.3.33.1: Tracking area identity list information element

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Value part of the Tracking area identity list information element (octet 3 to n) | | | | | |
|  | | | | | |
| The value part of the Tracking area identity list information element consists of one or several partial tracking area identity lists. The length of each partial tracking area identity list can be determined from the 'type of list' field and the 'number of elements' field in the first octet of the partial tracking area identity list. | | | | | |
| The UE shall store the complete list received. If more than 16 TAIs are included in this information element, the UE shall store the first 16 TAIs and ignore the remaining octets of the information element. | | | | | |
|  | | | | | |
|  | | | | | |
| Partial tracking area identity list: | | | | | |
|  | | | | | |
| Type of list (octet 1) | | | | | |
| Bits | | | | | |
| 7 | 6 |  | | | |
| 0 | 0 | list of TACs belonging to one PLMN, with non-consecutive TAC values | | | |
| 0 | 1 | list of TACs belonging to one PLMN, with consecutive TAC values | | | |
| 1 | 0 | list of TAIs belonging to different PLMNs (see NOTE) | | | |
|  | | | | | |
| All other values are reserved. | | | | | |
|  | | | | | |
| Number of elements (octet 1) | | | | | |
| Bits | | | | | |
| 5 | 4 | 3 | 2 | 1 |  |
| 0 | 0 | 0 | 0 | 0 | 1 element |
| 0 | 0 | 0 | 0 | 1 | 2 elements |
| 0 | 0 | 0 | 1 | 0 | 3 elements |
| … | | | | |  |
| 0 | 1 | 1 | 0 | 1 | 14 elements |
| 0 | 1 | 1 | 1 | 0 | 15 elements |
| 0 | 1 | 1 | 1 | 1 | 16 elements |
|  | | | | | |
| All other values are unused and shall be interpreted as 16, if received by the UE. | | | | | |
|  | | | | | |
| Bit 8 of octet 1 is spare and shall be coded as zero. | | | | | |
|  | | | | | |
|  | | | | | |
| For type of list = "000" and number of elements = k: | | | | | |
|  | | | | | |
| octet 2 to 4 contain the MCC+MNC, and | | | | | |
| for j = 1, k: | | | | | |
| octet 2j+3 and 2j+4 contain the TAC of the j-th TAI belonging to the partial list, | | | | | |
|  | | | | | |
| For type of list = "001" and number of elements = k: | | | | | |
|  | | | | | |
| octet 2 to 4 contain the MCC+MNC, and | | | | | |
| octet 5 and 6 contain the TAC of the first TAI belonging to the partial list. | | | | | |
| The TAC values of the other k-1 TAIs are TAC+1, TAC+2, …, TAC+k-1. | | | | | |
|  | | | | | |
| For type of list = "010" and number of elements = k: | | | | | |
|  | | | | | |
| for j = 1, k. | | | | | |
| octet 5j-3 to 5j-1 contain the MCC+MNC, and | | | | | |
| octet 5j and 5j+1 contain the TAC of the j-th TAI belonging to the partial list. | | | | | |
|  | | | | | |
|  | | | | | |
| MCC, Mobile country code | | | | | |
|  | | | | | |
| The MCC field is coded as in ITU-T Recommendation E.212 [30], annex A. | | | | | |
|  | | | | | |
| MNC, Mobile network code | | | | | |
|  | | | | | |
| The coding of this field is the responsibility of each administration but BCD coding shall be used. The MNC shall consist of 2 or 3 digits. If a network operator decides to use only two digits in the MNC, MNC digit 3 shall be coded as "1111". | | | | | |
|  | | | | | |
| TAC, Tracking area code | | | | | |
|  | | | | | |
| In the TAC field bit 8 of the first octet is the most significant bit and bit 1 of second octet the least significant bit. | | | | | |
| The coding of the tracking area code is the responsibility of each administration. Coding using full hexadecimal representation may be used. The tracking area code consists of 2 octets. | | | | | |
|  | | | | | |
| NOTE: If the "list of TAIs belonging to different PLMNs" is used, the PLMNs included in the list need to be present in the list of "equivalent PLMNs". | | | | | |

#### 9.9.3.34 UE network capability

The purpose of the UE network capability information element is to provide the network with information concerning aspects of the UE related to EPS or interworking with GPRS. The contents might affect the manner in which the network handles the operation of the UE. The UE network capability information indicates general UE characteristics and it shall therefore, except for fields explicitly indicated, be independent of the frequency band of the channel it is sent on.

The UE network capability information element is coded as shown in figure 9.9.3.34.1 and table 9.9.3.34.1.

The UE network capability is a type 4 information element with a minimum length of 4 octets and a maximum length of 15 octets.

NOTE: The requirements for the support of UMTS security algorithms in the UE are specified in 3GPP TS 33.102 [18], and the requirements for the support of EPS security algorithms in 3GPP TS 33.401 [19].

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | 8 | | 7 | | 6 | | 5 | | 4 | | 3 | | 2 | | 1 | |  | |
| UE network capability IEI | | | | | | | | | | | | | | | | octet 1 | |  |
| Length of UE network capability contents | | | | | | | | | | | | | | | | octet 2 | |  |
| EEA0 | | 128-  EEA1 | | 128-  EEA2 | | 128-  EEA3 | | EEA4 | | EEA5 | | EEA6 | | EEA7 | | octet 3 | |  |
| EIA0 | | 128-  EIA1 | | 128-  EIA2 | | 128-  EIA3 | | EIA4 | | EIA5 | | EIA6 | | EIA7 | | octet 4 | |  |
| UEA0 | | UEA1 | | UEA2 | | UEA3 | | UEA4 | | UEA5 | | UEA6 | | UEA7 | | octet 5\* | |  |
| UCS2 | | UIA1 | | UIA2 | | UIA3 | | UIA4 | | UIA5 | | UIA6 | | UIA7 | | octet 6\* | |  |
| ProSe-dd | | ProSe | | H.245-ASH | | ACC-CSFB | | LPP | | LCS | | 1xSR  VCC | | NF | | octet 7\* | |  |
| ePCO | | HC-CP CIoT | | ERw/oPDN | | S1-U data | | UP CIoT | | CP CIoT | | Prose-relay | | ProSe-dc | | octet 8\* | |  |
| 0 Spare | | 0 Spare | | 0 Spare | | 0 Spare | | 0 Spare | | 0 Spare | | 0 Spare | | multipleDRB | | octet 9\* | |  |
| 0 | | 0 | | 0 | | 0 | | 0 | | 0 | | 0 | | 0 | | octet 10\* -15\* | |  |
| Spare | | | | | | | | | | | | | | | |  |

Figure 9.9.3.34.1: UE network capability information element

Table 9.9.3.34.1: UE network capability information element

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| EPS encryption algorithms supported (octet 3) | | | | |
|  | | | | |
| EPS encryption algorithm EEA0 supported (octet 3, bit 8) | | | | |
| 0 |  |  |  | EPS encryption algorithm EEA0 not supported |
| 1 |  |  |  | EPS encryption algorithm EEA0 supported |
|  | | | | |
| EPS encryption algorithm 128-EEA1 supported (octet 3, bit 7) | | | | |
| 0 |  |  |  | EPS encryption algorithm 128-EEA1 not supported |
| 1 |  |  |  | EPS encryption algorithm 128-EEA1 supported |
|  | | | | |
| EPS encryption algorithm 128-EEA2 supported (octet 3, bit 6) | | | | |
| 0 |  |  |  | EPS encryption algorithm 128-EEA2 not supported |
| 1 |  |  |  | EPS encryption algorithm 128-EEA2 supported |
|  | | | | |
| EPS encryption algorithm 128-EEA3 supported (octet 3, bit 5) | | | | |
| 0 |  |  |  | EPS encryption algorithm 128-EEA3 not supported |
| 1 |  |  |  | EPS encryption algorithm 128-EEA3 supported |
|  | | | | |
| EPS encryption algorithm EEA4 supported (octet 3, bit 4) | | | | |
| 0 |  |  |  | EPS encryption algorithm EEA4 not supported |
| 1 |  |  |  | EPS encryption algorithm EEA4 supported |
|  | | | | |
| EPS encryption algorithm EEA5 supported (octet 3, bit 3) | | | | |
| 0 |  |  |  | EPS encryption algorithm EEA5 not supported |
| 1 |  |  |  | EPS encryption algorithm EEA5 supported |
|  | | | | |
| EPS encryption algorithm EEA6 supported (octet 3, bit 2) | | | | |
| 0 |  |  |  | EPS encryption algorithm EEA6 not supported |
| 1 |  |  |  | EPS encryption algorithm EEA6 supported |
|  | | | | |
| EPS encryption algorithm EEA7 supported (octet 3, bit 1) | | | | |
| 0 |  |  |  | EPS encryption algorithm EEA7 not supported |
| 1 |  |  |  | EPS encryption algorithm EEA7 supported |
|  | | | | |
| EPS integrity algorithms supported (octet 4) | | | | |
|  | | | | |
| EPS integrity algorithm EIA0 supported (octet 4, bit 8) | | | | |
| 0 |  |  |  | EPS integrity algorithm EIA0 not supported |
| 1 |  |  |  | EPS integrity algorithm EIA0 supported |
|  | | | | |
| EPS integrity algorithm 128-EIA1 supported (octet 4, bit 7) | | | | |
| 0 |  |  |  | EPS integrity algorithm 128-EIA1 not supported |
| 1 |  |  |  | EPS integrity algorithm 128-EIA1 supported |
|  | | | | |
| EPS integrity algorithm 128-EIA2 supported (octet 4, bit 6) | | | | |
| 0 |  |  |  | EPS integrity algorithm 128-EIA2 not supported |
| 1 |  |  |  | EPS integrity algorithm 128-EIA2 supported |
|  | | | | |
| EPS integrity algorithm 128-EIA3 supported (octet 4, bit 5) | | | | |
| 0 |  |  |  | EPS integrity algorithm 128-EIA3 not supported |
| 1 |  |  |  | EPS integrity algorithm 128-EIA3 supported |
|  | | | | |
| EPS integrity algorithm EIA4 supported (octet 4, bit 4) | | | | |
| 0 |  |  |  | EPS integrity algorithm EIA4 not supported |
| 1 |  |  |  | EPS integrity algorithm EIA4 supported |
|  | | | | |
| EPS integrity algorithm EIA5 supported (octet 4, bit 3) | | | | |
| 0 |  |  |  | EPS integrity algorithm EIA5 not supported |
| 1 |  |  |  | EPS integrity algorithm EIA5 supported |
|  | | | | |
| EPS integrity algorithm EIA6 supported (octet 4, bit 2) | | | | |
| 0 |  |  |  | EPS integrity algorithm EIA6 not supported |
| 1 |  |  |  | EPS integrity algorithm EIA6 supported |
|  | | | | |
| EPS integrity algorithm EIA7 supported (octet 4, bit 1) | | | | |
| 0 |  |  |  | EPS integrity algorithm EIA7 not supported |
| 1 |  |  |  | EPS integrity algorithm EIA7 supported |
|  | | | | |
| UMTS encryption algorithms supported (octet 5) | | | | |
|  | | | | |
| UMTS encryption algorithm UEA0 supported (octet 5, bit 8) | | | | |
| 0 |  |  |  | UMTS encryption algorithm UEA0 not supported |
| 1 |  |  |  | UMTS encryption algorithm UEA0 supported |
|  | | | | |
| UMTS encryption algorithm UEA1 supported (octet 5, bit 7) | | | | |
| 0 |  |  |  | UMTS encryption algorithm UEA1 not supported |
| 1 |  |  |  | UMTS encryption algorithm UEA1 supported |
|  | | | | |
| UMTS encryption algorithm UEA2 supported (octet 5, bit 6) | | | | |
| 0 |  |  |  | UMTS encryption algorithm UEA2 not supported |
| 1 |  |  |  | UMTS encryption algorithm UEA2 supported |
|  | | | | |
| UMTS encryption algorithm UEA3 supported (octet 5, bit 5) | | | | |
| 0 |  |  |  | UMTS encryption algorithm UEA3 not supported |
| 1 |  |  |  | UMTS encryption algorithm UEA3 supported |
|  | | | | |
| UMTS encryption algorithm UEA4 supported (octet 5, bit 4) | | | | |
| 0 |  |  |  | UMTS encryption algorithm UEA4 not supported |
| 1 |  |  |  | UMTS encryption algorithm UEA4 supported |
|  | | | | |
| UMTS encryption algorithm UEA5 supported (octet 5, bit 3) | | | | |
| 0 |  |  |  | UMTS encryption algorithm UEA5 not supported |
| 1 |  |  |  | UMTS encryption algorithm UEA5 supported |
|  | | | | |
| UMTS encryption algorithm UEA6 supported (octet 5, bit 2) | | | | |
| 0 |  |  |  | UMTS encryption algorithm UEA6 not supported |
| 1 |  |  |  | UMTS encryption algorithm UEA6 supported |
|  | | | | |
| UMTS encryption algorithm UEA7 supported (octet 5, bit 1) | | | | |
| 0 |  |  |  | UMTS encryption algorithm UEA7 not supported |
| 1 |  |  |  | UMTS encryption algorithm UEA7 supported |
|  | | | | |
| UCS2 support (UCS2) (octet 6, bit 8) | | | | |
| This information field indicates the likely treatment of UCS2 encoded character strings by the UE. | | | | |
|  | | | | |
| 0 |  |  |  | The UE has a preference for the default alphabet (defined in |
|  |  |  |  | 3GPP TS 23.038 [3]) over UCS2 (see ISO/IEC 10646 [29]). |
| 1 |  |  |  | The UE has no preference between the use of the default alphabet and |
|  |  |  |  | the use of UCS2. |
|  | | | | |
| UMTS integrity algorithms supported (octet 6) | | | | |
|  | | | | |
| UMTS integrity algorithm UIA1 supported (octet 6, bit 7) | | | | |
| 0 |  |  |  | UMTS integrity algorithm UIA1 not supported |
| 1 |  |  |  | UMTS integrity algorithm UIA1 supported |
|  | | | | |
| UMTS integrity algorithm UIA2 supported (octet 6, bit 6) | | | | |
| 0 |  |  |  | UMTS integrity algorithm UIA2 not supported |
| 1 |  |  |  | UMTS integrity algorithm UIA2 supported |
|  | | | | |
| UMTS integrity algorithm UIA3 supported (octet 6, bit 5) | | | | |
| 0 |  |  |  | UMTS integrity algorithm UIA3 not supported |
| 1 |  |  |  | UMTS integrity algorithm UIA3 supported |
|  | | | | |
| UMTS integrity algorithm UIA4 supported (octet 6, bit 4) | | | | |
| 0 |  |  |  | UMTS integrity algorithm UIA4 not supported |
| 1 |  |  |  | UMTS integrity algorithm UIA4 supported |
|  | | | | |
| UMTS integrity algorithm UIA5 supported (octet 6, bit 3) | | | | |
| 0 |  |  |  | UMTS integrity algorithm UIA5 not supported |
| 1 |  |  |  | UMTS integrity algorithm UIA5 supported |
|  | | | | |
| UMTS integrity algorithm UIA6 supported (octet 6, bit 2) | | | | |
| 0 |  |  |  | UMTS integrity algorithm UIA6 not supported |
| 1 |  |  |  | UMTS integrity algorithm UIA6 supported |
|  | | | | |
| UMTS integrity algorithm UIA7 supported (octet 6, bit 1) | | | | |
| 0 |  |  |  | UMTS integrity algorithm UIA7 not supported |
| 1 |  |  |  | UMTS integrity algorithm UIA7 supported |
|  | | | | |
| NF capability (octet 7, bit 1) | | | | |
| 0 |  |  |  | notification procedure not supported |
| 1 |  |  |  | notification procedure supported |
|  | | | | |
| 1xSRVCC capability (octet 7, bit 2) | | | | |
| 0 |  |  |  | SRVCC from E-UTRAN to cdma2000® 1x CS not supported |
| 1 |  |  |  | SRVCC from E-UTRAN to cdma2000® 1x CS supported |
|  |  |  |  | (see 3GPP TS 23.216 [8]) |
|  | | | | |
| Location services (LCS) notification mechanisms capability (octet 7, bit 3) | | | | |
| 0 |  |  |  | LCS notification mechanisms not supported |
| 1 |  |  |  | LCS notification mechanisms supported (see 3GPP TS 24.171 [13C]) |
|  | | | | |
| LTE Positioning Protocol (LPP) capability (octet 7, bit 4) | | | | |
| 0 |  |  |  | LPP not supported |
| 1 |  |  |  | LPP supported (see 3GPP TS 36.355 [22A]) |
| Access class control for CSFB (ACC-CSFB) capability (octet 7, bit 5) | | | | |
| 0 |  |  |  | eNodeB-based access class control for CSFB not supported |
| 1 |  |  |  | eNodeB-based access class control for CSFB supported  (see 3GPP TS 22.011 [1A]) |
| H.245 After SRVCC Handover capability (H.245-ASH) (octet 7, bit 6)  This bit indicates the capability for H.245 with support and use of pre-defined codecs, and if needed, H.245 codec negotiation after SRVCC handover. | | | | |
| 0 |  |  |  | H.245 after SRVCC handover capability not supported |
| 1 |  |  |  | H.245 after SRVCC handover capability supported  (see 3GPP TS 23.216 [8]) |
| ProSe (octet 7, bit 7)  This bit indicates the capability for ProSe. | | | | |
| 0 |  |  |  | ProSe not supported |
| 1 |  |  |  | ProSe supported |
| ProSe direct discovery (ProSe-dd) (octet 7, bit 8)  This bit indicates the capability for ProSe direct discovery. | | | | |
| 0 |  |  |  | ProSe direct discovery not supported |
| 1 |  |  |  | ProSe direct discovery supported |
| ProSe direct communication (ProSe-dc) (octet 8, bit 1)  This bit indicates the capability for ProSe direct communication. | | | | |
| 0 |  |  |  | ProSe direct communication not supported |
| 1 |  |  |  | ProSe direct communication supported |
| ProSe UE-to-network-relay (ProSe-relay) (octet 8, bit 2)  This bit indicates the capability to act as a ProSe UE-to-network relay | | | | |
| 0 |  |  |  | Acting as a ProSe UE-to-network relay not supported |
| 1 |  |  |  | Acting as a ProSe UE-to-network relay supported |
| Control plane CIoT EPS optimization (CP CIoT) (octet 8, bit 3)  This bit indicates the capability for control plane CIoT EPS optimization. | | | | |
| 0 |  |  |  | Control plane CIoT EPS optimization not supported |
| 1 |  |  |  | Control plane CIoT EPS optimization supported |
| User plane CIoT EPS optimization (UP CIoT) (octet 8, bit 4)  This bit indicates the capability for user plane CIoT EPS optimization. | | | | |
| 0 |  |  |  | User plane CIoT EPS optimization not supported |
| 1 |  |  |  | User plane CIoT EPS optimization supported |
| S1-u data transfer (S1-U data) (octet 8, bit 5)  This bit indicates the capability for S1-u data transfer. | | | | |
| 0 |  |  |  | S1-U data transfer not supported |
| 1 |  |  |  | S1-U data transfer supported |
| EMM-REGISTERED without PDN connection (ERw/oPDN) (octet 8, bit 6)  This bit indicates the capability for EMM REGISTERED without PDN connectivity. | | | | |
| 0 |  |  |  | EMM-REGISTERED without PDN connection not supported |
| 1 |  |  |  | EMM-REGISTERED without PDN connection supported |
| Header compression for control plane CIoT EPS optimization (HC-CP CIoT) (octet 8, bit 7)  This bit indicates the capability for header compression for control plane CIoT EPS optimization. | | | | |
| 0 |  |  |  | Header compression for control plane CIoT EPS optimization not supported |
| 1 |  |  |  | Header compression for control plane CIoT EPS optimization supported |
| Extended protocol configuration options (ePCO) (octet 8, bit 8)  This bit indicates the support of the extended protocol configuration options IE. | | | | |
| 0 |  |  |  | Extended protocol configuration options IE not supported |
| 1 |  |  |  | Extended protocol configuration options IE supported |
| Multiple DRB support (multipleDRB) (octet 9, bit 1)  This bit indicates the capability to support multiple user plane radio bearers (see 3GPP TS 36.306 [44], 3GPP TS 36.331 [22]) in NB-S1 mode. | | | | |
| 0 |  |  |  | Multiple DRB not supported |
| 1 |  |  |  | Multiple DRB supported |
| All other bits in octet 9 to 15 are spare and shall be coded as zero, if the respective octet is included in the information element. | | | | |
|  | | | | |

#### 9.9.3.35 UE radio capability information update needed

The purpose of the UE radio capability information update needed information element is to indicate whether the MME shall delete the stored UE radio capability information, if any.

The UE radio capability information update needed information element is coded as shown in figure 9.9.3.35.1and table 9.9.3.35.1.

The UE radio capability information update needed is a type 1 information element.

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 |  |
| UE radio capability information update needed IEI | | | | 0 | 0 | 0 | URC  upd | octet 1 |
| spare | | |

Figure 9.9.3.35.1: UE radio capability information update needed information element

Table 9.9.3.35.1: UE radio capability information update needed information element

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| UE radio capability information update needed flag (URC upd) (octet 1) | | | | |
| Bit | | | | |
| 1 |  |  |  |  |
| 0 |  |  |  | UE radio capability information update not needed |
| 1 |  |  |  | UE radio capability information update needed |
|  | | | | |

#### 9.9.3.36 UE security capability

The UE security capability information element is used by the network to indicate which security algorithms are supported by the UE in S1 mode, Iu mode and Gb mode. Security algorithms supported in S1 mode are supported both for NAS and for AS security. If the UE supports S101 mode, then these security algorithms are also supported for NAS security in S101 mode.

The UE security capability information element is coded as shown in figure 9.9.3.36.1 and table 9.9.3.36.1.

The UE security capability is a type 4 information element with a minimum length of 4 octets and a maximum length of 7 octets.

Octets 5, 6, and 7 are optional. If octet 5 is included, then also octet 6 shall be included and octet 7 may be included.

If a UE did not indicate support of any security algorithm for Gb mode, octet 7 shall not be included. If the UE did not indicate support of any security algorithm for Iu mode and Gb mode, octets 5, 6, and 7 shall not be included.

If the UE did not indicate support of any security algorithm for Iu mode but indicated support of a security algorithm for Gb mode, octets 5, 6, and 7 shall be included. In this case octets 5 and 6 are filled with the value of zeroes.

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | 8 | | 7 | | 6 | | 5 | | 4 | | 3 | | 2 | | 1 | |  | |
| UE security capability IEI | | | | | | | | | | | | | | | | octet 1 | |  |
| Length of UE security capability contents | | | | | | | | | | | | | | | | octet 2 | |  |
| EEA0 | | 128-  EEA1 | | 128-  EEA2 | | 128-  EEA3 | | EEA4 | | EEA5 | | EEA6 | | EEA7 | | octet 3 | |  |
| EIA0 | | 128-  EIA1 | | 128-  EIA2 | | 128-  EIA3 | | EIA4 | | EIA5 | | EIA6 | | EIA7 | | octet 4 | |  |
| UEA0 | | UEA1 | | UEA2 | | UEA3 | | UEA4 | | UEA5 | | UEA6 | | UEA7 | | octet 5\* | |  |
| 0  spare | | UIA1 | | UIA2 | | UIA3 | | UIA4 | | UIA5 | | UIA6 | | UIA7 | | octet 6\* | |  |
| 0  spare | | GEA1 | | GEA2 | | GEA3 | | GEA4 | | GEA5 | | GEA6 | | GEA7 | | octet 7\* | |  |

Figure 9.9.3.36.1: UE security capability information element

Table 9.9.3.36.1: UE security capability information element

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| EPS encryption algorithms supported (octet 3) | | | | |
|  | | | | |
| EPS encryption algorithm EEA0 supported (octet 3, bit 8) | | | | |
| 0 |  |  |  | EPS encryption algorithm EEA0 not supported |
| 1 |  |  |  | EPS encryption algorithm EEA0 supported |
|  | | | | |
| EPS encryption algorithm 128-EEA1 supported (octet 3, bit 7) | | | | |
| 0 |  |  |  | EPS encryption algorithm 128-EEA1 not supported |
| 1 |  |  |  | EPS encryption algorithm 128-EEA1 supported |
|  | | | | |
| EPS encryption algorithm 128-EEA2 supported (octet 3, bit 6) | | | | |
| 0 |  |  |  | EPS encryption algorithm 128-EEA2 not supported |
| 1 |  |  |  | EPS encryption algorithm 128-EEA2 supported |
|  | | | | |
| EPS encryption algorithm 128-EEA3 supported (octet 3, bit 5) | | | | |
| 0 |  |  |  | EPS encryption algorithm 128-EEA3 not supported |
| 1 |  |  |  | EPS encryption algorithm 128-EEA3 supported |
|  | | | | |
| EPS encryption algorithm EEA4 supported (octet 3, bit 4) | | | | |
| 0 |  |  |  | EPS encryption algorithm EEA4 not supported |
| 1 |  |  |  | EPS encryption algorithm EEA4 supported |
|  | | | | |
| EPS encryption algorithm EEA5 supported (octet 3, bit 3) | | | | |
| 0 |  |  |  | EPS encryption algorithm EEA5 not supported |
| 1 |  |  |  | EPS encryption algorithm EEA5 supported |
|  | | | | |
| EPS encryption algorithm EEA6 supported (octet 3, bit 2) | | | | |
| 0 |  |  |  | EPS encryption algorithm EEA6 not supported |
| 1 |  |  |  | EPS encryption algorithm EEA6 supported |
|  | | | | |
| EPS encryption algorithm EEA7 supported (octet 3, bit 1) | | | | |
| 0 |  |  |  | EPS encryption algorithm EEA7 not supported |
| 1 |  |  |  | EPS encryption algorithm EEA7 supported |
|  | | | | |
| EPS integrity algorithms supported (octet 4) | | | | |
|  | | | | |
| EPS integrity algorithm EIA0 supported (octet 4, bit 8) | | | | |
| 0 |  |  |  | EPS integrity algorithm EIA0 not supported |
| 1 |  |  |  | EPS integrity algorithm EIA0 supported |
|  | | | | |
| EPS integrity algorithm 128-EIA1 supported (octet 4, bit 7) | | | | |
| 0 |  |  |  | EPS integrity algorithm 128-EIA1 not supported |
| 1 |  |  |  | EPS integrity algorithm 128-EIA1 supported |
|  | | | | |
| EPS integrity algorithm 128-EIA2 supported (octet 4, bit 6) | | | | |
| 0 |  |  |  | EPS integrity algorithm 128-EIA2 not supported |
| 1 |  |  |  | EPS integrity algorithm 128-EIA2 supported |
|  | | | | |
| EPS integrity algorithm 128-EIA3 supported (octet 4, bit 5) | | | | |
| 0 |  |  |  | EPS integrity algorithm 128-EIA3 not supported |
| 1 |  |  |  | EPS integrity algorithm 128-EIA3 supported |
|  | | | | |
| EPS integrity algorithm EIA4 supported (octet 4, bit 4) | | | | |
| 0 |  |  |  | EPS integrity algorithm EIA4 not supported |
| 1 |  |  |  | EPS integrity algorithm EIA4 supported |
|  | | | | |
| EPS integrity algorithm EIA5 supported (octet 4, bit 3) | | | | |
| 0 |  |  |  | EPS integrity algorithm EIA5 not supported |
| 1 |  |  |  | EPS integrity algorithm EIA5 supported |
|  | | | | |
| EPS integrity algorithm EIA6 supported (octet 4, bit 2) | | | | |
| 0 |  |  |  | EPS integrity algorithm EIA6 not supported |
| 1 |  |  |  | EPS integrity algorithm EIA6 supported |
|  | | | | |
| EPS integrity algorithm EIA7 supported (octet 4, bit 1) | | | | |
| 0 |  |  |  | EPS integrity algorithm EIA7 not supported |
| 1 |  |  |  | EPS integrity algorithm EIA7 supported |
|  | | | | |
| UMTS encryption algorithms supported (octet 5) | | | | |
|  | | | | |
| UMTS encryption algorithm UEA0 supported (octet 5, bit 8) | | | | |
| 0 |  |  |  | UMTS encryption algorithm UEA0 not supported |
| 1 |  |  |  | UMTS encryption algorithm UEA0 supported |
|  | | | | |
| UMTS encryption algorithm UEA1 supported (octet 5, bit 7) | | | | |
| 0 |  |  |  | UMTS encryption algorithm UEA1 not supported |
| 1 |  |  |  | UMTS encryption algorithm UEA1 supported |
|  | | | | |
| UMTS encryption algorithm UEA2 supported (octet 5, bit 6) | | | | |
| 0 |  |  |  | UMTS encryption algorithm UEA2 not supported |
| 1 |  |  |  | UMTS encryption algorithm UEA2 supported |
|  | | | | |
| UMTS encryption algorithm UEA3 supported (octet 5, bit 5) | | | | |
| 0 |  |  |  | UMTS encryption algorithm UEA3 not supported |
| 1 |  |  |  | UMTS encryption algorithm UEA3 supported |
|  | | | | |
| UMTS encryption algorithm UEA4 supported (octet 5, bit 4) | | | | |
| 0 |  |  |  | UMTS encryption algorithm UEA4 not supported |
| 1 |  |  |  | UMTS encryption algorithm UEA4 supported |
|  | | | | |
| UMTS encryption algorithm UEA5 supported (octet 5, bit 3) | | | | |
| 0 |  |  |  | UMTS encryption algorithm UEA5 not supported |
| 1 |  |  |  | UMTS encryption algorithm UEA5 supported |
|  | | | | |
| UMTS encryption algorithm UEA6 supported (octet 5, bit 2) | | | | |
| 0 |  |  |  | UMTS encryption algorithm UEA6 not supported |
| 1 |  |  |  | UMTS encryption algorithm UEA6 supported |
|  | | | | |
| UMTS encryption algorithm UEA7 supported (octet 5, bit 1) | | | | |
| 0 |  |  |  | UMTS encryption algorithm UEA7 not supported |
| 1 |  |  |  | UMTS encryption algorithm UEA7 supported |
|  | | | | |
| UMTS integrity algorithms supported (octet 6) | | | | |
|  | | | | |
| Bit 8 of octet 6 is spare and shall be coded as zero. | | | | |
|  | | | | |
| UMTS integrity algorithm UIA1 supported (octet 6, bit 7) | | | | |
| 0 |  |  |  | UMTS integrity algorithm UIA1 not supported |
| 1 |  |  |  | UMTS integrity algorithm UIA1 supported |
|  | | | | |
| UMTS integrity algorithm UIA2 supported (octet 6, bit 6) | | | | |
| 0 |  |  |  | UMTS integrity algorithm UIA2 not supported |
| 1 |  |  |  | UMTS integrity algorithm UIA2 supported |
|  | | | | |
| UMTS integrity algorithm UIA3 supported (octet 6, bit 5) | | | | |
| 0 |  |  |  | UMTS integrity algorithm UIA3 not supported |
| 1 |  |  |  | UMTS integrity algorithm UIA3 supported |
|  | | | | |
| UMTS integrity algorithm UIA4 supported (octet 6, bit 4) | | | | |
| 0 |  |  |  | UMTS integrity algorithm UIA4 not supported |
| 1 |  |  |  | UMTS integrity algorithm UIA4 supported |
|  | | | | |
| UMTS integrity algorithm UIA5 supported (octet 6, bit 3) | | | | |
| 0 |  |  |  | UMTS integrity algorithm UIA5 not supported |
| 1 |  |  |  | UMTS integrity algorithm UIA5 supported |
|  | | | | |
| UMTS integrity algorithm UIA6 supported (octet 6, bit 2) | | | | |
| 0 |  |  |  | UMTS integrity algorithm UIA6 not supported |
| 1 |  |  |  | UMTS integrity algorithm UIA6 supported |
|  | | | | |
| UMTS integrity algorithm UIA7 supported (octet 6, bit 1) | | | | |
| 0 |  |  |  | UMTS integrity algorithm UIA7 not supported |
| 1 |  |  |  | UMTS integrity algorithm UIA7 supported |
|  | | | | |
| GPRS encryption algorithms supported (octet 7) | | | | |
|  | | | | |
| Bit 8 of octet 7 is spare and shall be coded as zero. | | | | |
|  | | | | |
| GPRS encryption algorithm GEA1 supported (octet 7, bit 7) | | | | |
| 0 |  |  |  | GPRS encryption algorithm GEA1 not supported |
| 1 |  |  |  | GPRS encryption algorithm GEA1 supported |
|  | | | | |
| GPRS encryption algorithm GEA2 supported (octet 7, bit 6) | | | | |
| 0 |  |  |  | GPRS encryption algorithm GEA2 not supported |
| 1 |  |  |  | GPRS encryption algorithm GEA2 supported |
|  | | | | |
| GPRS encryption algorithm GEA3 supported (octet 7, bit 5) | | | | |
| 0 |  |  |  | GPRS encryption algorithm GEA3 not supported |
| 1 |  |  |  | GPRS encryption algorithm GEA3 supported |
|  | | | | |
| GPRS encryption algorithm GEA4 supported (octet 7, bit 4) | | | | |
| 0 |  |  |  | GPRS encryption algorithm GEA4 not supported |
| 1 |  |  |  | GPRS encryption algorithm GEA4 supported |
|  | | | | |
| GPRS encryption algorithm GEA5 supported (octet 7, bit 3) | | | | |
| 0 |  |  |  | GPRS encryption algorithm GEA5 not supported |
| 1 |  |  |  | GPRS encryption algorithm GEA5 supported |
|  | | | | |
| GPRS encryption algorithm GEA6 supported (octet 7, bit 2) | | | | |
| 0 |  |  |  | GPRS encryption algorithm GEA6 not supported |
| 1 |  |  |  | GPRS encryption algorithm GEA6 supported |
|  | | | | |
| GPRS encryption algorithm GEA7 supported (octet 7, bit 1) | | | | |
| 0 |  |  |  | GPRS encryption algorithm GEA7 not supported |
| 1 |  |  |  | GPRS encryption algorithm GEA7 supported |
|  | | | | |

#### 9.9.3.37 Emergency Number List

See subclause 10.5.3.13 in 3GPP TS 24.008 [13].

#### 9.9.3.38 CLI

The purpose of the CLI information element is to convey information about the calling line for a terminated call to a CS fallback capable UE.

The CLI information element is coded as shown in figure 9.9.3.38.1 and table 9.9.3.38.1.

The CLI is a type 4 information element with a minimum length of 3 octets and a maximum length of 14 octets.

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 |  |
| CLI IEI | | | | | | | | octet 1 |
| Length of CLI | | | | | | | | octet 2 |
| CLI (value part) | | | | | | | | octet 3  to |
|  | | | | | | | | octet 14 |

Figure 9.9.3.38.1: CLI information element

Table 9.9.3.38.1: CLI information element

|  |
| --- |
| CLI (value part) |
|  |
| The coding of the CLI value part is the same as for octets 3 to 14 of the Calling party BCD number information element defined in subclause 10.5.4.9 of 3GPP TS 24.008 [13]. |

#### 9.9.3.39 SS Code

The purpose of the SS code information element is to convey information related to a network initiated supplementary service request to a CS fallback capable UE.

The SS Code information element is coded as shown in figure 9.9.3.39.1 and table 9.9.3.39.1.

The SS Code is a type 3 information element with 2 octets length.

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 |  |
| SS Code IEI | | | | | | | | octet 1 |
| SS Code value | | | | | | | | octet 2 |

Figure 9.9.3.39.1: SS Code information element

Table 9.9.3.39.1: SS Code information element

|  |
| --- |
| SS Code value |
|  |
| The coding of the SS Code value is given in subclause 17.7.5 of 3GPP TS 29.002 [15C]. |

#### 9.9.3.40 LCS indicator

The purpose of the LCS indicator information element is to indicate that the origin of the message is due to a LCS request and the type of this request to a CS fallback capable UE.

The LCS indicator information element is coded as shown in figure 9.9.3.40.1 and table 9.9.3.40.1.

The LCS indicator is a type 3 information element with 2 octets length.

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 |  |
| LCS indicator IEI | | | | | | | | octet 1 |
| LCS indicator value | | | | | | | | octet 2 |

Figure 9.9.3.40.1: LCS indicator information element

Table 9.9.3.40.1: LCS indicator information element

|  |
| --- |
| LCS indicator value  Bits  8 7 6 5 4 3 2 1  0 0 0 0 0 0 0 0 Normal, unspecified in this version of the protocol.  0 0 0 0 0 0 0 1 MT-LR  0 0 0 0 0 0 1 0  to Normal, unspecified in this version of the protocol  1 1 1 1 1 1 1 1 |

#### 9.9.3.41 LCS client identity

The purpose of the LCS client identity information element is to convey information related to the client of a LCS request for a CS fallback capable UE.

The LCS client identity information element is coded as shown in figure 9.9.3.41.1 and table 9.9.3.41.1.

The LCI client identity is a type 4 information element with a minimum length of 3 octets and a maximum length of 257 octets.

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 |  |
| LCS client identity IEI | | | | | | | | octet 1 |
| Length of LCS client identity | | | | | | | | octet 2 |
| LCS client identity (value part) | | | | | | | | octet 3  to |
|  | | | | | | | | octet 257 |

Figure 9.9.3.41.1: LCS client identity information element

Table 9.9.3.41.1: LCS client identity information element

|  |
| --- |
| LCS client identity (value part) |
|  |
| The coding of the value part of the LCS client identity is given in subclause 17.7.13 of 3GPP TS 29.002 [15C]. |

#### 9.9.3.42 Generic message container type

The purpose of the generic message container type information element is to specify the type of message contained in the generic message container IE.

The generic message container type information element is coded as shown in table 9.9.3.42.1.

Table 9.9.3.42.1: Generic message container type information element

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Bits | | | | | | | |  |  |
| 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 |  |  |
|  |  |  |  |  |  |  |  |  |  |
| 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |  | Reserved |
| 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |  | LTE Positioning Protocol (LPP) message container (see 3GPP TS 36.355 [22A] ) |
| 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 |  | Location services message container (see 3GPP TS 24.171 [13C]) |
| 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 |  |  |
| to | | | | | | | |  | Unused |
| 0 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |  |  |
| 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |  |  |
| to | | | | | | | |  | Reserved |
| 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |  |  |
|  |  |  |  |  |  |  |  |  |  |
|  | | | | | | | | | |

#### 9.9.3.43 Generic message container

This information element is used to encapsulate the application message transferred between the UE and the network.The generic message container information element is coded as shown in figure 9.9.3.43.1 and table 9.9.3.43.1.

The generic message container is a type 6 information element.

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 |  |
| Generic message container IEI | | | | | | | | octet 1 |
| Length of generic message container contents | | | | | | | | octet 2 |
|  | | | | | | | | octet 3 |
|  | | | | | | | | octet 4 |
| Generic message container contents | | | | | | | |  |
|  | | | | | | | | octet n |

Figure 9.9.3.43.1: Generic message container information element

Table 9.9.3.43.1: Generic message container information element

|  |
| --- |
| Generic message container contents (octet 4 to octet n); Max value of 65535 octets |
|  |
| The coding of the contents of the generic message container is dependent on the particular application. |
|  |

#### 9.9.3.44 Voice domain preference and UE's usage setting

See subclause 10.5.5.28 in 3GPP TS 24.008 [13].

#### 9.9.3.45 GUTI type

The purpose of the GUTI type information element is to indicate whether the GUTI included in the same message in an information element of type EPS mobile identity represents a native GUTI or a mapped GUTI.

The GUTI type information element information element is coded as shown in figure 9.9.3.45.1 and table 9.9.3.45.1.

The GUTI type is a type 1 information element.

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 |  |
| GUTI type IEI | | | | 0 | 0 | 0 | GUTI type | octet 1 |
| spare | | |

Figure 9.9.3.45.1: GUTI type information element

Table 9.9.3.45.1: GUTI type information element

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| GUTI type (octet 1) | | | | |
| Bit | | | | |
| 1 |  |  |  |  |
| 0 |  |  |  | Native GUTI |
| 1 |  |  |  | Mapped GUTI |
|  | | | | |
| Bits 2 to 4 of octet 1 are spare and shall be coded as zero. | | | | |
|  | | | | |

#### 9.9.3.46 Extended DRX parameters

See subclause 10.5.5.32 in 3GPP TS 24.008 [13].

#### 9.9.3.47 Control plane service type

The purpose of the Control plane service type information element is to specify the purpose of the CONTROL PLANE SERVICE REQUEST message.

The Control plane service type information element is coded as shown in figure 9.9.3.47.1 and table 9.9.3.47.1.

The Control plane service type is a type 1 information element.

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 |  |
| Control plane service type  IEI | | | | "Active" flag | Control plane service type  value | | | octet 1 |

Figure 9.9.3.47.1: Control plane service type information element

Table 9.9.3.47.1: Control plane service type information element

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Control plane service type value (octet 1, bit 1 to 3) | | | | |
|  | | | | |
| Bits | | | | |
|  | | | | |
| 3 | 2 | 1 |  |  |
| 0 | 0 | 0 |  | mobile originating request |
| 0 | 0 | 1 |  | mobile terminating request |
| 0 | 1 | 0 |  |  |
|  | to |  |  | unused; shall be interpreted as " mobile originating request", if received |
| 1 | 1 | 1 |  | by the network. |
|  | | | | |
| All other values are reserved. | | | | |
|  | | | | |
| "Active" flag (octet 1, bit 4) | | | | |
| Bit | | | | |
|  | | | | |
| 4 |  |  |  |  |
| 0 |  |  |  | No radio bearer establishment requested |
| 1 |  |  |  | Radio bearer establishment requested |
|  | | | | |

### 9.9.4 EPS Session Management (ESM) information elements

#### 9.9.4.1 Access point name

See subclause 10.5.6.1 in 3GPP TS 24.008 [13].

#### 9.9.4.2 APN aggregate maximum bit rate

The purpose of the APN aggregate maximum bit rate information element is to indicate the initial subscribed APN-AMBR when the UE establishes a PDN connection or to indicate the new APN-AMBR if it is changed by the network.

The APN aggregate maximum bit rate information element is coded as shown in figure 9.9.4.2.1 and table 9.9.4.2.1.

The APN aggregate maximum bit rate is a type 4 information element with a minimum length of 4 octets and a maximum length of 8 octets. Octets 5-8 are optional. If octet 5 is included, then octet 6 shall also be included, and octets 7-8 may be included. If octet 7 is included, then octet 8 shall also be included. The length of the APN-AMBR IE can be either 4 octets, 6 octets or 8 octets.

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 |  |
| APN aggregate maximum bit rate IEI | | | | | | | | octet 1 |
| Length of APN aggregate maximum bit rate contents | | | | | | | | octet 2 |
| APN-AMBR for downlink | | | | | | | | octet 3 |
| APN-AMBR for uplink | | | | | | | | octet 4 |
| APN-AMBR for downlink (extended) | | | | | | | | octet 5\* |
| APN-AMBR for uplink (extended) | | | | | | | | octet 6\* |
| APN-AMBR for downlink (extended-2) | | | | | | | | octet 7\* |
| APN-AMBR for uplink (extended-2) | | | | | | | | octet 8\* |

Figure 9.9.4.2.1: APN aggregate maximum bit rate information element

Table 9.9.4.2.1: APN aggregate maximum bit rate information element

|  |
| --- |
| APN-AMBR for downlink, octet 3  Bits  8 7 6 5 4 3 2 1  0 0 0 0 0 0 0 0 Reserved  0 0 0 0 0 0 0 1 The APN-AMBR is binary coded in 8 bits, using a granularity of 1 kbps  to giving a range of values from 1 kbps to 63 kbps in 1 kbps increments.  0 0 1 1 1 1 1 1  0 1 0 0 0 0 0 0 The APN-AMBR is 64 kbps + ((the binary coded value in 8 bits –01000000) \* 8 kbps)  to giving a range of values from 64 kbps to 568 kbps in 8 kbps increments.  0 1 1 1 1 1 1 1  1 0 0 0 0 0 0 0 The APN-AMBR is 576 kbps + ((the binary coded value in 8 bits –10000000) \* 64 kbps)  to giving a range of values from 576 kbps to 8640 kbps in 64 kbps increments.  1 1 1 1 1 1 1 0  1 1 1 1 1 1 1 1 0kbps  If the network wants to indicate an APN-AMBR for downlink higher than 8640 kbps, it shall set octet 3 to "11111110", i.e. 8640 kbps, and shall encode the value for the APN-AMBR in octet 5.  APN-AMBR for uplink, octet 4  Coding is identical to that of APN-AMBR for downlink.  APN-AMBR for downlink (extended), octet 5  Bits  8 7 6 5 4 3 2 1  0 0 0 0 0 0 0 0 Use the value indicated by the APN-AMBR for downlink in octet 3.  For all other values: Ignore the value indicated by the APN-AMBR for downlink in octet 3  and use the following value:  0 0 0 0 0 0 0 1 The APN-AMBR is 8600 kbps + ((the binary coded value in 8 bits) \* 100 kbps),  to giving a range of values from 8700 kbps to 16000 kbps in 100 kbps increments.  0 1 0 0 1 0 1 0  0 1 0 0 1 0 1 1 The APN-AMBR is 16 Mbps + ((the binary coded value in 8 bits - 01001010) \* 1 Mbps),  to giving a range of values from 17 Mbps to 128 Mbps in 1 Mbps increments.  1 0 1 1 1 0 1 0  1 0 1 1 1 0 1 1 The APN-AMBR is 128 Mbps + ((the binary coded value in 8 bits - 10111010) \* 2 Mbps),  to giving a range of values from 130 Mbps to 256 Mbps in 2 Mbps increments.  1 1 1 1 1 0 1 0  All other values shall be interpreted as '1 1 1 1 1 0 1 0'.  APN-AMBR for uplink (extended), octet 6  This field is an extension of the APN-AMBR for uplink in octet 4. The coding is identical to that of the APN-AMBR for downlink (extended).  APN-AMBR for downlink (extended-2), octet 7  Bits  8 7 6 5 4 3 2 1  0 0 0 0 0 0 0 0 Use the value indicated by the APN-AMBR for downlink and APN-AMBR for downlink (extended) in  octets 3 and 5.  0 0 0 0 0 0 0 1 The APN-AMBR is (the binary coded value in 8 bits) \* 256 Mbps + (the value indicated by  to the APN-AMBR for downlink and APN-AMBR for downlink (extended) in octets 3 and 5),  1 1 1 1 1 1 1 0 giving a range of 256 Mbps to 65280 Mbps.  1 1 1 1 1 1 1 1 This value shall be interpreted as '0 0 0 0 0 0 0 0' in this version of the specification.  APN-AMBR for uplink (extended-2), octet 8  This field is an extension of the APN-AMBR for uplink and APN-AMBR for uplink (extended) in octets 4 and 6. The coding is identical to that of the APN-AMBR for downlink (extended-2). |

#### 9.9.4.2A Connectivity type

See subclause 10.5.6.19 in 3GPP TS 24.008 [13].

#### 9.9.4.3 EPS quality of service

The purpose of the EPS quality of service information element is to specify the QoS parameters for an EPS bearer context.

The EPS quality of service information element is coded as shown in figure 9.9.4.3.1 and table 9.9.4.3.1.

The EPS quality of service is a type 4 information element with a minimum length of 3 octets and a maximum length of 15 octets. Octets 4-15 are optional. If octet 4 is included, then octets 5-7 shall also be included, and octets 8-15 may be included. If octet 8 is included, then octets 4-11 shall also be included, and octets 12-15 may be included. If octet 12 is included, then octets 4-15 shall also be included. The length of the EPS QoS IE can be either 3 octets, 7 octets, 11 octets or 15 octets.

Refer to 3GPP TS 23.203 [7] for a detailed description of the QoS Class Identifier (QCI).

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 |  |
| EPS quality of service IEI | | | | | | | | octet 1 |
| Length of EPS quality of service contents | | | | | | | | octet 2 |
| QCI | | | | | | | | octet 3 |
| Maximum bit rate for uplink | | | | | | | | octet 4\* |
| Maximum bit rate for downlink | | | | | | | | octet 5\* |
| Guaranteed bit rate for uplink | | | | | | | | octet 6\* |
| Guaranteed bit rate for downlink | | | | | | | | octet 7\* |
| Maximum bit rate for uplink (extended) | | | | | | | | octet 8\* |
| Maximum bit rate for downlink (extended) | | | | | | | | octet 9\* |
| Guaranteed bit rate for uplink (extended) | | | | | | | | octet 10\* |
| Guaranteed bit rate for downlink (extended) | | | | | | | | octet 11\* |
| Maximum bit rate for uplink (extended-2) | | | | | | | | octet 12\* |
| Maximum bit rate for downlink (extended-2) | | | | | | | | octet 13\* |
| Guaranteed bit rate for uplink (extended-2) | | | | | | | | octet 14\* |
| Guaranteed bit rate for downlink (extended-2) | | | | | | | | octet 15\* |

Figure 9.9.4.3.1: EPS quality of service information element

Table 9.9.4.3.1: EPS quality of service information element

|  |
| --- |
| Quality of Service Class Identifier (QCI), octet 3 (see 3GPP TS 23.203 [7] and 3GPP TS 29.212 [16B])  Bits  8 7 6 5 4 3 2 1  In UE to network direction:  0 0 0 0 0 0 0 0 no QCI requested (NOTE)  In network to UE direction:  0 0 0 0 0 0 0 0 Reserved  In UE to network direction and in network to UE direction:  0 0 0 0 0 0 0 1 QCI 1  0 0 0 0 0 0 1 0 QCI 2  0 0 0 0 0 0 1 1 QCI 3  0 0 0 0 0 1 0 0 QCI 4  0 0 0 0 0 1 0 1 QCI 5  0 0 0 0 0 1 1 0 QCI 6  0 0 0 0 0 1 1 1 QCI 7  0 0 0 0 1 0 0 0 QCI 8  0 0 0 0 1 0 0 1 QCI 9  0 0 0 0 1 0 1 0  to Spare  0 1 0 0 0 0 0 0  0 1 0 0 0 0 0 1 QCI 65  0 1 0 0 0 0 1 0 QCI 66  0 1 0 0 0 0 1 1  to Spare  0 1 0 0 0 1 0 0  0 1 0 0 0 1 0 1 QCI 69  0 1 0 0 0 1 1 0 QCI 70  0 1 0 0 0 1 1 1  to Spare  0 1 1 1 1 1 1 1  1 0 0 0 0 0 0 0  to Operator-specific QCIs  1 1 1 1 1 1 1 0  1 1 1 1 1 1 1 1 Reserved  The network shall consider all other values not explicitly defined in this version of the protocol as unsupported.  NOTE: The UE shall use this value, if the information element has presence requirement "M" in a message, but the information element does not serve any useful purpose in the specific procedure for which the message is sent (see subclause 6.5.3.2).  QCI values 10-127 were reserved in earlier versions of the protocol.  If the UE receives a QCI value (excluding the reserved QCI values) that it does not understand, the UE shall choose a QCI value from the set of QCI values defined in this version of the protocol (see 3GPP TS 23.203 [7] and 3GPP TS 29.212 [16B]) and associated with:  - GBR bearers if the IE includes a guaranteed bit rate value; and  - non-GBR bearers if the IE does not include a guaranteed bit rate value.  The UE shall use this chosen QCI value for internal operations only. The UE shall use the received QCI value in subsequent NAS signalling procedures.  For all non-GBR QCIs, the maximum and guaranteed bit rates shall be ignored.  Maximum bit rate for uplink, octet 4 (see 3GPP TS 23.107 [5])  Bits  8 7 6 5 4 3 2 1  In UE to network direction:  0 0 0 0 0 0 0 0 Subscribed maximum bit rate for uplink  In network to UE direction:  0 0 0 0 0 0 0 0 Reserved  In UE to network direction and in network to UE direction:  0 0 0 0 0 0 0 1 The maximum bit rate is binary coded in 8 bits, using a granularity of 1 kbps  to giving a range of values from 1 kbps to 63 kbps in 1 kbps increments.  0 0 1 1 1 1 1 1  0 1 0 0 0 0 0 0 The maximum bit rate is 64 kbps + ((the binary coded value in 8 bits – 01000000) \* 8 kbps)  to giving a range of values from 64 kbps to 568 kbps in 8 kbps increments.  0 1 1 1 1 1 1 1  1 0 0 0 0 0 0 0 The maximum bit rate is 576 kbps + ((the binary coded value in 8 bits – 10000000) \* 64 kbps)  to giving a range of values from 576 kbps to 8640 kbps in 64 kbps increments.  1 1 1 1 1 1 1 0  1 1 1 1 1 1 1 1 0kbps  If the sending entity wants to indicate a maximum bit rate for uplink higher than 8640 kbps, it shall set octet 4 to "11111110", i.e. 8640 kbps, and shall encode the value for the maximum bit rate in octet 8.  The network shall map all other values not explicitly defined onto one of the values defined in this version of the protocol. The network shall return a negotiated value which is explicitly defined in this version of the protocol.  Maximum bit rate for downlink, octet 5 (see 3GPP TS 23.107 [5])  Coding is identical to that of maximum bit rate for uplink.  If the sending entity wants to indicate a maximum bit rate for downlink higher than 8640 kbps, it shall set octet 5 to "11111110", i.e. 8640 kbps, and shall encode the value for the maximum bit rate in octet 9.  The network shall map all other values not explicitly defined onto one of the values defined in this version of the protocol. The network shall return a negotiated value which is explicitly defined in this version of the protocol.  In this version of the protocol, for messages specified in the present document, the sending entity shall not request 0 kbps for both the maximum bit rate for downlink and the maximum bit rate for uplink at the same time. Any entity receiving a request for 0 kbps in both the maximum bit rate for downlink and the maximum bit rate for uplink shall consider that as a syntactical error (see clause 8 of 3GPP TS 24.008 [13]).  Guaranteed bit rate for uplink, octet 6 (see 3GPP TS 23.107 [5])  Coding is identical to that of maximum bit rate for uplink.  If the sending entity wants to indicate a guaranteed bit rate for uplink higher than 8640 kbps, it shall set octet 6 to "11111110", i.e. 8640 kbps, and shall encode the value for the guaranteed bit rate in octet 10.  The network shall map all other values not explicitly defined onto one of the values defined in this version of the protocol. The network shall return a negotiated value which is explicitly defined in this version of the protocol.  Guaranteed bit rate for downlink, octet 7 (see 3GPP TS 23.107 [5])  Coding is identical to that of maximum bit rate for uplink.  If the sending entity wants to indicate a guaranteed bit rate for downlink higher than 8640 kbps, it shall set octet 7 to "11111110", i.e. 8640 kbps, and shall encode the value for the guaranteed bit rate in octet 11.  The network shall map all other values not explicitly defined onto one of the values defined in this version of the protocol. The network shall return a negotiated value which is explicitly defined in this version of the protocol.  Maximum bit rate for uplink (extended), octet 8  Bits  8 7 6 5 4 3 2 1  In UE to network direction and in network to UE direction:  0 0 0 0 0 0 0 0 Use the value indicated by the maximum bit rate for uplink in octet 4.  For all other values: ignore the value indicated by the maximum bit rate for uplink in octet 4  and use the following value:  0 0 0 0 0 0 0 1 The maximum bit rate is 8600 kbps + ((the binary coded value in 8 bits) \* 100 kbps),  to giving a range of values from 8700 kbps to 16000 kbps in 100 kbps increments.  0 1 0 0 1 0 1 0  0 1 0 0 1 0 1 1 The maximum bit rate is 16 Mbps + ((the binary coded value in 8 bits - 01001010) \* 1 Mbps),  to giving a range of values from 17 Mbps to 128 Mbps in 1 Mbps increments.  1 0 1 1 1 0 1 0  1 0 1 1 1 0 1 1 The maximum bit rate is 128 Mbps + ((the binary coded value in 8 bits - 10111010) \* 2 Mbps),  to giving a range of values from 130 Mbps to 256 Mbps in 2 Mbps increments.  1 1 1 1 1 0 1 0  If the sending entity wants to indicate a Maximum bit rate for uplink higher than 256 Mbps, it shall set octet 8 to "11111010", i.e. 256 Mbps, and shall encode the value for the Maximum bit rate in octet 12.  The network shall map all other values not explicitly defined onto one of the values defined in this version of the protocol. The network shall return a negotiated value which is explicitly defined in this version of the protocol.  Maximum bit rate for downlink (extended), octet 9  This field is an extension of the maximum bit rate for downlink in octet 5. The coding is identical to that of the maximum bit rate for uplink (extended).  If the sending entity wants to indicate a Maximum bit rate for downlink higher than 256 Mbps, it shall set octet 9 to "11111010", i.e. 256 Mbps, and shall encode the value for the Maximum bit rate in octet 13.  The network shall map all other values not explicitly defined onto one of the values defined in this version of the protocol. The network shall return a negotiated value which is explicitly defined in this version of the protocol.  Guaranteed bit rate for uplink (extended), octet 10  Bits  8 7 6 5 4 3 2 1  In UE to network direction and in network to UE direction:  0 0 0 0 0 0 0 0 Use the value indicated by the guaranteed bit rate for uplink in octet 6.  For all other values: ignore the value indicated by the guaranteed bit rate for uplink in octet 6  and use the following value:  0 0 0 0 0 0 0 1 The guaranteed bit rate is 8600 kbps + ((the binary coded value in 8 bits) \* 100 kbps),  to giving a range of values from 8700 kbps to 16000 kbps in 100 kbps increments.  0 1 0 0 1 0 1 0  0 1 0 0 1 0 1 1 The guaranteed bit rate is 16 Mbps + ((the binary coded value in 8 bits - 01001010) \* 1 Mbps),  to giving a range of values from 17 Mbps to 128 Mbps in 1 Mbps increments.  1 0 1 1 1 0 1 0  1 0 1 1 1 0 1 1 The guaranteed bit rate is 128 Mbps + ((the binary coded value in 8 bits - 10111010) \* 2 Mbps),  to giving a range of values from 130 Mbps to 256 Mbps in 2 Mbps increments.  1 1 1 1 1 0 1 0  If the sending entity wants to indicate a Guaranteed bit rate for uplink higher than 256 Mbps, it shall set octet 10 to "11111010", i.e. 256 Mbps, and shall encode the value for the Maximum bit rate in octet 14.  The network shall map all other values not explicitly defined onto one of the values defined in this version of the protocol. The network shall return a negotiated value which is explicitly defined in this version of the protocol.  Guaranteed bit rate for downlink (extended), octet 11  This field is an extension of the guaranteed bit rate for downlink in octet 7. The coding is identical to that of guaranteed bit rate for uplink (extended).  If the sending entity wants to indicate a Guaranteed bit rate for downlink higher than 256 Mbps, it shall set octet 11 to "11111010", i.e. 256 Mbps, and shall encode the value for the Maximum bit rate in octet 15.  The network shall map all other values not explicitly defined onto one of the values defined in this version of the protocol. The network shall return a negotiated value which is explicitly defined in this version of the protocol.  Maximum bit rate for uplink (extended-2), octet 12  Bits  8 7 6 5 4 3 2 1  In UE to network direction and in network to UE direction:  0 0 0 0 0 0 0 0 Use the value indicated by the Maximum bit rate for uplink in octet 4 and octet 8.  For all other values: Ignore the value indicated by the Maximum bit rate for upink in octet 4 and  octet 8 and use the following value:  0 0 0 0 0 0 0 1 The maximum bit rate is 256 Mbps + ((the binary coded value in 8 bits) \* 4 Mbps),  0 0 1 1 1 1 0 1 giving a range of values from 260 Mbps to 500 Mbps in 4 Mbps increments.  0 0 1 1 1 1 1 0 The maximum bit rate is 500 Mbps + ((the binary coded value in 8 bits - 00111101) \* 10 Mbps),  1 0 1 0 0 0 0 1 giving a range of values from 510 Mbps to 1500 Mbps in 10 Mbps increments.  1 0 1 0 0 0 1 0 The maximum bit rate is 1500 Mbps + ((the binary coded value in 8 bits - 10100001) \* 100 Mbps),  1 1 1 1 0 1 1 0 giving a range of values from 1600 Mbps to 10 Gbps in 100 Mbps increments.  If the sending entity wants to indicate a Maximum bit rate for uplink higher than 256 Mbps, it shall set octet 8 to "11111010", i.e. 256 Mbps, and shall encode the value for the maximum bit rate in octet 12.  The network shall map all other values not explicitly defined onto one of the values defined in this version of the protocol. The network shall return a negotiated value which is explicitly defined in this version of the protocol.  The UE shall map all other values not explicitly defined onto the maximum value defined in this version of the protocol.  Maximum bit rate for downlink (extended-2), octet 13  This field is an extension of the Maximum bit rate for downlink in octet 9. The coding is identical to that of the Maximum bit rate for uplink (extended-2).  If the sending entity wants to indicate a Maximum bit rate for downlink higher than 256 Mbps, it shall set octet 9 to "11111010", i.e. 256 Mbps, and shall encode the value for the maximum bit rate in octet 13.  The network shall map all other values not explicitly defined onto one of the values defined in this version of the protocol. The network shall return a negotiated value which is explicitly defined in this version of the protocol.  The UE shall map all other values not explicitly defined onto the maximum value defined in this version of the protocol.  Guaranteed bit rate for uplink (extended-2), octet 14  Bits  8 7 6 5 4 3 2 1  In UE to network direction and in network to UE direction:  0 0 0 0 0 0 0 0 Use the value indicated by the Guaranteed bit rate for uplink in octet 6 and octet 10.  For all other values: Ignore the value indicated by the Guaranteed bit rate for uplink in octet 6 and  octet 10 and use the following value:  0 0 0 0 0 0 0 1 The guaranteed bit rate is 256 Mbps + ((the binary coded value in 8 bits) \* 4 Mbps),  0 0 1 1 1 1 0 1 giving a range of values from 260 Mbps to 500 Mbps in 4 Mbps increments.  0 0 1 1 1 1 1 0 The guaranteed bit rate is 500 Mbps + ((the binary coded value in 8 bits - 00111101) \* 10 Mbps),  1 0 1 0 0 0 0 1 giving a range of values from 510 Mbps to 1500 Mbps in 10 Mbps increments.  1 0 1 0 0 0 1 0 The guaranteed bit rate is 1500 Mbps + ((the binary coded value in 8 bits - 10100001) \* 100 Mbps),  1 1 1 1 0 1 1 0 giving a range of values from 1600 Mbps to 10 Gbps in 100 Mbps increments.  If the sending entity wants to indicate a Guaranteed bit rate for uplink higher than 256 Mbps, it shall set octet 10 to "11111010", i.e. 256 Mbps, and shall encode the value for the guaranteed bit rate in octet 14.  The network shall map all other values not explicitly defined onto one of the values defined in this version of the protocol. The network shall return a negotiated value which is explicitly defined in this version of the protocol.  The UE shall map all other values not explicitly defined onto the maximum value defined in this version of the protocol.  Guaranteed bit rate for downlink (extended-2), octet 15  This field is an extension of the Guaranteed bit rate for downlink in octet 11. The coding is identical to that of the Guaranteed bit rate for uplink (extended-2).  If the sending entity wants to indicate a Guaranteed bit rate for downlink higher than 256 Mbps, it shall set octet 11 to "11111010", i.e. 256 Mbps, and shall encode the value for the guaranteed bit rate in octet 15.  The network shall map all other values not explicitly defined onto one of the values defined in this version of the protocol. The network shall return a negotiated value which is explicitly defined in this version of the protocol.  The UE shall map all other values not explicitly defined onto the maximum value defined in this version of the protocol. |

#### 9.9.4.4 ESM cause

The purpose of the ESM cause information element is to indicate the reason why a session management request is rejected.

The ESM cause information element is coded as shown in figure 9.9.4.4.1 and table 9.9.4.4.1.

The ESM cause is a type 3 information element with 2 octets length.

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 |  |
| ESM cause IEI | | | | | | | | octet 1 |
| Cause value | | | | | | | | octet 2 |

Figure 9.9.4.4.1: ESM cause information element

Table 9.9.4.4.1: ESM cause information element

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Cause value (octet 2) | | | | | | | | | |
|  | | | | | | | | | |
| Bits | | | | | | | | | |
| 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 |  |  |
| 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 |  | Operator Determined Barring |
| 0 | 0 | 0 | 1 | 1 | 0 | 1 | 0 |  | Insufficient resources |
| 0 | 0 | 0 | 1 | 1 | 0 | 1 | 1 |  | Missing or unknown APN |
| 0 | 0 | 0 | 1 | 1 | 1 | 0 | 0 |  | Unknown PDN type |
| 0 | 0 | 0 | 1 | 1 | 1 | 0 | 1 |  | User authentication failed |
| 0 | 0 | 0 | 1 | 1 | 1 | 1 | 0 |  | Request rejected by Serving GW or PDN GW |
| 0 | 0 | 0 | 1 | 1 | 1 | 1 | 1 |  | Request rejected, unspecified |
| 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 |  | Service option not supported |
| 0 | 0 | 1 | 0 | 0 | 0 | 0 | 1 |  | Requested service option not subscribed |
| 0 | 0 | 1 | 0 | 0 | 0 | 1 | 0 |  | Service option temporarily out of order |
| 0 | 0 | 1 | 0 | 0 | 0 | 1 | 1 |  | PTI already in use |
| 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 |  | Regular deactivation |
| 0 | 0 | 1 | 0 | 0 | 1 | 0 | 1 |  | EPS QoS not accepted |
| 0 | 0 | 1 | 0 | 0 | 1 | 1 | 0 |  | Network failure |
| 0 | 0 | 1 | 0 | 0 | 1 | 1 | 1 |  | Reactivation requested |
| 0 | 0 | 1 | 0 | 1 | 0 | 0 | 1 |  | Semantic error in the TFT operation |
| 0 | 0 | 1 | 0 | 1 | 0 | 1 | 0 |  | Syntactical error in the TFT operation |
| 0 | 0 | 1 | 0 | 1 | 0 | 1 | 1 |  | Invalid EPS bearer identity |
| 0 | 0 | 1 | 0 | 1 | 1 | 0 | 0 |  | Semantic errors in packet filter(s) |
| 0 | 0 | 1 | 0 | 1 | 1 | 0 | 1 |  | Syntactical errors in packet filter(s) |
| 0 | 0 | 1 | 0 | 1 | 1 | 1 | 0 |  | Unused (see NOTE 2) |
| 0 | 0 | 1 | 0 | 1 | 1 | 1 | 1 |  | PTI mismatch |
| 0 | 0 | 1 | 1 | 0 | 0 | 0 | 1 |  | Last PDN disconnection not allowed |
| 0 | 0 | 1 | 1 | 0 | 0 | 1 | 0 |  | PDN type IPv4 only allowed |
| 0 | 0 | 1 | 1 | 0 | 0 | 1 | 1 |  | PDN type IPv6 only allowed |
| 0 | 0 | 1 | 1 | 0 | 1 | 0 | 0 |  | Single address bearers only allowed |
| 0 | 0 | 1 | 1 | 0 | 1 | 0 | 1 |  | ESM information not received |
| 0 | 0 | 1 | 1 | 0 | 1 | 1 | 0 |  | PDN connection does not exist |
| 0 | 0 | 1 | 1 | 0 | 1 | 1 | 1 |  | Multiple PDN connections for a given APN not allowed |
| 0 | 0 | 1 | 1 | 1 | 0 | 0 | 0 |  | Collision with network initiated request |
| 0 | 0 | 1 | 1 | 1 | 0 | 1 | 1 |  | Unsupported QCI value |
| 0 | 0 | 1 | 1 | 1 | 1 | 0 | 0 |  | Bearer handling not supported |
| 0 | 1 | 0 | 0 | 0 | 0 | 0 | 1 |  | Maximum number of EPS bearers reached |
| 0 | 1 | 0 | 0 | 0 | 0 | 1 | 0 |  | Requested APN not supported in current RAT and PLMN combination |
| 0 | 1 | 0 | 1 | 0 | 0 | 0 | 1 |  | Invalid PTI value |
| 0 | 1 | 0 | 1 | 1 | 1 | 1 | 1 |  | Semantically incorrect message |
| 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 |  | Invalid mandatory information |
| 0 | 1 | 1 | 0 | 0 | 0 | 0 | 1 |  | Message type non-existent or not implemented |
| 0 | 1 | 1 | 0 | 0 | 0 | 1 | 0 |  | Message type not compatible with the protocol state |
| 0 | 1 | 1 | 0 | 0 | 0 | 1 | 1 |  | Information element non-existent or not implemented |
| 0 | 1 | 1 | 0 | 0 | 1 | 0 | 0 |  | Conditional IE error |
| 0 | 1 | 1 | 0 | 0 | 1 | 0 | 1 |  | Message not compatible with the protocol state |
| 0 | 1 | 1 | 0 | 1 | 1 | 1 | 1 |  | Protocol error, unspecified |
| 0 | 1 | 1 | 1 | 0 | 0 | 0 | 0 |  | APN restriction value incompatible with active EPS bearer context |
| 0 | 1 | 1 | 1 | 0 | 0 | 0 | 1 |  | Multiple accesses to a PDN connection not allowed |
|  |  |  |  |  |  |  |  |  |  |
| Any other value received by the UE shall be treated as 0010 0010, "service option temporarily out of order". Any other value received by the network shall be treated as 0110 1111, "protocol error, unspecified". | | | | | | | | | |
|  | | | | | | | | | |
| NOTE 1: The listed cause values are defined in annex B.  NOTE 2: This value was allocated in earlier versions of this protocol, but there is no situation where this value can be used. If received by the network, it shall be treated as 0110 1111, "protocol error, unspecified". | | | | | | | | | |

#### 9.9.4.5 ESM information transfer flag

The purpose of the ESM information transfer flag information element is to indicate whether ESM information, i.e. protocol configuration options or APN or both, is to be transferred security protected.

The ESM information transfer flag information element is coded as shown in figure 9.9.4.5.1 and table 9.9.4.5.1.

The ESM information transfer flag is a type 1 information element.

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 |  |
| ESM information transfer flag IEI | | | | 0 | 0 | 0 | EIT  value | octet 1 |
| spare | | |

Figure 9.9.4.5.1: ESM information transfer flag information element

Table 9.9.4.5.1: ESM information transfer flag information element

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| EIT (ESM information transfer) | | | |  |
|  | | | |  |
| Bit | | | |  |
|  | 1 |  |  | |
|  | 0 |  | security protected ESM information transfer not required | |
|  | 1 |  | security protected ESM information transfer required | |
|  |  |  |  | |

#### 9.9.4.6 Linked EPS bearer identity

The purpose of the Linked EPS bearer identity IE is to identify the default bearer that is associated with a dedicated EPS bearer or to identify the EPS bearer (default or dedicated) with which one or more packet filters specified in a traffic flow aggregate are associated.

The Linked EPS bearer identity information element is coded as shown in figure 9.9.4.6.1 and table 9.9.4.6.1.

The Linked EPS bearer identity is a type 1 information element.

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 |  |
| Linked EPS bearer identity IEI | | | | Linked EPS bearer identity value | | | | octet 1 |

Figure 9.9.4.6.1: Linked EPS bearer identity information element

Table 9.9.4.6.1: Linked EPS bearer identity information element

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Linked EPS bearer identity (bits 1-4) | | | | |
|  | | | | |
| 4 | 3 | 2 | 1 |  |
| 0 | 0 | 0 | 0 |  |
| to | | | | Reserved |
| 0 | 1 | 0 | 0 |  |
|  |  |  |  |  |
| 0 | 1 | 0 | 1 | EPS bearer identity value 5 |
| 0 | 1 | 1 | 0 | EPS bearer identity value 6 |
| 0 | 1 | 1 | 1 | EPS bearer identity value 7 |
| 1 | 0 | 0 | 0 | EPS bearer identity value 8 |
| 1 | 0 | 0 | 1 | EPS bearer identity value 9 |
| 1 | 0 | 1 | 0 | EPS bearer identity value 10 |
| 1 | 0 | 1 | 1 | EPS bearer identity value 11 |
| 1 | 1 | 0 | 0 | EPS bearer identity value 12 |
| 1 | 1 | 0 | 1 | EPS bearer identity value 13 |
| 1 | 1 | 1 | 0 | EPS bearer identity value 14 |
| 1 | 1 | 1 | 1 | EPS bearer identity value 15 |
|  | | | | |

#### 9.9.4.7 LLC service access point identifier

See subclause 10.5.6.9 in 3GPP TS 24.008 [13].

#### 9.9.4.7A Notification indicator

The purpose of the Notification indicator information element is to inform the UE about an event which is relevant for the upper layer using an EPS bearer context or having requested a procedure transaction.

The Notification indicator information element is coded as shown in figure 9.9.4.7A.1 and table 9.9.4.7A.1.

The Notification indicator is a type 4 information element with 3 octets length.

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 |  |
| Notification indicator IEI | | | | | | | | octet 1 |
| Length of notification indicator contents | | | | | | | | octet 2 |
| Notification indicator value | | | | | | | | octet 3 |

Figure 9.9.4.7A.1: Notification indicator information element

Table 9.9.4.7A.1: Notification indicator information element

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Notification indicator value (octet 3) | | | | | | | | | |
|  | | | | | | | | | |
| Bits | | | | | | | | | |
| 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 |  |  |
| 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |  | SRVCC handover cancelled, IMS session re-establishment required (see 3GPP TS 23.216 [8]) |
|  |  |  |  |  |  |  |  |  |  |
| 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 |  |  |
| to | | | | | | | |  | Unused, shall be ignored if received by the UE |
| 0 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |  |  |
|  | | | | | | | | | |
| All other values are reserved. | | | | | | | | | |
|  | | | | | | | | | |

#### 9.9.4.8 Packet flow identifier

See subclause 10.5.6.11 in 3GPP TS 24.008 [13].

#### 9.9.4.9 PDN address

The PDN address information element can assign an IPv4 address to the UE associated with a packet data network and provide the UE with an interface identifier to be used to build the IPv6 link local address.

The PDN address information element is coded as shown in figure 9.9.4.9.1 and table 9.9.4.9.1.

The PDN address is a type 4 information element with minimum length of 7 octets and a maximum length of 15 octets.

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 |  |
| PDN address IEI | | | | | | | | octet 1 |
| Length of PDN address contents | | | | | | | | octet 2 |
| 0 | 0 | 0 | 0 | 0 | PDN type value | | | octet 3 |
| spare | | | | |
| PDN address information | | | | | | | | octet 4  octet 15 |

Figure 9.9.4.9.1: PDN address information element

Table 9.9.4.9.1: PDN address information element

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| PDN type value (octet 3) | | | | |
| Bits | | | | |
| 3 | 2 | 1 |  |  |
| 0 | 0 | 1 |  | IPv4 |
| 0 | 1 | 0 |  | IPv6 |
| 0 | 1 | 1 |  | IPv4v6 |
| 1 | 0 | 1 |  | non IP |
|  | | | | |
| All other values are reserved. | | | | |
|  | | | | |
| Bit 4 to 8 of octet 3 are spare and shall be coded as zero. | | | | |
|  | | | | |
|  | | | | |
| PDN address information (octet 4 to 15) | | | | |
|  | | | | |
| If PDN type value indicates IPv4, the PDN address information in octet 4 to octet 7 contains an IPv4 address. Bit 8 of octet 4 represents the most significant bit of the IPv4 address and bit 1 of octet 7 the least significant bit. | | | | |
|  | | | | |
| If PDN type value indicates IPv6, the PDN address information in octet 4 to octet 11 contains an IPv6 interface identifier. Bit 8 of octet 4 represents the most significant bit of the IPv6 interface identifier and bit 1 of octet 11 the least significant bit. | | | | |
|  | | | | |
| If PDN type value indicates IPv4v6, the PDN address information in octet 4 to octet 15 contains an IPv6 interface identifier and an IPv4 address. Bit 8 of octet 4 represents the most significant bit of the IPv6 interface identifier and bit 1 of octet 11 the least significant bit. Bit 8 of octet 12 represents the most significant bit of the IPv4 address and bit 1 of octet 15 the least significant bit. | | | | |
|  | | | | |
| If PDN type value indicates IPv4 or IPv4v6 and DHCPv4 is to be used to allocate the IPv4 address, the IPv4 address shall be coded as 0.0.0.0. | | | | |
|  | | | | |
| If PDN type value indicates non IP, the PDN address information in octet 4 to octet 7 are spare and shall be coded as zero. | | | | |
|  | | | | |

#### 9.9.4.10 PDN type

The purpose of the PDN type information element is to indicate either:

- the IP version capability of the IP stack associated with the UE; or.- non IP

The PDN type information element is coded as shown in figure 9.9.4.10.1 and table 9.9.4.10.1.

The PDN type is a type 1 information element.

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 |  |
| PDN type IEI | | | | 0  Spare | PDN type value | | | octet 1 |

Figure 9.9.4.10.1: PDN type information element

Table 9.9.4.10.1: PDN type information element

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| PDN type value (octet 1) | | | | |
| Bits | | | | |
| 3 | 2 | 1 |  |  |
| 0 | 0 | 1 |  | IPv4 |
| 0 | 1 | 0 |  | IPv6 |
| 0 | 1 | 1 |  | IPv4v6 |
| 1 | 0 | 0 |  | unused; shall be interpreted as "IPv6" if received by the network |
| 1 | 0 | 1 |  | non IP |
|  | | | | |
| All other values are reserved. | | | | |
|  | | | | |
| Bit 4 of octet 1 is spare and shall be coded as zero. | | | | |
|  | | | | |

#### 9.9.4.11 Protocol configuration options

See subclause 10.5.6.3 in 3GPP TS 24.008 [13].

#### 9.9.4.12 Quality of service

See subclause 10.5.6.5 in 3GPP TS 24.008 [13].

#### 9.9.4.13 Radio priority

See subclause 10.5.7.2 in 3GPP TS 24.008 [13].

#### 9.9.4.13A Re-attempt indicator

The purpose of the *Re-attempt indicator* information element is to indicate a condition under which the UE is allowed, in the current PLMN for the same APN, to re-attempt a session management procedure (see 3GPP TS 24.008 [13]) corresponding to the EPS session management procedure which was rejected by the network.

The *Re-attempt indicator* information element is coded as shown in figure 9.9.4.13A/3GPP TS 24.301 and table 9.9.4.13A/3GPP TS 24.301.

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 8 | 7 | 6 | | 5 | | 4 | 3 | 2 | 1 | |  |
| *Reattempt indicator* IEI | | | | | | | | | | | octet 1 |
| *Length of Reattempt indicator* *contents* | | | | | | | | | | | octet 2 |
| 0  Spare | 0  Spare | 0  Spare | 0  Spare | | 0  Spare | | 0  Spare | EPLMNC value | | RATC value | octet 3 |

Figure 9.9.4.13A: Re-attempt indicator information element

Table 9.9.4.13A: Re-attempt indicator information element

|  |
| --- |
| Re-attempt indicator  RATC (octet 3, bit 1)  0 UE is allowed to re-attempt the procedure in A/Gb mode or Iu mode  1 UE is not allowed to re-attempt the procedure in A/Gb mode or Iu mode  EPLMNC (octet 3, bit 2)  0 UE is allowed to re-attempt the procedure in an equivalent PLMN  1 UE is not allowed to re-attempt the procedure in an equivalent PLMN  Bits 3 to 8 of octet 3 are spare and shall be encoded as zero. |

#### 9.9.4.14 Request type

See subclause 10.5.6.17 in 3GPP TS 24.008 [13].

#### 9.9.4.15 Traffic flow aggregate description

The purpose of the Traffic flow aggregate description information element is to specify the aggregate of one of more packet filters and their related parameters and operations. The traffic flow aggregate description may contain the aggregate of packet filters for the downlink direction, the uplink direction or packet filters that apply for both directions. The packet filters determine the traffic mapping to EPS bearer contexts. The downlink packet filters shall be applied by the network, and the uplink packet filters shall be applied by the UE. A packet filter that applies for both directions shall be applied by the network as a downlink packet filter and by the UE as an uplink packet filter.

When the traffic flow aggregate description is used in the UE requested bearer resource allocation procedure or the UE requested bearer resource modification procedure, it is associated to a particular procedure identified by a procedure transaction identity (PTI). Therefore, the UE shall release the traffic flow aggregate description when the UE requested bearer resource allocation procedure or the UE requested bearer resource modification procedure is completed. The UE shall not include the packet filters of a particular traffic flow aggregate description in any other traffic flow aggregate description when multiple UE requested bearer resource allocation procedures and/or UE requested bearer resource modification procedures are ongoing in parallel.

The Traffic flow aggregate description information element is encoded using the same format as the Traffic flow template (TFT) information element (see subclause 10.5.6.12 in 3GPP TS 24.008 [13]). When sending this IE in the BEARER RESOURCE ALLOCATION REQUEST message or the BEARER RESOURCE MODIFICATION REQUEST message, the UE shall set the packet filter identifier values to 0 if the packet filters are newly created; otherwise, the UE shall set the packet filter identifier values from those of already assigned packet filter identifiers of the existing EPS bearer, so that they are unique across all packet filters for the EPS bearer context indicated by the EPS bearer identity IE.

#### 9.9.4.16 Traffic flow template

See subclause 10.5.6.12 in 3GPP TS 24.008 [13].

#### 9.9.4.17 Transaction identifier

The purpose of the Transaction identifier information element is to represent the corresponding PDP context in A/Gb mode or Iu mode which is mapped from the EPS bearer context.

The Transaction identifier information element is coded as the Linked TI information element in 3GPP TS 24.008 [13], subclause 10.5.6.7.

#### 9.9.4.18 WLAN offload acceptability

See subclause 10.5.6.20 in 3GPP TS 24.008 [13].

#### 9.9.4.19 NBIFOM container

See subclause 10.5.6.21 in 3GPP TS 24.008 [4].

#### 9.9.4.20 Remote UE context list

The purpose of the Remote UE context list information element is to provide identity and optionally IP address of a remote UE connected to, or disconnected from, a UE acting as a ProSe UE-to-network relay.

The Remote UE context list information element is coded as shown in figure 9.9.4.20.1 and table 9.9.4.20.1.

The Remote UE context list is a type 6 information element with a minimum length of 5 octets and a maximum length of 65538 octets.

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 |  |
| Remote UE context list IEI | | | | | | | | octet 1 |
| Length of remote UE context list contents | | | | | | | | octet 2 to 3 |
|  |
| Number of remote UE contexts | | | | | | | | octet 4 |
| Remote UE context 1 | | | | | | | | octet 5 to a |
|  |
|  |
| … | | | | | | | |  |
| Remote UE context k | | | | | | | | octet b |
|  |
| octet m |

Figure 9.9.4.20.1: Remote UE context list

Table 9.9.4.20.1: Remote UE context list

|  |
| --- |
| Remote UE context (octet 5 etc) |
|  |
| The contents of remote UE context are applicable for one individual UE and are coded as shown in figure 9.9.4.20.2 and table 9.9.4.20.2. |
|  |

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 |  |
| Length of remote UE context | | | | | | | | octet 1 |
| Number of user identities | | | | | | | | octet 2 |
| Length of user identity 1 | | | | | | | | octet 3 |
| User identity 1 digit 1 | | | | odd/  even  indic | Type of user identity 1 | | | octet 4 |
| User identity 1 digit p+1 | | | | User identity 1 digit p | | | | octet 5\* |
| … | | | | | | | |  |
| Length of user identity v | | | | | | | | octet m |
| User identity v digit 1 | | | | odd/  even  indic | Type of user identity v | | | octet m+1 |
| User identity v digit p+1 | | | | User identity v digit p | | | | octet m+2\* |
| Spare | | | | | Address type | | | octet j |
| Address information | | | | | | | | octet j+1  octet j+k |

Figure 9.9.4.20.2: Remote UE context

Table 9.9.4.20.2: Remote UE context list information element

|  |  |  |  |
| --- | --- | --- | --- |
| Odd/even indication (octet 4)  Bit | | | |
| 4 |  |  |  |
| 0 |  |  | even number of identity digits |
| 1 |  |  | odd number of identity digits |
|  | | | |
| Type of user identity (octet 4)  Bits | | | |
| 3 | 2 | 1 |  |
| 0 | 0 | 1 | Encrypted IMSI |
| 0 | 1 | 0 | IMSI |
| 0 | 1 | 1 | MSISDN |
| 1 | 0 | 0 | IMEI |
| 1 | 0 | 1 | IMEISV |
| All other values are reserved. | | | |
|  | | | |
| Identity digits (octet 4 etc)  For the Encrypted IMSI, this field is coded as a 128-bit string. Bits 5 to 8 of octet 4 are not part of the encrypted IMSI and shall be coded as zero. Bit 8 of octet 5 represents the most significant bit of the encrypted IMSI and bit 1 of octet 21 the least significant bit. | | | |
| For the IMSI, this field is coded using BCD coding. If the number of identity digits is even then bits 5 to 8 of the last octet shall be filled with an end mark coded as "1111". The format of IMSI is described in 3GPP TS 23.003 [2]. | | | |
|  | | | |
| For the MSISDN, this field is coded using BCD coding. The format of MSISDN is described in 3GPP TS 23.003 [2]. | | | |
|  | | | |
| For the IMEI, this field is coded using BCD coding. The format of the IMEI is described in 3GPP TS 23.003 [2]. | | | |
|  | | | |
| For the IMEISV, this field is coded using BCD coding. Bits 5 to 8 of the last octet shall be filled with an end mark coded as "1111". The format of the IMEISV is described in 3GPP TS 23.003 [2].  Bits 4 to 8 of octet j are spare and shall be coded as zero. | | | |
|  | | | |
| Address type (octet j)  Bits | | | |
| 3 | 2 | 1 |  |
| 0 | 0 | 0 | No IP Info |
| 0 | 0 | 1 | IPv4 |
| 0 | 1 | 0 | IPv6 |
| All other values are reserved. | | | |
|  | | | |

If Address type indicates IPv4, the Address information in octet j+1 to octet j+6 contains the IPv4 address and port number. Bit 8 of octet j+1 represents the most significant bit of the IP address and bit 1 of octet j+4 the least significant bit. Bit 8 of octet j+5 represents the most significant bit of the port number and bit 1 of octet j+6 the least significant bit.

If Address type indicates IPv6, the Address information in octet j+1 to octet j+8 contains the /64 IPv6 prefix of a remote UE. Bit 8 of octet j+1 represents the most significant bit of the /64 IPv6 prefix and bit 1 of octet j+8 the least significant bit.

If Address type indicates No IP info, the Address information octets are not included.

#### 9.9.4.21 PKMF address

The purpose of the PKMF address information element is to provide IP address of a ProSe Key Management Function associated with remote UEs connected to or disconnected from a UE acting as a ProSe UE-to-network relay.

The PKMF address information element is coded as shown in figure 9.9.4.21.1 and table 9.9.4.21.1.

The PKMF address is a type 4 information element with a minimum length of 3 octets and a maximum length of 19 octets.

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 |  |
| PKMF address IEI | | | | | | | | octet 1 |
| Length of PKMF address contents | | | | | | | | octet 2 |
| Spare | | | | | Address type | | | octet 3 |
| Address information | | | | | | | | octet 4  octet 4+k |

Figure 9.9.4.21.1: PKMF Address

Table 9.9.4.21.1: PKMF Address information element

|  |  |  |  |
| --- | --- | --- | --- |
| Bits 4 to 8 of octet 1 are spare and shall be coded as zero. | | | |
|  | | | |
| Address type (octet 1)  Bits | | | |
| 3 | 2 | 1 |  |
| 0 | 0 | 1 | IPv4 |
| 0 | 1 | 0 | IPv6 |
| All other values are reserved. | | | |
|  | | | |

If Address type indicates IPv4, the Address information in octet 4 to octet 7 contains the IPv4 address. Bit 8 of octet 4 represents the most significant bit of the IP address and bit 1 of octet 7 the least significant bit.

If Address type indicates IPv6, the Address information in octet 4 to octet 19 contains the IPv6 address. Bit 8 of octet 4 represents the most significant bit of the IP address and bit 1 of octet 19 the least significant bit.

#### 9.9.4.22 Header compression configuration

The purpose of the Header compression configuration information element is to negotiate ROHC channel setup parameters specified in IETF RFC 4995 [37] and, optionally, provide additional header compression context setup parameters.

The Header compression configuration information element is coded as shown in figure 9.9.4.22.1 and table 9.9.4.22.1.

The Header compression configuration is a type 4 information element with a minimum length of 5 octets and a maximum length of 257 octets.

The optional Additional header compression parameters container field conveys the additional header compression context setup parameters as specified in 3GPP TS 23.401 [10] in a generic container. This field corresponds to the Profile specific information in the header of the ROHC IR packet type in IETF RFC 4995 [37].

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 8 | 7 | 6 | 5 | 4 | | 3 | 2 | 1 |  |
| Header compression configuration IEI | | | | | | | | | octet 1 |
| Length of Header compression configuration contents | | | | | | | | | octet 2 |
| Spare | P0x0104 | P0x0103 | P0x0102 | | P0x0006 | P0x0004 | P0x0003 | P0x0002 | octet 3 |
| MAX\_CID | | | | | | | | | octet 4 |
| octet 5 |
| Additional header compression context setup parameters type | | | | | | | | | octet 6\* |
| Additional header compression context setup parameters container | | | | | | | | | octet 7\* |
|  |
| octet n\* |

Figure 9.9.4.22.1: Header compression configuration information element

Table 9.9.4.22.1: Header compression configuration information element

|  |
| --- |
| ROHC Profiles (octet 3)  The ROHC Profiles shall indicate which of the ROHC profiles is supported. When a particular bit is set to 1, this indicates that the corresponding profile is supported. The No Compression profile 0x0000 (see IETF RFC 4995 [37]) shall always be supported. When all the bits are set to 0, this indicates that only the No Compression profile 0x0000 is supported.  Profile 0x0002 support indicator (see IETF RFC 3095 [40] and IETF RFC 4815 [42]) (octet 3 bit 1)  0 RoHC profile 0x0002 (UDP/IP) is not supported  1 RoHC profile 0x0002 (UDP/IP) is supported  Profile 0x0003 support indicator (see IETF RFC 3095 [40] and IETF RFC 4815 [42]) (octet 3 bit 2)  0 RoHC profile 0x0003 (ESP/IP) is not supported  1 RoHC profile 0x0003 (ESP/IP) is supported  Profile 0x0004 support indicator (see IETF RFC 3843 [41] and IETF RFC 4815 [42]) (octet 3 bit 3)  0 RoHC profile 0x0004 (IP) is not supported  1 RoHC profile 0x0004 (IP) is supported  Profile 0x0006 support indicator (see IETF RFC 4996 [39]) (octet 3 bit 4)  0 RoHC profile 0x0006 (TCP/IP) is not supported  1 RoHC profile 0x0006 (TCP/IP) is supported  Profile 0x0102 support indicator (see IETF RFC 5225 [43]) (octet 3 bit 5)  0 RoHC profile 0x0102 (UDP/IP) is not supported  1 RoHC profile 0x0102 (UDP/IP) is supported  Profile 0x0103 support indicator (see IETF RFC 5225 [43]) (octet 3 bit 6)  0 RoHC profile 0x0103 (ESP/IP) is not supported  1 RoHC profile 0x0103 (ESP/IP) is supported  Profile 0x0104 support indicator (see IETF RFC 5225 [43]) (octet 3 bit 7)  0 RoHC profile 0x0104 (IP) is not supported  1 RoHC profile 0x0104 (IP) is supported  Bits 8 is spare and shall be set to 0.  MAX\_CID (octet 4 and octet 5)  This is the MAX\_CID value as specified in 3GPP TS 36.323 [38]. It is encoded in binary coding with a value in the range from 1 to 16383.  Additional header compression context parameters type (octet 6).  The Additional header compression context parameters type octet indicates the profile associated with the profile specifc information in the Additional header compression context parameters container.  Bits  **8 7 6 5 4 3 2 1** Type    0 0 0 0 0 0 0 0 0x0000 (No Compression)  0 0 0 0 0 0 0 1 0x0002 (UDP/IP)  0 0 0 0 0 0 1 0 0x0003 (ESP/IP)  0 0 0 0 0 0 1 1 0x0004 (IP)  0 0 0 0 0 1 0 0 0x0006 (TCP/IP)  0 0 0 0 0 1 0 1 0x0102 (UDP/IP)  0 0 0 0 0 1 1 0 0x0103 (ESP/IP)  0 0 0 0 0 1 1 1 0x0104 (IP)  0 0 0 0 1 0 0 0 Other  0 0 0 0 1 0 0 1  to  1 1 1 1 1 1 1 1 Spare  Additional header compression context parameters container (octets 7 to n).  Additional header compression context parameters container carries the profile specific information (see IETF RFC 4995 [37]). The maximum size is 251 octets. |

#### 9.9.4.23 Control plane only indication

The purpose of the Control plane only indication information element is to indicate that a PDN connection is only for control plane CIoT EPS optimization, e.g. the PDN connection is with an SCEF (see 3GPP TS 23.401 [10]).

The Control plane only indication information element is coded as shown in figure 9.9.4.23.1.

The Control plane only indication is a type 1 information element.

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 |  |
| Control plane only indication IEI | | | | 0  Spare | 0  Spare | 0  Spare | CPOI value | octet 1 |

Figure 9.9.4.23.1: Control plane only indication information element

Table 9.9.4.23.1: Control plane only indication information element

|  |  |
| --- | --- |
| Control plane only indication value (CPOI) (octet 1) | |
| Bit | |
| 1 |  |
| 0 | PDN connection can be used with user plane radio bearer(s) |
| 1 | PDN connection can be used for control plane CIoT EPS optimization only |
|  | |
| Bits 4 to 2 of octet 1 are spare and shall be all encoded as zero. | |
|  | |

#### 9.9.4.24 User data container

This information element is used to encapsulate the user data transferred between the UE and the MME. The User data container information element is coded as shown in figure 9.9.4.24.1 and table 9.9.4.24.1.

The User data container is a type 6 information element.

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 |  |
| User data container IEI | | | | | | | | octet 1 |
| Length of User data container contents | | | | | | | | octet 2 |
|  | | | | | | | | octet 3 |
|  | | | | | | | | octet 4 |
| User data container contents | | | | | | | |  |
|  | | | | | | | | octet n |

Figure 9.9.4.24.1: User data container information element

Table 9.9.4.24.1: User data container information element

|  |
| --- |
| User data container contents (octet 4 to octet n) |
|  |
| These octets include user data to be delivered between UE and MME. |
|  |

#### 9.9.4.25 Release assistance indication

The purpose of the Release assistance indication IE is to inform the network whether

- no further uplink or downlink data transmission is expected; or

- only a single downlink data transmission (e.g. acknowledgement or response to uplink data) and no further uplink data transmission subsequent to the uplink data transmission is expected.

The Release assistance indication information element is coded as shown in figure 9.9.4.25.1 and table 9.9.4.25.1.

The Release assistance indication is a type 1 information element.

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 8 | 7 | 6 | 5 | 4 | 3 | | 2 | 1 |  |
| Release assistance indication  IEI | | | | 0  Spare | 0  Spare | DDX | | | octet 1 |

Figure 9.9.4.25.1: Release assistance indication information element

Table 9.9.4.25.1: Release assistance indication information element

|  |  |  |
| --- | --- | --- |
| Release assistance indication value | | |
|  | | |
| Downlink data expected (DDX) | | |
|  | | |
| Bits | | |
| 2 | 1 |  |
| 0 | 0 | No information available |
| 0 | 1 | No further uplink or downlink data transmission subsequent to the uplink data transmission is expected |
| 1 | 0 | Only a single downlink data transmission and no further uplink data transmission subsequent to the uplink data transmission is expected |
| 1 | 1 | reserved |
|  |  |  |
| Bits 3 and 4 of octet 1 are spare and shall be encoded as zero. | | |
|  | | |

#### 9.9.4.26 Extended protocol configuration options

The purpose of the *extended protocol configuration options* information element is to:

- transfer external network protocol options associated with a EPS bearer context activation, and

- transfer additional (protocol) data (e.g. configuration parameters, error codes or messages/events) associated with an external protocol or an application.

The *extended protocol configuration options* is a type 6 information element with a minimum length of 4 octets and a maximum length of 65538 octets.

The *extended protocol configuration options* information element is coded as shown in figure 9.9.4.26.1 and table 9.9.4.26.1.

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 |  |
| Extended protocol configuration options IEI | | | | | | | | octet 1 |
| Length of extended protocol configuration options contents | | | | | | | | octet 2 |
|  | | | | | | | | octet 3 |
|  | | | | | | | | octet 4 |
| Extended protocol configuration options contents | | | | | | | |  |
|  | | | | | | | | octet n |

Figure 9.9.4.26.1: Extended protocol configuration options information element

Table 9.9.4.26.1: Extended protocol configuration options information element

|  |
| --- |
| Extended protocol configuration options contents (octet 4 to octet n); Max value of 65535 octets |
|  |
| The contents of extended protocol configuration options is coded as octet 3 and above of protocol configuration options IE shown in subclause 10.5.6.3 in 3GPP TS 24.008 [13]. |
|  |

#### 9.9.4.27 Header compression configuration status

The purpose of the Header compression configuration status information element is to indicate the status of the Header compression configuration for each EPS bearer using Control plane CIoT EPS optimisation that can be identified by an EPS bearer identity.

The Header compression confguration status information element is a type 4 information element with 4 the length of 4 octets.

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 |  |
| Header compression configuration status IEI | | | | | | | | octet 1 |
| Length of Header compression configuration status contents | | | | | | | | octet 2 |
| EBI  (7) | EBI  (6) | EBI  (5) | EBI  (4) | EBI  (3) | EBI  (2) | EBI  (1) | EBI  (0) | octet 3 |
| EBI  (15) | EBI  (14) | EBI  (13) | EBI  (12) | EBI  (11) | EBI  (10) | EBI  (9) | EBI  (8) | octet 4 |

Figure 9.9.4.27.1: Header compression confguration status information element

Table 9.9.4.27.1: Header compression confguration status information element

|  |
| --- |
| EBI(x) shall be coded as follows:  EBI(0) - EBI(4):  Bits 0 to 4 of octet 3 are spare and shall be coded as zero.  EBI(5) – EBI(15):  0 indicates that the header compression configuration for the corresponding EPS bearer is used.  1 indicates that the header compression configuration for the corresponding EPS bearer is not used. |

#### 9.9.4.28 Serving PLMN rate control

The purpose of the Serving PLMN rate control information element is to indicate the maximum number of uplink ESM DATA TRANSPORT messages including User data container IEs the UE is allowed to send via a PDN connection per 6 minute interval (see 3GPP TS 23.401 [10]).

The Serving PLMN rate control information element is coded as shown in figure 9.9.4.28.1.

The Serving PLMN rate control is a type 4 information element with 4 octets length.

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 |  |
| Serving PLMN rate control IEI | | | | | | | | octet 1 |
| Length of serving PLMN rate control contents | | | | | | | | octet 2 |
| Serving PLMN rate control value | | | | | | | | octet 3  octet 4 |

Figure 9.9.4.28.1: Serving PLMN rate control information element

Serving PLMN rate control value (octet 3 to octet 4) is a binary encoded integer indicating the maximum number of uplink ESM DATA TRANSPORT messages including User data container IEs the UE is allowed to send per 6 minute interval. The Serving PLMN rate control value is an integer equal to or higher than 10. The Serving PLMN rate control value FFFFH indicates that the maximum number of uplink ESM DATA TRANSPORT messages including User data container IEs the UE is allowed to send per 6 minute interval is not restricted.

# 10 List of system parameters

## 10.1 General

The description of timers in the following tables should be considered a brief summary.

## 10.2 Timers of EPS mobility management

Table 10.2.1: EPS mobility management timers – UE side

| TIMER NUM. | TIMER VALUE | STATE | CAUSE OF START | NORMAL STOP | **ON**  EXPIRY |
| --- | --- | --- | --- | --- | --- |
| T3402 | Default 12 min.  NOTE 1 | EMM-DEREGISTERED  EMM-REGISTERED | At attach failure and the attempt counter is equal to 5.  At tracking area updating failure and the attempt counter is equal to 5.  ATTACH ACCEPT with EMM cause #16 or #17 and the attempt counter is equal to 5 for CS/PS mode 2 UE, or ATTACH ACCEPT with EMM cause #22, as described in subclause 5.5.1.3.4.3.  TRACKING AREA UPDATE ACCEPT with EMM cause #16 or #17 and the attempt counter is equal to 5 for CS/PS mode 2 UE, TRACKING AREA UPDATE ACCEPT with EMM cause #16 or #17 and the attempt counter is equal to 5 for CS/PS mode 1 UE with "IMS voice not available" and with a persistent EPS bearer context, or TRACKING AREA UPDATE ACCEPT with EMM cause #22, as described in subclause 5.5.3.3.4.3. | ATTACH REQUEST sent  TRACKING AREA UPDATE REQUEST sent  NAS signalling connection released | Initiation of the attach procedure, if still required or TAU procedure |
| T3410 | 15s  NOTE 7  NOTE 8 | EMM-REGISTERED-INITIATED | ATTACH REQUEST sent | ATTACH ACCEPT received  ATTACH REJECT received | Start T3411 or T3402 as described in subclause 5.5.1.2.6 |
| T3411 | 10s | EMM-DEREGISTERED. ATTEMPTING-TO-ATTACH  EMM-REGISTERED. ATTEMPTING-TO-UPDATE  EMM-REGISTERED. NORMAL-SERVICE | At attach failure due to lower layer failure, T3410 timeout or attach rejected with other EMM cause values than those treated in subclause 5.5.1.2.5.  At tracking area updating failure due to lower layer failure, T3430 timeout or TAU rejected with other EMM cause values than those treated in subclause 5.5.3.2.5. | ATTACH REQUEST sent  TRACKING AREA UPDATE REQUEST sent  EMM-CONNECTED mode entered (NOTE 6) | Retransmission of the ATTACH REQUEST, if still required as described in subclause 5.5.1.2.6 or retransmission of TRACKING AREA UPDATE REQUEST |
| T3412 | Default 54 min.  NOTE 2  NOTE 5 | EMM-REGISTERED | In EMM-REGISTERED, when EMM-CONNECTED mode is left. | When entering state EMM-DEREGISTERED or when entering EMM-CONNECTED mode. | Initiation of the periodic TAU procedure if the UE is not attached for emergency bearer services or T3423 started under the conditions as specified in subclause 5.3.5.  Implicit detach from network if the UE is attached for emergency bearer services. |
| T3416 | 30s  NOTE 7  NOTE 8 | EMM-REGISTERED-INITIATED  EMM-REGISTERED  EMM-DEREGISTERED-INITIATED  EMM-TRACKING-AREA-UPDATING-INITIATED  EMM-SERVICE-REQUEST-INITIATED | RAND and RES stored as a result of an EPS authentication challenge | SECURITY MODE COMMAND received  SERVICE REJECT received  TRACKING AREA UPDATE ACCEPT received  AUTHENTICATION REJECT received  AUTHENTICATION FAILURE sent  EMM-DEREGISTERED, EMM-NULL or  EMM-IDLE mode entered | Delete the stored RAND and RES |
| T3417 | 5s  NOTE 7  NOTE 8 | EMM-SERVICE-REQUEST-INITIATED | SERVICE REQUEST sent  EXTENDED SERVICE REQUEST sent in case f, g, i and j in subclause 5.6.1.1  EXTENDED SERVICE REQUEST sent with service type set to "packet services via S1" in case a, b, c, h and k in subclause 5.6.1.1  CONTROL PLANE SERVICE REQUEST sent as specified in subclause 5.6.1.2.2 | Bearers have been set up  SERVICE REJECT received  Indication of system change from lower layer received  cdma2000® 1xCS fallback rejection received  see subclause 5.6.1.4.2 | Abort the procedure |
| T3417ext | 10s | EMM-SERVICE-REQUEST-INITIATED | EXTENDED SERVICE REQUEST sent in case d in subclause 5.6.1.1  EXTENDED SERVICE REQUEST sent in case e in subclause 5.6.1.1 and the CSFB response was set to "CS fallback accepted by the UE" | Inter-system change from S1 mode to A/Gb mode or Iu mode is completed  Inter-system change from S1 mode to A/Gb mode or Iu mode is failed  SERVICE REJECT received | Select GERAN or UTRAN if EXTENDED SERVICE REQUEST was sent due to mobile originated CS fallback. Otherwise, abort the procedure. |
| T3418 | 20s  NOTE 7  NOTE 8 | EMM-REGISTERED-INITIATED  EMM-REGISTERED  EMM-TRACKING-AREA-UPDATING-INITIATED  EMM-DEREGISTERED-INITIATED  EMM-SERVICE-REQUEST-INITIATED | AUTHENTICATION FAILURE (EMM cause = #20 "MAC failure" or #26 "non-EPS authentication unacceptable") sent | AUTHENTICATION REQUEST received or AUTHENTICATION REJECT received  or  SECURITY MODE COMMAND received  when entering EMM-IDLE mode  indication of transmission failure of AUTHENTICATION FAILURE message from lower layers | On first expiry, the UE should consider the network as false and follow item f of subclause 5.4.2.7, if the UE is not attached for emergency bearer services.  On first expiry, the UE will follow subclause 5.4.2.7 under "For items c, d, and e:", if the UE is attached for emergency bearer services. |
| T3420 | 15s  NOTE 7  NOTE 8 | EMM-REGISTERED-INITIATED  EMM-REGISTERED  EMM-DEREGISTERED-INITIATED  EMM-TRACKING-AREA-UPDATING-INITIATED  EMM-SERVICE-REQUEST-INITIATED | AUTHENTICATION FAILURE (cause = #21 "synch failure") sent | AUTHENTICATION REQUEST received or AUTHENTICATION REJECT received  or  SECURITY MODE COMMAND received  when entering EMM-IDLE mode  indication of transmission failure of AUTHENTICATION FAILURE message from lower layers | On first expiry, the UE should consider the network as false and follow item f of subclause 5.4.2.7, if the UE is not attached for emergency bearer services.  On first expiry, the UE will follow subclause 5.4.2.7 under "For items c, d, and e:", if the UE is attached for emergency bearer services. |
| T3421 | 15s  NOTE 7  NOTE 8 | EMM-DEREGISTERED-INITIATED  EMM-  REGISTERED.  IMSI-DETACH-  INITIATED | DETACH REQUEST sent with  the Detach type IE not indicating "switch off" | DETACH ACCEPT received | Retransmission of DETACH REQUEST |
| T3423 | NOTE 3 | EMM-REGISTERED | T3412 expires while ISR is activated and either T3346 is running or the UE is in one of the following states:  - EMM-REGISTERED.NO-CELL-AVAILABLE;  - EMM-REGISTERED.PLMN-SEARCH;  -EMM-REGISTERED.UPDATE-NEEDED; or  -EMM-REGISTERED.LIMITED-SERVICE. | When entering state EMM-DEREGISTERED or when entering EMM-CONNECTED mode. | Set TIN to "PTMSI".  For A/Gb mode or Iu mode, see 3GPP TS 24.008 [13] |
| T3430 | 15s  NOTE 7  NOTE 8 | EMM-TRACKING-AREA-UPDATING-INITIATED | TRACKING AREA UPDATE REQUEST sent | TRACKING AREA UPDATE ACCEPT received  TRACKING AREA UPDATE REJECT received | Start T3411 or T3402 as described in subclause 5.5.3.2.6 |
| T3440 | 10s | EMM-REGISTERED-INITIATED  EMM-TRACKING-AREA-UPDATING-INITIATED  EMM-DEREGISTERED-INITIATED  EMM-SERVICE-REQUEST-INITIATED  EMM-REGISTERED | ATTACH REJECT, DETACH REQUEST, TRACKING AREA UPDATE REJECT with any of the EMM cause #7, #8, #11, #12, #13, #14, #15 or #35  SERVICE REJECT received with any of the EMM cause #7, #8, #11, #12, #13, #15, 35 or #39  TRACKING AREA UPDATE ACCEPT received after the UE sent TRACKING AREA UPDATE REQUEST in EMM-IDLE mode without the "active" flag set and without the "signalling active" flag set, and the user-plane radio bearers have not been setup  DETACH ACCEPT received after the UE sent DETACH REQUEST with detach type to "IMSI detach"  Upon receipt of ESM DATA TRANSPORT message as described in subclause 5.3.1.2.1 (NOTE 9) | NAS signalling connection released  Bearers have been set up or a request for PDN connection for emergency bearer services or a CS emergency call is started  Upon receipt of ESM DATA TRANSPORT message as described in subclause 5.3.1.2.1 (NOTE 9) | Release the NAS signalling connection for the cases a), b) and c) as described in subclause 5.3.1.2 |
| EMM-DEREGISTERED  EMM-DEREGISTERED.NORMAL-SERVICE | TRACKING AREA UPDATE REJECT, SERVICE REJECT with any of the EMM cause #9, #10 or #40 | NAS signalling connection released | Release the NAS signalling connection for the cases d) and e) as described in subclause  5.3.1.2 and initiation of the attach procedure as specified in subclause 5.5.3.2.5, 5.5.3.3.5 or 5.6.1.5 |
| T3442 | NOTE 4 | EMM-REGISTERED | SERVICE REJECT received with EMM cause #39 "CS service temporarily not available" with a non-zero T3442 value | TRACKING AREA UPDATE REQUEST sent | None |
| NOTE 1: The cases in which the default value of this timer is used are described in subclause 5.3.6.  NOTE 2: The value of this timer is provided by the network operator during the attach and tracking area updating procedures.  NOTE 3: The value of this timer may be provided by the network in the ATTACH ACCEPT message and TRACKING AREA UPDATE ACCEPT message. The default value of this timer is identical to the value of T3412.  NOTE 4: The value of this timer is provided by the network operator when a service request for CS fallback is rejected by the network with EMM cause #39 "CS service temporarily not available".  NOTE 5: The default value of this timer is used if the network does not indicate a value in the TRACKING AREA UPDATE ACCEPT message and the UE does not have a stored value for this timer.  NOTE 6: The conditions for which this applies are described in subclause 5.5.3.2.6.  NOTE 7: In NB-S1 mode, the timer value shall be calculated as described in subclause 4.7.  NOTE 8: In WB-S1 mode, if the UE supports CE mode B, then the timer value is calculated as described in subclause 4.8.  NOTE 9: It is possible that the UE does not stop or start timer T3440 upon receipt of ESM DATA TRANSPORT message as described in subclause 5.3.1.2.1. | | | | | |

Table 10.2.2: EPS mobility management timers – network side

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| TIMER NUM. | TIMER VALUE | STATE | CAUSE OF START | NORMAL STOP | **ON THE**  1st, 2nd, 3rd, 4th EXPIRY (NOTE 1) |
| T3413  NOTE 8  NOTE 10 | NOTE 2 | EMM-REGISTERED | Paging procedure for EPS services initiated | Paging procedure for EPS services completed  Paging procedure is aborted | Network dependent |
| T3415  NOTE 8  NOTE 10 | NOTE 6 | EMM-REGISTERED | Paging procedure for EPS services initiated for a UE which the network accepted the request to use eDRX | Paging procedure for EPS services completed  Paging procedure is aborted | Paging procedure is aborted and the network proceeds as specified in 3GPP TS 23.401 [10] |
| T3422  NOTE 7  NOTE 9 | 6s | EMM-DEREGISTERED-INITIATED | DETACH REQUEST sent | DETACH ACCEPT received | Retransmission of DETACH REQUEST |
| T3450  NOTE 7  NOTE 9 | 6s | EMM-COMMON-PROC-INIT | ATTACH ACCEPT sent  TRACKING AREA UPDATE ACCEPT sent with GUTI  TRACKING AREA UPDATE ACCEPT sent with TMSI  GUTI REALLOCATION COMMAND sent | ATTACH COMPLETE received  TRACKING AREA UPDATE COMPLETE received  GUTI REALLOCATION COMPLETE received | Retransmission of the same message type, i.e. ATTACH ACCEPT, TRACKING AREA UPDATE ACCEPT or GUTI REALLOCATION COMMAND |
| T3460  NOTE 7  NOTE 9 | 6s | EMM-COMMON-PROC-INIT | AUTHENTICATION REQUEST sent  SECURITY MODE COMMAND sent | AUTHENTICATION RESPONSE received  AUTHENTICATION FAILURE received  SECURITY MODE COMPLETE received  SECURITY MODE REJECT received | Retransmission of the same message type, i.e. AUTHENTICATION REQUEST  or SECURITY MODE COMMAND |
| T3470  NOTE 7  NOTE 9 | 6s | EMM-COMMON-PROC-INIT | IDENTITY REQUEST sent | IDENTITY RESPONSE received | Retransmission of IDENTITY REQUEST |
| Mobile reachable | NOTE 4 | All except EMM-DEREGISTERED | Entering EMM-IDLE mode | NAS signalling connection established | Network dependent, but typically paging is halted on 1st expiry if the UE is not attached for emergency bearer services.  Implicitly detach the UE which is attached for emergency bearer services. |
| Implicit detach timer | NOTE 3 | All except EMM-DEREGISTERED | The mobile reachable timer expires while the network is in EMM-IDLE mode | NAS signalling connection established | Implicitly detach the UE on 1st expiry |
| active timer | NOTE 5 | All except EMM-DEREGISTERED | Entering EMM-IDLE mode | NAS signalling connection established | Network dependent, but typically paging is halted on 1st expiry |
| NOTE 1: Typically, the procedures are aborted on the fifth expiry of the relevant timer. Exceptions are described in the corresponding procedure description.  NOTE 2: The value of this timer is network dependent.  NOTE 3: The value of this timer is network dependent. If ISR is activated, the default value of this timer is 4 minutes greater than T3423.  NOTE 4: The default value of this timer is 4 minutes greater than T3412. If T3346 is larger than T3412 and the MME includes timer T3346 in the TRACKING AREA UPDATE REJECT message or SERVICE REJECT message, the value of the mobile reachable timer and implicit detach timer is set such that the sum of the timer values is greater than T3346. If the UE is attached for emergency bearer services, the value of this timer is set equal to T3412.  NOTE 5: If the MME includes timer T3324 in the ATTACH ACCEPT message or TRACKING AREA UPDATE ACCEPT message and if the UE is not attached for emergency bearer services and has no PDN connection for emergency bearer services, the value of this timer is equal to the value of timer T3324.  NOTE 6: The value of this timer is smaller than the value of timer T3-RESPONSE (see 3GPP TS 29.274 [16D]).  NOTE 7: In NB-S1 mode, then the timer value shall be calculated as described in subclause 4.7.  NOTE 8: In NB-S1 mode, then the timer value shall be calculated by using a NAS timer value which is network dependent.  NOTE 9: In WB-S1 mode, if the UE supports CE mode B, then the timer value is calculated as described in subclause 4.8.  NOTE 10: In WB-S1 mode, if the UE supports CE mode B, then the timer value shall be calculated by using a NAS timer value which is network dependent. | | | | | |

## 10.3 Timers of EPS session management

Table 10.3.1: EPS session management timers – UE side

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| TIMER NUM. | TIMER VALUE | STATE | CAUSE OF START | NORMAL STOP | **ON THE**  1st, 2nd, 3rd, 4th EXPIRY (NOTE 1) |
| T3480  NOTE 2  NOTE 3 | 8s | PROCEDURE TRANSACTION PENDING | BEARER RESOURCE ALLOCATION REQUEST sent | ACTIVATE DEDICATED EPS BEARER CONTEXT REQUEST received or MODIFY EPS BEARER CONTEXT REQUEST received or BEARER RESOURCE ALLOCATION REJECT received | Retransmission of BEARER RESOURCE ALLOCATION REQUEST |
| T3481  NOTE 2  NOTE 3 | 8s | PROCEDURE TRANSACTION PENDING | BEARER RESOURCE MODIFICATION REQUEST sent | ACTIVATE DEDICATED EPS BEARER CONTEXT REQUEST received or MODIFY EPS BEARER CONTEXT REQUEST received or DEACTIVATE EPS BEARER CONTEXT REQUEST received or BEARER RESOURCE MODIFICATION REJECT received | Retransmission of BEARER RESOURCE MODIFICATION REQUEST |
| T3482  NOTE 2  NOTE 3 | 8s | PROCEDURE TRANSACTION PENDING | An additional PDN connection is requested by the UE which is not combined in attach procedure | ACTIVE DEFAULT EPS BEARER CONTEXT REQUEST received or PDN CONNECTIVITY REJECT received | Retransmission of PDN CONNECTIVITY REQUEST |
| T3492  NOTE 2  NOTE 3 | 6s | PROCEDURE TRANSACTION PENDING | PDN DISCONNECT REQUEST sent | DEACTIVATE EPS BEARER CONTEXT REQUEST received or PDN DISCONNECT REJECT received | Retransmission of PDN DISCONNECT REQUEST |
| T3493  NOTE 2 | 4s | PROCEDURE TRANSACTION PENDING | REMOTE UE REPORT sent | REMOTE UE REPORT RESPONSE received | Retransmission of REMOTE UE REPORT |
| Back-off timer |  |  | defined in 3GPP TS 24.008 [13] |  |  |
| NOTE 1: Typically, the procedures are aborted on the fifth expiry of the relevant timer. Exceptions are described in the corresponding procedure description.  NOTE 2: In NB-S1 mode, then the timer value shall be calculated as described in subclause 4.7.  NOTE 3: In WB-S1 mode, if the UE supports CE mode B, then the timer value is calculated as described in subclause 4.8. | | | | | |

NOTE 1: The back-off timer is used to describe a logical model of the required UE behaviour. This model does not imply any specific implementation, e.g. as a timer or timestamp.

NOTE 2: Reference to back-off timer in this section can either refer to use of timer T3396 or to use of a different packet system specific timer within the UE. Whether the UE uses T3396 as a back-off timer or it uses different packet system specific timers as back-off timers is left up to UE implementation.

Table 10.3.2: EPS session management timers – network side

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| TIMER NUM. | TIMER VALUE | STATE | CAUSE OF START | NORMAL STOP | **ON THE**  1st, 2nd, 3rd, 4th EXPIRY (NOTE 1) |
| T3485  NOTE 2  NOTE 3 | 8s | BEARER CONTEXT ACTIVE PENDING | ACTIVATE DEFAULT EPS BEARER CONTEXT REQUEST sent  ACTIVATE DEDICATED EPS BEARER CONTEXT REQUEST sent | ACTIVATE DEFAULT EPS BEARER CONTEXT ACCEPT received  or ACTIVATE DEFAULT EPS BEARER CONTEXT REJECT received  or ACTIVATE DEDICATED EPS BEARER CONTEXT ACCEPT received  or ACTIVATE DEDICATED EPS BEARER CONTEXT REJECT received | Retransmission of the same message |
| T3486  NOTE 2  NOTE 3 | 8s | BEARER CONTEXT MODIFY PENDING | MODIFY EPS BEARER CONTEXT REQUEST sent | MODIFY EPS BEARER CONTEXT ACCEPT received  or MODIFY EPS BEARER CONTEXT REJECT received | Retransmission of MODIFY EPS BEARER CONTEXT REQUEST |
| T3489  NOTE 2  NOTE 3 | 4s | PROCEDURE TRANSACTION PENDING | ESM INFORMATION REQUEST sent | ESM INFORMATION RESPONSE received | Retransmission of ESM INFORMATION REQUEST on 1st and 2nd expiry only |
| T3495  NOTE 2  NOTE 3 | 8s | BEARER CONTEXT INACTIVE PENDING | DEACTIVATE EPS BEARER CONTEXT REQUEST sent | DEACTIVATE EPS BEARER CONTEXT ACCEPT received | Retransmission of DEACTIVATE EPS BEARER CONTEXT REQUEST |
| NOTE 1: Typically, the procedures are aborted on the fifth expiry of the relevant timer. Exceptions are described in the corresponding procedure description.  NOTE 2: In NB-S1 mode, then the timer value shall be calculated as described in subclause 4.7.  NOTE 3: In WB-S1 mode, if the UE supports CE mode B, then the timer value is calculated as described in subclause 4.8. | | | | | |