**3GPP TSG-SA3 Meeting #88-LI-e-a *s3i230080***

**Online, , 23rd Jan 2023 - 27th Jan 2023**

|  |
| --- |
| *CR-Form-v12.2* |
| **CHANGE REQUEST** |
|  |
|  | **33.128** | **CR** | **0493** | **rev** | **1** | **Current version:** | **17.7.0** |  |
|  |
| *For* [***HE******LP***](http://www.3gpp.org/3G_Specs/CRs.htm#_blank)*on using this form: comprehensive instructions can be found at* [*http://www.3gpp.org/Change-Requests*](http://www.3gpp.org/Change-Requests)*.* |
|  |

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

|  |
| --- |
|  |
| ***Title:***  | Alignment of the EPS Location reporting types |
|  |  |
| ***Source to WG:*** | SA3-LI (OTD, Rogers Communications Canada) |
| ***Source to TSG:*** | SA3 |
|  |  |
| ***Work item code:*** | LI17 |  | ***Date:*** | 2023-01-19 |
|  |  |  |  |  |
| ***Category:*** | **F** |  | ***Release:*** | Rel-17 |
|  | *Use one of the following categories:****F*** *(correction)****A*** *(mirror corresponding to a change in an earlier release)****B*** *(addition of feature),* ***C*** *(functional modification of feature)****D*** *(editorial modification)*Detailed explanations of the above categories canbe found in 3GPP [TR 21.900](http://www.3gpp.org/ftp/Specs/html-info/21900.htm). | *Use one of the following releases:Rel-8 (Release 8)Rel-9 (Release 9)Rel-10 (Release 10)Rel-11 (Release 11)…Rel-16 (Release 16)Rel-17 (Release 17)Rel-18 (Release 18)Rel-19 (Release 19)* |
|  |  |
| ***Reason for change:*** | Other groups in 3GPP began using the terms Positioning Info and Location Info to differentiate locations generated by LCS and by network routing/location operations respectively. The 5G Location structures within TS 33.128 follow this convention. This CR proposes a new structure and the renaming of an existing structure in order to align the EPS location structures to this convention. |
|  |  |
| ***Summary of change:*** | Renames EPSLocationInfo to EPSPositioningInfo and defines a new EPSLocationInfo type to align EPS location reporting types to 5GS location reporting types. |
|  |  |
| ***Consequences if not approved:*** | Locations reported may be confusing. |
|  |  |
| ***Clauses affected:*** | 2, Annex A, 6.3.2.2.2, 6.3.2.2.3, 6.3.2.2.4, 6.3.2.2.5, 6.3.2.2.6, 6.3.2.2.7 |
|  |  |
|  | **Y** | **N** |  |  |
| ***Other specs*** |  | **X** |  Other core specifications  | TS/TR ... CR ...  |
| ***affected:*** |  | **X** |  Test specifications | TS/TR ... CR ...  |
| ***(show related CRs)*** |  | **X** |  O&M Specifications | TS/TR ... CR ...  |
|  |  |
| ***Other comments:*** | This CR is associated with the following changes in the Forge:Merge request: [!134](https://forge.3gpp.org/rep/sa3/li/-/merge_requests/134)Commit hash: [2d607d48c38d493cec21a944ed948389852d269d](https://forge.3gpp.org/rep/sa3/li/-/merge_requests/134/diffs?commit_id=2d607d48c38d493cec21a944ed948389852d269d)   TDoc S3i230081 (CR 0494) is the release 18 mirror for this document. |
|  |  |
| ***This CR's revision history:*** | S3i230061 |

## \*\*\*\* START OF FIRST CHANGE (MAIN DOCUMENT) \*\*\*

# 2 References

The following documents contain provisions which, through reference in this text, constitute provisions of the present document.

- References are either specific (identified by date of publication, edition number, version number, etc.) or non‑specific.

- For a specific reference, subsequent revisions do not apply.

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

[1] 3GPP TR 21.905: "Vocabulary for 3GPP Specifications".

[2] 3GPP TS 23.501: "System Architecture for the 5G System".

[3] 3GPP TS 33.126: "Lawful Interception Requirements".

[4] 3GPP TS 23.502: "Procedures for the 5G System; Stage 2".

[5] 3GPP TS 33.127: "Lawful Interception (LI) Architecture and Functions".

[6] ETSI TS 103 120: "Lawful Interception (LI); Interface for warrant information".

[7] ETSI TS 103 221-1: "Lawful Interception (LI); Internal Network Interfaces; Part 1: X1".

[8] ETSI TS 103 221-2: "Lawful Interception (LI); Internal Network Interfaces; Part 2: X2/X3".

 [9] ETSI TS 102 232-1: "Lawful Interception (LI); Handover Interface and Service-Specific Details (SSD) for IP delivery; Part 1: Handover specification for IP delivery".

[10] ETSI TS 102 232-7: "Lawful Interception (LI); Handover Interface and Service-Specific Details (SSD) for IP delivery; Part 7: Service-specific details for Mobile Services".

[11] 3GPP TS 33.501: "Security Architecture and Procedures for the 5G System".

[12] 3GPP TS 33.108: "3G security; Handover interface for Lawful Interception (LI)".

[13] 3GPP TS 24.501: "Non-Access-Stratum (NAS) protocol for 5G System (5GS)".

[14] 3GPP TS 24.007: "Mobile radio interface signalling layer 3; General Aspects".

[15] 3GPP TS 29.244: "Interface between the Control Plane and the User Plane nodes".

[16] 3GPP TS 29.502: "5G System; Session Management Services; Stage 3".

[17] 3GPP TS 29.571: "5G System; Common Data Types for Service Based Interfaces; Stage 3".

[18] 3GPP TS 23.040: "Technical realization of the Short Message Service (SMS)".

[19] 3GPP TS 23.003: "Numbering, addressing and identification ".

[20] OMA-TS-MLP-V3\_5-20181211-C: "Open Mobile Alliance; Mobile Location Protocol, Candidate Version 3.5", <https://www.openmobilealliance.org/release/MLS/V1_4-20181211-C/OMA-TS-MLP-V3_5-20181211-C.pdf>.

[21] 3GPP TS 29.540: "5G System; SMS Services; Stage 3".

[22] 3GPP TS 29.518: "5G System; Access and Mobility Management Services; Stage 3".

[23] 3GPP TS 38.413: "NG Application Protocol (NGAP)".

[24] 3GPP TS 29.572: "Location Management Services; Stage 3".

[25] 3GPP TS 29.503: "5G System; Unified Data Management Services".

[26] IETF RFC 815: "IP datagram reassembly algorithms".

[27] IETF RFC 2460: "Internet Protocol, Version 6 (IPv6) Specification".

[28] IETF RFC 793: "Transmission Control Protocol".

[29] IETF RFC 768: "User Datagram Protocol".

[30] IETF RFC 4340: "Datagram Congestion Control Protocol (DCCP)".

[31] IETF RFC 4960: "Stream Control Transmission Protocol".

[32] IANA (www.iana.org): Assigned Internet Protocol Numbers, "Protocol Numbers".

[33] IETF RFC 6437: "IPv6 Flow Label Specification".

[34] IETF RFC 791: "Internet Protocol".

[35] Open Geospatial Consortium OGC 05-010: "URNs of definitions in ogc namespace".

[36] 3GPP TS 33.107: "3G security; Lawful interception architecture and functions".

[37] 3GPP TS 37.340: "Evolved Universal Radio Access (E-UTRA) and NR-Multi-connectivity; Stage 2".

[38] 3GPP TS 36.413: "S1 Application Protocol (S1AP)".

[39] OMA-TS-MMS\_ENC-V1\_3-20110913-A: "Multimedia Messaging Service Encapsulation Protocol".

[40] 3GPP TS 23.140: "Multimedia Messaging Protocol. Functional Description. Stage 2".

[41] 3GPP TS 38.415: "NG-RAN; PDU Session User Plane Protocol".

[42] 3GPP TS 23.273: "5G System (5GS) Location Services (LCS); Stage 2".

[43] IETF RFC 4566: "SDP: Session Description Protocol".

[44] 3GPP TS 24.193: "Stage 3: Access Traffic Steering, Switching and Splitting (ATSSS)".

[45] 3GPP TS 29.509: "5G System; Authentication Server Services; Stage 3".

[46] 3GPP TS 24.011: "Point-to-Point (PP) Short Message Service (SMS) support on mobile radio interface".

[47] 3GPP TS 29.002: "Mobile Application Part (MAP) specification".

[48] 3GPP TS 29.504: "5G System; Unified Data Repository Services; Stage 3".

[49] 3GPP TS 29.505: "5G System; Usage of the Unified Data Repository services for Subscription Data; Stage 3".

[50] 3GPP TS 23.401 "General Packet Radio Service (GPRS) enhancements for Evolved Universal Terrestrial Radio Access Network (E-UTRAN) access".

[51] 3GPP TS 24.301 "Non-Access-Stratum (NAS) protocol for Evolved Packet System (EPS), Stage 3".

[52] 3GPP TS 23.271 "Functional stage 2 description of Location Services (LCS)".

[53] 3GPP TS 29.172 "Evolved Packet Core (EPC) LCS Protocol (ELP) between the Gateway Mobile Location Centre (GMLC) and the Mobile Management Entity (MME); SLg interface".

[54] 3GPP TS 29.171 "LCS Application Protocol (LCS-AP) between the Mobile Management Entity (MME) and Evolved Serving Mobile Location Centre (E-SMLC); SLs interface".

[55] 3GPP TS 24.379: "Mission Critical Push to Talk (MCPTT) call control; protocol specification".

[56] OMA-TS-PoC-System\_Description-V2\_1-20110802-A: "OMA PoC System Description".

[57] 3GPP TS 29.541: "5G System; Network Exposure (NE) function services for Non-IP Data Delivery (NIDD); Stage 3".

[58] 3GPP TS 29.522: "5G System; Network Exposure Function Northbound APIs; Stage 3".

[59] 3GPP TS 29.338: "Diameter based protocols to support Short Message Service (SMS) capable Mobile Management Entities (MMEs); Stage 3".

[60] 3GPP TS 29.337: "Diameter-based T4 interface for communications with packet data networks and applications".

[61] 3GPP TS 24.250: "Protocol for Reliable Data Service; Stage 3".

[62] 3GPP TS 29.128: "Mobility Management Entity (MME) and Serving GPRS Support Node (SGSN) interfaces for interworking with packet data networks and applications".

[63] 3GPP TS 29.122: "T8 reference point for Northbound APIs".

[64] 3GPP TS 29.598: "5G System; Unstructured Data Storage Services; Stage3".

[65] 3GPP TS 33.535: "Authentication and Key Management for Applications (AKMA) based on 3GPP credentials in the 5G System (5GS)".

[66] IETF RFC 5246: "The Transport Layer Security (TLS) Protocol Version 1.2".

[67] GSMA IR.88: "IR.88 LTE and EPC Roaming Guidelines".

[68] GSMA NG.114 "IMS Profile for Voice, Video and Messaging over 5GS".

[69] IETF RFC 8225: "PASSporT: Personal Assertion Token".

[70] IETF RFC 8224: "Authenticated Identity Management in the Session Initiation Protocol (SIP)".

[71] IETF RFC 8588: "Personal Assertion Token (PaSSporT) Extension for Signature-based Handling of Asserted information using toKENs (SHAKEN)".

[72] 3GPP TS 24.196: "Enhanced Calling Name (eCNAM)".

[73] IETF draft-ietf-stir-passport-rcd-17: "PASSporT Extension for Rich Call Data".

NOTE: The above document cannot be formally referenced until it is published as an RFC.

[74] 3GPP TS 24.229: "IP multimedia call control protocol based on Session Initiation Protocol (SIP) and Session Description Protocol (SDP); Stage 3".

[75] IANA Session Initiation Protocol (SIP) Parameters: <https://www.iana.org/assignments/sip-parameters/sip-parameters.xhtml>

[76] IETF RFC 8946: "Personal Assertion Token (PASSporT) Extension for Diverted Calls".

[77] 3GPP TS 23.204: "3rd Generation Partnership Project; Technical Specification Group Services and System Aspects; Support of Short Message Service (SMS) over generic 3GPP Internet Protocol (IP) access; Stage 2".

[78] GSMA RCC.07: "Rich Communication Suite – Advanced Communications Services and Client Specification".

[79] IETF RFC 4975: "The Message Session Relay Protocol (MSRP)".

[80] IETF RFC 3862: "Common Presence and Instant Messaging (CPIM): Message Format".

[81] IETF RFC 5438: "Instant Message Disposition Notification (IMDN)".

[82] OMA-TS-CPM\_System\_Description-V2\_2-20170926-C: "OMA Converged IP Messaging System Description".

[83] IETF RFC 4566: "SDP: Session Description Protocol".

[84] 3GPP TS 36.455: "Evolved Universal Terrestrial Radio Access (E-UTRA); LTE Positioning Protocol A (LPPa) ".

[85] 3GPP TS 37.355: "LTE Positioning Protocol (LPP) ".

[86] 3GPP TS 38.455: "NG-RAN; NR Positioning Protocol A (NRPPa)".

[87] 3GPP TS 29.274: "3GPP Evolved Packet System (EPS); Evolved General Packet Radio Service (GPRS) Tunnelling Protocol for Control plane (GTPv2-C); Stage 3".

[88] 3GPP TS 29.513: "5G System; Policy and Charging Control signalling flows and QoS parameter mapping".

[89] 3GPP TS 29.512: "5G System; Session Management Policy Control Service; Stage 3".

[90] 3GPP TS 29.508: "5G System; Session Management Event Exposure Service; Stage 3".

[91] 3GPP TS 29.514: "5G System; Policy Authorization Service; Stage 3".

[92] 3GPP TS 29.214: "Policy and Charging Control over Rx reference point".

[93] 3GPP TS 24.008: "Mobile radio interface Layer 3 specification; Core network protocols; Stage 3".

[94] 3GPP TS 29.551: "5G System; Packet Flow Description Management Service; Stage 3".

[95] 3GPP TS 24.341: "Support of SMS over IP networks, Stage 3".

[Re1] 3GPP TS 29.272 " Mobility Management Entity (MME) and Serving GPRS Support Node (SGSN) related interfaces based on Diameter protocol".

## \*\*\*\* START OF NEXT CHANGE (MAIN DOCUMENT) \*\*\*

##### 6.3.2.2.2 MME identifier association

The IRI-POI present in the MME shall generate an xIRI containing an MMEIdentifierAssociation record when the IRI-POI present in the MME detects a new identifier association for a UE matching one of the target identifiers provided via LI\_X1. Generation of this record is subject to this record type being enabled for a specific target (see clause 6.3.2.2.1).

Table 6.3.2-1: Payload for MMEIdentifierAssociation record

|  |  |  |
| --- | --- | --- |
| Field name | Description | M/C/O |
| iMSI | IMSI associated with the procedure. (see NOTE 1). | M |
| iMEI | IMEI used in the procedure, if available (see NOTE 1). | C |
| mSISDN | MSISDN used in the procedure, if available (see NOTE 1). | C |
| gUTI | LTE GUTI used in the procedure. | M |
| location | Location information available when identifier association occurs.Shall include all location information for the target UE available at the MME encoded as one of the following:* *ePSUserLocationInformation* parameter (*location>fourGLocationInfo>ePSUserLocationInformation*).
* *ePSLocationInformation* parameter (*location>fourGLocationInfo>ePSLocationInformation*).

When Dual Connectivity is activated, the *additionalCellIDs* parameter (*location>fourGLocationInfo>ePSLocationInformation>mMELocationInformation>additionalCellIDs*) shall also be populated, see clause 7.3.3 and Annex A. | M |
| tAIList | List of tracking areas associated with the registration area within which the UE is current registered. (see NOTE 2). | C |
| NOTE 1: IMSI shall always be provided, in addition to the warrant target identifier if different to IMSI. Other identifiers shall be provided if available.NOTE 2: List shall be included each time there is a change to the registration area. |

The IRI-POI present in the MME generating an xIRI containing an MMEIdentifierAssociation record shall set the Payload Direction field in the PDU header to *not applicable* (Direction Value 5, see ETSI TS 103 221-2 [8] clause 5.2.6).

When transmitting the xIRI, the IRI-POI present in the MME shall set the payload format to 2, and provide the payload as a BER-encoded TS33128Payloads.XIRIPayloads structure.

##### 6.3.2.2.3 Attach

The IRI-POI in the MME shall generate an xIRI containing an MMEAttach record when the IRI-POI present in the MME detects that a UE matching one of the target identifiers provided via LI\_X1 has successfully attached to EPS. Accordingly, the IRI-POI in the MME generates the xIRI when the following event is detected:

- MME sends an S1: ATTACH ACCEPT message to the target UE and the UE EPS Mobility Management (EMM) state within the MME is changed to EMM-REGISTERED.

Table 6.3.2-2: Payload for MMEAttach record

|  |  |  |
| --- | --- | --- |
| Field name | Description | M/C/O |
| attachType | Specifies the type of EPS Attach, see TS 24.301 [51] clause 9.9.3.11. This is derived from the information received from the UE in the Attach Request message. | M |
| attachResult | Specifies the result of the attach procedure, see TS 24.301 [51] clause 9.9.3.10. | M |
| iMSI | IMSI associated with the registration. | M |
| iMEI | IMEI associated with the registration, if available. | C |
| mSISDN | mSISDN associated with the registration, if available. | C |
| gUTI | GUTI provided as outcome of initial attach or used in other cases, see TS 24.301 [51] clause 5.5.1.2.4. | M |
| location | Location information determined by the network during the registration or known at the MME, if available.Shall include all location information for the target UE available at the MME encoded as one of the following:* *ePSUserLocationInformation* parameter (*location>fourGLocationInfo>ePSUserLocationInformation*).

*- ePSLocationInformation* parameter *(location>fourGLocationInfo>ePSLocationInformation).*  | C |
| ePSTAIList | List of tracking areas associated with the registration area within which the UE is currently registered, see TS 24.301 [51] clause 9.9.3.33. (see NOTE) | C |
| sMSServiceStatus | Indicates the availability of SMS Services. Shall be provided if present in the ATTACH ACCEPT. | C |
| oldGUTI | Old GUTI used in the registration, if available. | C |
| eMM5GRegStatus | UE Status, if provided in the REGISTRATION REQUEST message, see TS 24.501 [13] clause 9.11.3.56. | C |
| NOTE: List shall be included each time there is a change to the registration area. |

##### 6.3.2.2.4 Detach

The IRI-POI in the MME shall generate an xIRI containing an MMEDetach record when the IRI-POI present in the MME detects that a UE matching one of the target identifiers provided via LI\_X1 has deregistered from the EPS. Accordingly, the IRI-POI in the MME generates the xIRI when any of the following events is detected:

- For network initiated de-registration, when the MME receives the S1: DETACH ACCEPT message from the target UE, when the MME receives an S3: DETACH NOTIFICATION about the target UE from the SGSN or when implicit deregistration timer expires; and in all cases the UE EMM state within the MME is changed to EMM-DEREGISTERED.

- For UE initiated de-registration, when the MME sends the S1: DETACH ACCEPT message to the target UE or when the MME receives the S1: DETACH REQUEST message from the target UE with deregistration type value of “switch off”; and in both cases the UE EMM state within the MME is changed to EMM-DEREGISTERED.

Table 6.3.2-3: Payload for MMEDetach record

|  |  |  |
| --- | --- | --- |
| Field name | Description | M/C/O |
| deregistrationDirection | Indicates whether the deregistration was initiated by the network or by the UE. | M |
| detachType | Indicates the type of detach as determined by the direction of the detach request and the value of the DetachType information element, see table 6.3.2-4. | M |
| iMSI | IMSI associated with the detach. | M |
| iMEI | IMEI associated with the detach, if available. | C |
| mSISDN | mSISDN associated with the detach, if available. | C |
| gUTI | GUTI associated with the detach, if available. | C |
| cause | Indicates the EMM cause value for network-initiated detach, see TS 24.301 [51] clause 9.9.3.9. | C |
| location | Location information determined by the network during the deregistration or known at the MME, if available.Shall include all location information for the target UE available at the MME encoded as one of the following:* *ePSUserLocationInformation* parameter (*location>fourGLocationInfo>ePSUserLocationInformation*).
* *ePSLocationInformation* parameter (*location>fourGLocationInfo>ePSLocationInformation*).

When Dual Connectivity is activated, the *additionalCellIDs* parameter (*location>fourGLocationInfo>ePSLocationInformation>mMELocationInformation>additionalCellIDs*) shall also be populated, see clause 7.3.3 and Annex A. | C |
| switchOffIndicator | If Bit 4 of the Detach type information element sent in the Detach Request is set to 0, this parameter shall be set to “normalDetach”. If Bit 4 of the Detach type information element sent in the Detach Request is set to 1, this parameter shall be set to “switchOff”. See TS 24.301 [51] clause 9.9.3.7. This parameter is conditional only for backwards compatibility. | C |

Table 6.3.2-4: detachType values

|  |  |  |
| --- | --- | --- |
| Type of detach value | Direction | detachType value |
| 001 | UE🡪network | ePSDetach |
| 010 | UE🡪network | iMSIDetach |
| 011 | UE🡪network | combinedEPSIMSIDetach |
| 110 | UE🡪network | reserved |
| 111 | UE🡪network | reserved |
| Any Other | UE🡪network | combinedEPSIMSIDetach |
| 001 | network🡪UE | reAttachRequired |
| 010 | network🡪UE | reAttachNotRequired |
| 011 | network🡪UE | iMSIDetach |
| 110 | network🡪UE | reserved |
| 111 | network🡪UE | reserved |
| Any Other | network🡪UE | reAttachNotRequired |

The IRI-POI in the MME shall populate the ePSDetachType field with the values listed in table 6.3.2-4 based on the Detach Type sent in the Detach Request message (see TS 24.301 [51] clause 9.9.3.7) and the direction of the Detach Request associated to the event that triggered the generation of the xIRI.

If the Detach Request message associated to the event that triggered the generation of the xIRI has the EMM Cause field populated, the IRI-POI in the MME shall set the value of the cause field of the MMEDetach record to the integer value of the EMM Cause, see TS 24.301 [51] clause 9.9.3.9.

##### 6.3.2.2.5 Tracking Area/EPS Location update

When the reporting of location information is authorised, the IRI-POI in the MME shall generate an xIRI containing an MMELocationUpdate record each time the IRI-POI present in an MME detects that the target UE location is updated due to target UE mobility or as a part of an MME service procedure. The generation of such separate xIRI is not required if the updated UE location information is obtained as a part of a procedure producing some other xIRIs (e.g. mobility registration). In that case the location information is included into the respective xIRI.

In addition to the Tracking Area Update described in TS 23.401 [50], clause 5.3.3, the UE mobility events resulting in generation of an MMELocationUpdate xIRI include the *S1 Path Switch Request* (*intra E-UTRAN handover* *X2 based handover* procedure described in TS 23.401 [50] clause 5.5.1.1) and the *S1 Handover Notify* (*Intra E-UTRAN S1 based handover* procedure described in TS 23.401 [50] clause 5.5.1.2).

The MMELocationUpdate xIRI is also generated when the MME receives an E-UTRAN S1AP *ERAB Modification Indication* message as a result of Dual Connectivity activation/release for the target UE, as described in TS 37.340 [37] clause 10.

Based on regulatory requirements and operator policy, the location information obtained by the MME from E-UTRAN or the E-SMLC in the course of some service operations may result in the generation of the MMELocationUpdate xIRI record. Additionally, the IRI-POI in the MME shall capture the location information in the scenarios described in TS 23.271 [52] clause 4.4.2. Also, in the case of Mobile Originated LCS service invoked by the target, the location information may be derived from the Location Service Response sent to the target UE via the MME (see TS 23.271 [52] clause 9.2.6).

Optionally, based on regulatory and operator policy, other MME messages that do not generate separate xIRI but carry location information such as emergency services or LCS may trigger the generation of an MMELocationUpdate xIRI record.

Table 6.3.2-5: Payload for MMELocationUpdate record

|  |  |  |
| --- | --- | --- |
| Field name | Description | M/C/O |
| iMSI | iMSI associated with the location update. | M |
| iMEI | iMEI associated with the location update, if available. | C |
| mSISDN | mSISDN associated with the location update, if available as part of the subscription profile. | C |
| gUTI | GUTI assigned during the location update, if available, see TS 24.301 [50]. | C |
| location | Updated location information determined by the network. Depending on the service or message type from which the location information is extracted, it may be encoded in several forms (Annex A). | M |
| oldGUTI | GUTI used to initiate the location update, if available, see TS 24.301 [50]. | C |
| sMSServiceStatus | Indicates the availability of SMS Services. Shall be provided if present in the TRACKING AREA UPDATE ACCEPT. | C |

##### 6.3.2.2.6 Start of interception with EPS attached UE

The IRI-POI in the MME shall generate an xIRI containing an MMEStartOfInterceptionWithEPSAttachedUE record when the IRI-POI present in the MME detects that interception is activated on a UE that has already attached to the EPS. A UE is considered already attached to the EPS when the EMM state for that UE is EMM-REGISTERED. Therefore, the IRI-POI present in the MME shall generate the xIRI MMEStartOfInterceptionWithEPSAttachedUE record when it detects that a new interception for a UE is activated (i.e. provisioned by the LIPF) and the EPS mobility management state within the MME for that UE is EMM-REGISTERED.

Table 6.3.2-6: Payload for MMEStartOfInterceptionWithEPSAttachedUE record

|  |  |  |
| --- | --- | --- |
| Field name | Description | M/C/O |
| attachType | Specifies the type of EPS Attach, see TS 24.301 [51] clause 9.9.3.11. This is derived from the information stored in the UE Context at the MME, see TS 23.401 [50] clause 5.7.2. | M |
| attachResult | Specifies the result of the attach procedure, see TS 24.301 [51] clause 9.9.3.10. This is derived from the information stored in the UE Context at the MME, see TS 23.401 [50] clause 5.7.2. | M |
| iMSI | IMSI associated with the target UE Context at the MME, see TS 23.401 [50] clause 5.7.2. | M |
| iMEI | IMEI associated with the target UE Context at the MME, if available, see TS 23.401 [50] clause 5.7.2. | C |
| mSISDN | mSISDN associated with the target UE Context at the MME, if available. | C |
| gUTI | Current GUTI associated with the target UE context at the MME, if available, see TS 23.401 [50] clause 5.7.2. | C |
| location | Location information stored in the UE Context at the MME, if available, see TS 23.401 [50] clause 5.7.2.Shall include all location information for the target UE available at the MME encoded as one of the following:* *ePSUserLocationInformation* parameter (*location>fourGLocationInfo>ePSUserLocationInformation*).
* *ePSLocationInformation* parameter *(location>fourGLocationInfo>ePSLocationInformation*).

When Dual Connectivity is activated, the *additionalCellIDs* parameter (*location>fourGLocationInfo>ePSLocationInformation>mMELocationInformation>additionalCellIDs*) shall also be populated, see clause 7.3.3 and Annex A. | C |
| ePSTAIList | List of tracking areas associated with the registration area within which the UE is currently registered, see TS 24.301 [51], clause 9.9.3.33 and TS 23.401 [50] clause 5.7.2. | C |
| sMSServiceStatus | Indicates the availability of SMS Services. Shall be provided if present in the UE Context at the MME, see TS 23.401 [50] clause 5.7.2. | C |
| eMM5GRegStatus | UE Status, if present in the UE Context at the MME, see TS 24.501 [13] clause 9.11.3.56. | C |

The IRI-POI present in the MME generating an xIRI containing an MMEStartOfInterceptionWithEPSAttachedUE record shall set the Payload Direction field in the PDU header to *not applicable* (see ETSI TS 103 221-2 [8] clause 5.2.6).

##### 6.3.2.2.7 MME unsuccessful procedure

The IRI-POI in the MME shall generate an xIRI containing an MMEUnsuccessfulProcedure record when the IRI-POI present in the MME detects an unsuccessful procedure for a UE matching one of the target identifiers provided via LI\_X1.

Accordingly, the IRI-POI in the MME generates the xIRI when any of the following events is detected:

- MME sends a reject to any EMM request message to the target UE and the UE EPS Mobility Management (EMM) within the MME is changed to EMM-DEREGISTERED.

- MME aborts a registration procedure before the UE EPS Mobility Management (EMM) state within the MME is changed to EMM-REGISTERED.

- MME sends a reject to any ESM request message to the target UE.

Unsuccessful attach attempts shall be reported only if the target UE has been successfully authenticated.

Table 6.3.2-7: Payload for MMEUnsuccessfulProcedure record

|  |  |  |
| --- | --- | --- |
| Field name | Description | M/C/O |
| failedprocedureType | Specifies the procedure which failed at the MME. | M |
| failureCause | Provides the value of the ESM or EMM cause, see TS 24.301 [51] clauses 9.9.3.9 and 9.9.4.4. | M |
| iMSI | IMSI associated with the procedure, if available (see NOTE). | C |
| iMEI | IMEI associated with the procedure, if available. | C |
| mSISDN | mSISDN associated with the procedure, if available. | C |
| gUTI | GUTI provided used in the procedure, if available. | C |
| location | Location information determined by the network during the procedure or known at the MME, if available.Shall include all location information for the target UE available at the MME encoded as one of the following:* *ePSUserLocationInformation* parameter (*location>fourGLocationInfo> ePSUserLocationInformation*).
* *ePSLocationInformation* parameter (*location>fourGLocationInfo>ePSLocationInformation*).

When Dual Connectivity is activated, the *additionalCellIDs* parameter (*location>fourGLocationInfo>ePSLocationInformation>mMELocationInformation>additionalCellIDs*) shall also be populated, see clause 7.3.3 and Annex A. | C |
| NOTE: At least one identity shall be provided, the others shall be provided if available. |

## \*\*\*\* END OF MAIN DOCUMENTS CHANGES \*\*\*

## \*\*\*\* START OF FIRST CHANGE (ATTACHMENT TS33128Payloads.asn) \*\*\*

Annex A (normative):
ASN.1 Schema for the Internal and External Interfaces

TS33128Payloads

{itu-t(0) identified-organization(4) etsi(0) securityDomain(2) lawfulIntercept(2) threeGPP(4) ts33128(19) r17(17) version6(6)}

DEFINITIONS IMPLICIT TAGS EXTENSIBILITY IMPLIED ::=

BEGIN

-- =============

-- Relative OIDs

-- =============

tS33128PayloadsOID RELATIVE-OID ::= {threeGPP(4) ts33128(19) r17(17) version6(6)}

xIRIPayloadOID RELATIVE-OID ::= {tS33128PayloadsOID xIRI(1)}

xCCPayloadOID RELATIVE-OID ::= {tS33128PayloadsOID xCC(2)}

iRIPayloadOID RELATIVE-OID ::= {tS33128PayloadsOID iRI(3)}

cCPayloadOID RELATIVE-OID ::= {tS33128PayloadsOID cC(4)}

lINotificationPayloadOID RELATIVE-OID ::= {tS33128PayloadsOID lINotification(5)}

-- ===============

-- X2 xIRI payload

-- ===============

XIRIPayload ::= SEQUENCE

{

 xIRIPayloadOID [1] RELATIVE-OID,

 event [2] XIRIEvent

}

XIRIEvent ::= CHOICE

{

 -- Access and mobility related events, see clause 6.2.2

 registration [1] AMFRegistration,

 deregistration [2] AMFDeregistration,

 locationUpdate [3] AMFLocationUpdate,

 startOfInterceptionWithRegisteredUE [4] AMFStartOfInterceptionWithRegisteredUE,

 unsuccessfulAMProcedure [5] AMFUnsuccessfulProcedure,

 -- PDU session-related events, see clause 6.2.3

 pDUSessionEstablishment [6] SMFPDUSessionEstablishment,

 pDUSessionModification [7] SMFPDUSessionModification,

 pDUSessionRelease [8] SMFPDUSessionRelease,

 startOfInterceptionWithEstablishedPDUSession [9] SMFStartOfInterceptionWithEstablishedPDUSession,

 unsuccessfulSMProcedure [10] SMFUnsuccessfulProcedure,

 -- Subscriber-management related events, see clause 7.2.2

 servingSystemMessage [11] UDMServingSystemMessage,

 -- SMS-related events, see clause 6.2.5, see also sMSReport ([56] below)

 sMSMessage [12] SMSMessage,

 -- LALS-related events, see clause 7.3.1

 lALSReport [13] LALSReport,

 -- PDHR/PDSR-related events, see clause 6.2.3.4.1

 pDHeaderReport [14] PDHeaderReport,

 pDSummaryReport [15] PDSummaryReport,

 -- tag 16 is reserved because there is no equivalent mDFCellSiteReport in XIRIEvent

 -- MMS-related events, see clause 7.4.2

 mMSSend [17] MMSSend,

 mMSSendByNonLocalTarget [18] MMSSendByNonLocalTarget,

 mMSNotification [19] MMSNotification,

 mMSSendToNonLocalTarget [20] MMSSendToNonLocalTarget,

 mMSNotificationResponse [21] MMSNotificationResponse,

 mMSRetrieval [22] MMSRetrieval,

 mMSDeliveryAck [23] MMSDeliveryAck,

 mMSForward [24] MMSForward,

 mMSDeleteFromRelay [25] MMSDeleteFromRelay,

 mMSDeliveryReport [26] MMSDeliveryReport,

 mMSDeliveryReportNonLocalTarget [27] MMSDeliveryReportNonLocalTarget,

 mMSReadReport [28] MMSReadReport,

 mMSReadReportNonLocalTarget [29] MMSReadReportNonLocalTarget,

 mMSCancel [30] MMSCancel,

 mMSMBoxStore [31] MMSMBoxStore,

 mMSMBoxUpload [32] MMSMBoxUpload,

 mMSMBoxDelete [33] MMSMBoxDelete,

 mMSMBoxViewRequest [34] MMSMBoxViewRequest,

 mMSMBoxViewResponse [35] MMSMBoxViewResponse,

 -- PTC-related events, see clause 7.5.2

 pTCRegistration [36] PTCRegistration,

 pTCSessionInitiation [37] PTCSessionInitiation,

 pTCSessionAbandon [38] PTCSessionAbandon,

 pTCSessionStart [39] PTCSessionStart,

 pTCSessionEnd [40] PTCSessionEnd,

 pTCStartOfInterception [41] PTCStartOfInterception,

 pTCPreEstablishedSession [42] PTCPreEstablishedSession,

 pTCInstantPersonalAlert [43] PTCInstantPersonalAlert,

 pTCPartyJoin [44] PTCPartyJoin,

 pTCPartyDrop [45] PTCPartyDrop,

 pTCPartyHold [46] PTCPartyHold,

 pTCMediaModification [47] PTCMediaModification,

 pTCGroupAdvertisement [48] PTCGroupAdvertisement,

 pTCFloorControl [49] PTCFloorControl,

 pTCTargetPresence [50] PTCTargetPresence,

 pTCParticipantPresence [51] PTCParticipantPresence,

 pTCListManagement [52] PTCListManagement,

 pTCAccessPolicy [53] PTCAccessPolicy,

 -- More Subscriber-management related events, see clause 7.2.2

 subscriberRecordChangeMessage [54] UDMSubscriberRecordChangeMessage,

 cancelLocationMessage [55] UDMCancelLocationMessage,

 -- SMS-related events continued from choice 12

 sMSReport [56] SMSReport,

 -- MA PDU session-related events, see clause 6.2.3.2.7

 sMFMAPDUSessionEstablishment [57] SMFMAPDUSessionEstablishment,

 sMFMAPDUSessionModification [58] SMFMAPDUSessionModification,

 sMFMAPDUSessionRelease [59] SMFMAPDUSessionRelease,

 startOfInterceptionWithEstablishedMAPDUSession [60] SMFStartOfInterceptionWithEstablishedMAPDUSession,

 unsuccessfulMASMProcedure [61] SMFMAUnsuccessfulProcedure,

 -- Identifier Association events, see clauses 6.2.2.2.7 and 6.3.2.2.2

 aMFIdentifierAssociation [62] AMFIdentifierAssociation,

 mMEIdentifierAssociation [63] MMEIdentifierAssociation,

 -- PDU to MA PDU session-related events, see clause 6.2.3.2.8

 sMFPDUtoMAPDUSessionModification [64] SMFPDUtoMAPDUSessionModification,

 -- NEF services related events, see clause 7.7.2

 nEFPDUSessionEstablishment [65] NEFPDUSessionEstablishment,

 nEFPDUSessionModification [66] NEFPDUSessionModification,

 nEFPDUSessionRelease [67] NEFPDUSessionRelease,

 nEFUnsuccessfulProcedure [68] NEFUnsuccessfulProcedure,

 nEFStartOfInterceptionWithEstablishedPDUSession [69] NEFStartOfInterceptionWithEstablishedPDUSession,

 nEFdeviceTrigger [70] NEFDeviceTrigger,

 nEFdeviceTriggerReplace [71] NEFDeviceTriggerReplace,

 nEFdeviceTriggerCancellation [72] NEFDeviceTriggerCancellation,

 nEFdeviceTriggerReportNotify [73] NEFDeviceTriggerReportNotify,

 nEFMSISDNLessMOSMS [74] NEFMSISDNLessMOSMS,

 nEFExpectedUEBehaviourUpdate [75] NEFExpectedUEBehaviourUpdate,

 -- SCEF services related events, see clause 7.8.2

 sCEFPDNConnectionEstablishment [76] SCEFPDNConnectionEstablishment,

 sCEFPDNConnectionUpdate [77] SCEFPDNConnectionUpdate,

 sCEFPDNConnectionRelease [78] SCEFPDNConnectionRelease,

 sCEFUnsuccessfulProcedure [79] SCEFUnsuccessfulProcedure,

 sCEFStartOfInterceptionWithEstablishedPDNConnection [80] SCEFStartOfInterceptionWithEstablishedPDNConnection,

 sCEFdeviceTrigger [81] SCEFDeviceTrigger,

 sCEFdeviceTriggerReplace [82] SCEFDeviceTriggerReplace,

 sCEFdeviceTriggerCancellation [83] SCEFDeviceTriggerCancellation,

 sCEFdeviceTriggerReportNotify [84] SCEFDeviceTriggerReportNotify,

 sCEFMSISDNLessMOSMS [85] SCEFMSISDNLessMOSMS,

 sCEFCommunicationPatternUpdate [86] SCEFCommunicationPatternUpdate,

 -- EPS Events, see clause 6.3

 -- MME Events, see clause 6.3.2.2

 mMEAttach [87] MMEAttach,

 mMEDetach [88] MMEDetach,

 mMELocationUpdate [89] MMELocationUpdate,

 mMEStartOfInterceptionWithEPSAttachedUE [90] MMEStartOfInterceptionWithEPSAttachedUE,

 mMEUnsuccessfulProcedure [91] MMEUnsuccessfulProcedure,

 -- AKMA key management events, see clause 7.9.1

 aAnFAnchorKeyRegister [92] AAnFAnchorKeyRegister,

 aAnFKAKMAApplicationKeyGet [93] AAnFKAKMAApplicationKeyGet,

 aAnFStartOfInterceptWithEstablishedAKMAKeyMaterial [94] AAnFStartOfInterceptWithEstablishedAKMAKeyMaterial,

 aAnFAKMAContextRemovalRecord [95] AAnFAKMAContextRemovalRecord,

 aFAKMAApplicationKeyRefresh [96] AFAKMAApplicationKeyRefresh,

 aFStartOfInterceptWithEstablishedAKMAApplicationKey [97] AFStartOfInterceptWithEstablishedAKMAApplicationKey,

 aFAuxiliarySecurityParameterEstablishment [98] AFAuxiliarySecurityParameterEstablishment,

 aFApplicationKeyRemoval [99] AFApplicationKeyRemoval,

 -- HR LI Events, see clause 7.10.3.3

 n9HRPDUSessionInfo [100] N9HRPDUSessionInfo,

 s8HRBearerInfo [101] S8HRBearerInfo,

 -- Separated Location Reporting, see clause 7.3.4

 separatedLocationReporting [102] SeparatedLocationReporting,

 -- STIR SHAKEN and RCD/eCNAM Events, see clause 7.11.2

 sTIRSHAKENSignatureGeneration [103] STIRSHAKENSignatureGeneration,

 sTIRSHAKENSignatureValidation [104] STIRSHAKENSignatureValidation,

 -- IMS events, see clause 7.12.4.2

 iMSMessage [105] IMSMessage,

 startOfInterceptionForActiveIMSSession [106] StartOfInterceptionForActiveIMSSession,

 iMSCCUnavailable [107] IMSCCUnavailable,

 -- UDM events, see clause 7.2.2

 uDMLocationInformationResult [108] UDMLocationInformationResult,

 uDMUEInformationResponse [109] UDMUEInformationResponse,

 uDMUEAuthenticationResponse [110] UDMUEAuthenticationResponse,

 -- AMF events, see 6.2.2.2.8

 positioningInfoTransfer [111] AMFPositioningInfoTransfer,

 -- MME Events, see clause 6.3.2.2.8

 mMEPositioningInfoTransfer [112] MMEPositioningInfoTransfer,

 -- Tags 113 to 131 are not used in this version of the specification

 -- AMF events, see 6.2.2.2.9, continued from tag 111

 aMFUEConfigurationUpdate [132] AMFUEConfigurationUpdate

}

-- ==============

-- X3 xCC payload

-- ==============

-- No additional xCC payload definitions required in the present document.

-- ===============

-- HI2 IRI payload

-- ===============

IRIPayload ::= SEQUENCE

{

 iRIPayloadOID [1] RELATIVE-OID,

 event [2] IRIEvent,

 targetIdentifiers [3] SEQUENCE OF IRITargetIdentifier OPTIONAL

}

IRIEvent ::= CHOICE

{

 -- Registration-related events, see clause 6.2.2

 registration [1] AMFRegistration,

 deregistration [2] AMFDeregistration,

 locationUpdate [3] AMFLocationUpdate,

 startOfInterceptionWithRegisteredUE [4] AMFStartOfInterceptionWithRegisteredUE,

 unsuccessfulRegistrationProcedure [5] AMFUnsuccessfulProcedure,

 -- PDU session-related events, see clause 6.2.3

 pDUSessionEstablishment [6] SMFPDUSessionEstablishment,

 pDUSessionModification [7] SMFPDUSessionModification,

 pDUSessionRelease [8] SMFPDUSessionRelease,

 startOfInterceptionWithEstablishedPDUSession [9] SMFStartOfInterceptionWithEstablishedPDUSession,

 unsuccessfulSessionProcedure [10] SMFUnsuccessfulProcedure,

 -- Subscriber-management related events, see clause 7.2.2

 servingSystemMessage [11] UDMServingSystemMessage,

 -- SMS-related events, see clause 6.2.5, see also sMSReport ([56] below)

 sMSMessage [12] SMSMessage,

 -- LALS-related events, see clause 7.3.1

 lALSReport [13] LALSReport,

 -- PDHR/PDSR-related events, see clause 6.2.3.4.1

 pDHeaderReport [14] PDHeaderReport,

 pDSummaryReport [15] PDSummaryReport,

 -- MDF-related events, see clause 7.3.2

 mDFCellSiteReport [16] MDFCellSiteReport,

 -- MMS-related events, see clause 7.4.2

 mMSSend [17] MMSSend,

 mMSSendByNonLocalTarget [18] MMSSendByNonLocalTarget,

 mMSNotification [19] MMSNotification,

 mMSSendToNonLocalTarget [20] MMSSendToNonLocalTarget,

 mMSNotificationResponse [21] MMSNotificationResponse,

 mMSRetrieval [22] MMSRetrieval,

 mMSDeliveryAck [23] MMSDeliveryAck,

 mMSForward [24] MMSForward,

 mMSDeleteFromRelay [25] MMSDeleteFromRelay,

 mMSDeliveryReport [26] MMSDeliveryReport,

 mMSDeliveryReportNonLocalTarget [27] MMSDeliveryReportNonLocalTarget,

 mMSReadReport [28] MMSReadReport,

 mMSReadReportNonLocalTarget [29] MMSReadReportNonLocalTarget,

 mMSCancel [30] MMSCancel,

 mMSMBoxStore [31] MMSMBoxStore,

 mMSMBoxUpload [32] MMSMBoxUpload,

 mMSMBoxDelete [33] MMSMBoxDelete,

 mMSMBoxViewRequest [34] MMSMBoxViewRequest,

 mMSMBoxViewResponse [35] MMSMBoxViewResponse,

 -- PTC-related events, see clause 7.5.2

 pTCRegistration [36] PTCRegistration,

 pTCSessionInitiation [37] PTCSessionInitiation,

 pTCSessionAbandon [38] PTCSessionAbandon,

 pTCSessionStart [39] PTCSessionStart,

 pTCSessionEnd [40] PTCSessionEnd,

 pTCStartOfInterception [41] PTCStartOfInterception,

 pTCPreEstablishedSession [42] PTCPreEstablishedSession,

 pTCInstantPersonalAlert [43] PTCInstantPersonalAlert,

 pTCPartyJoin [44] PTCPartyJoin,

 pTCPartyDrop [45] PTCPartyDrop,

 pTCPartyHold [46] PTCPartyHold,

 pTCMediaModification [47] PTCMediaModification,

 pTCGroupAdvertisement [48] PTCGroupAdvertisement,

 pTCFloorControl [49] PTCFloorControl,

 pTCTargetPresence [50] PTCTargetPresence,

 pTCParticipantPresence [51] PTCParticipantPresence,

 pTCListManagement [52] PTCListManagement,

 pTCAccessPolicy [53] PTCAccessPolicy,

 -- More Subscriber-management related events, see clause 7.2.2

 subscriberRecordChangeMessage [54] UDMSubscriberRecordChangeMessage,

 cancelLocationMessage [55] UDMCancelLocationMessage,

 -- SMS-related events, continued from choice 12

 sMSReport [56] SMSReport,

 -- MA PDU session-related events, see clause 6.2.3.2.7

 sMFMAPDUSessionEstablishment [57] SMFMAPDUSessionEstablishment,

 sMFMAPDUSessionModification [58] SMFMAPDUSessionModification,

 sMFMAPDUSessionRelease [59] SMFMAPDUSessionRelease,

 startOfInterceptionWithEstablishedMAPDUSession [60] SMFStartOfInterceptionWithEstablishedMAPDUSession,

 unsuccessfulMASMProcedure [61] SMFMAUnsuccessfulProcedure,

 -- Identifier Association events, see clauses 6.2.2.2.7 and 6.3.2.2.2

 aMFIdentifierAssociation [62] AMFIdentifierAssociation,

 mMEIdentifierAssociation [63] MMEIdentifierAssociation,

 -- PDU to MA PDU session-related events, see clause 6.2.3.2.8

 sMFPDUtoMAPDUSessionModification [64] SMFPDUtoMAPDUSessionModification,

 -- NEF services related events, see clause 7.7.2,

 nEFPDUSessionEstablishment [65] NEFPDUSessionEstablishment,

 nEFPDUSessionModification [66] NEFPDUSessionModification,

 nEFPDUSessionRelease [67] NEFPDUSessionRelease,

 nEFUnsuccessfulProcedure [68] NEFUnsuccessfulProcedure,

 nEFStartOfInterceptionWithEstablishedPDUSession [69] NEFStartOfInterceptionWithEstablishedPDUSession,

 nEFdeviceTrigger [70] NEFDeviceTrigger,

 nEFdeviceTriggerReplace [71] NEFDeviceTriggerReplace,

 nEFdeviceTriggerCancellation [72] NEFDeviceTriggerCancellation,

 nEFdeviceTriggerReportNotify [73] NEFDeviceTriggerReportNotify,

 nEFMSISDNLessMOSMS [74] NEFMSISDNLessMOSMS,

 nEFExpectedUEBehaviourUpdate [75] NEFExpectedUEBehaviourUpdate,

 -- SCEF services related events, see clause 7.8.2

 sCEFPDNConnectionEstablishment [76] SCEFPDNConnectionEstablishment,

 sCEFPDNConnectionUpdate [77] SCEFPDNConnectionUpdate,

 sCEFPDNConnectionRelease [78] SCEFPDNConnectionRelease,

 sCEFUnsuccessfulProcedure [79] SCEFUnsuccessfulProcedure,

 sCEFStartOfInterceptionWithEstablishedPDNConnection [80] SCEFStartOfInterceptionWithEstablishedPDNConnection,

 sCEFdeviceTrigger [81] SCEFDeviceTrigger,

 sCEFdeviceTriggerReplace [82] SCEFDeviceTriggerReplace,

 sCEFdeviceTriggerCancellation [83] SCEFDeviceTriggerCancellation,

 sCEFdeviceTriggerReportNotify [84] SCEFDeviceTriggerReportNotify,

 sCEFMSISDNLessMOSMS [85] SCEFMSISDNLessMOSMS,

 sCEFCommunicationPatternUpdate [86] SCEFCommunicationPatternUpdate,

 -- EPS Events, see clause 6.3

 -- MME Events, see clause 6.3.2.2

 mMEAttach [87] MMEAttach,

 mMEDetach [88] MMEDetach,

 mMELocationUpdate [89] MMELocationUpdate,

 mMEStartOfInterceptionWithEPSAttachedUE [90] MMEStartOfInterceptionWithEPSAttachedUE,

 mMEUnsuccessfulProcedure [91] MMEUnsuccessfulProcedure,

 -- AKMA key management events, see clause 7.9.1

 aAnFAnchorKeyRegister [92] AAnFAnchorKeyRegister,

 aAnFKAKMAApplicationKeyGet [93] AAnFKAKMAApplicationKeyGet,

 aAnFStartOfInterceptWithEstablishedAKMAKeyMaterial [94] AAnFStartOfInterceptWithEstablishedAKMAKeyMaterial,

 aAnFAKMAContextRemovalRecord [95] AAnFAKMAContextRemovalRecord,

 aFAKMAApplicationKeyRefresh [96] AFAKMAApplicationKeyRefresh,

 aFStartOfInterceptWithEstablishedAKMAApplicationKey [97] AFStartOfInterceptWithEstablishedAKMAApplicationKey,

 aFAuxiliarySecurityParameterEstablishment [98] AFAuxiliarySecurityParameterEstablishment,

 aFApplicationKeyRemoval [99] AFApplicationKeyRemoval,

 -- tag 100 is reserved because there is no equivalent n9HRPDUSessionInfo in IRIEvent.

 -- tag 101 is reserved because there is no equivalent S8HRBearerInfo in IRIEvent.

 -- Separated Location Reporting, see clause 7.3.4

 separatedLocationReporting [102] SeparatedLocationReporting,

 -- STIR SHAKEN and RCD/eCNAM Events, see clause 7.11.3

 sTIRSHAKENSignatureGeneration [103] STIRSHAKENSignatureGeneration,

 sTIRSHAKENSignatureValidation [104] STIRSHAKENSignatureValidation,

 -- IMS events, see clause 7.11.4.2

 iMSMessage [105] IMSMessage,

 startOfInterceptionForActiveIMSSession [106] StartOfInterceptionForActiveIMSSession,

 iMSCCUnavailable [107] IMSCCUnavailable,

 -- UDM events, see clause 7.2.2

 uDMLocationInformationResultRecord [108] UDMLocationInformationResult,

 uDMUEInformationResponse [109] UDMUEInformationResponse,

 uDMUEAuthenticationResponse [110] UDMUEAuthenticationResponse,

 -- AMF events, see 6.2.2.2.8

 positioningInfoTransfer [111] AMFPositioningInfoTransfer,

 -- MME Events, see clause 6.3.2.2.8

 mMEPositioningInfoTransfer [112] MMEPositioningInfoTransfer,

 -- Tags 113 to 131 are not used in this version of the specification

 -- AMF events, see 6.2.2.3, continued from tag 111

 aMFUEConfigurationUpdate [132] AMFUEConfigurationUpdate

}

IRITargetIdentifier ::= SEQUENCE

{

 identifier [1] TargetIdentifier,

 provenance [2] TargetIdentifierProvenance OPTIONAL

}

-- ==============

-- HI3 CC payload

-- ==============

CCPayload ::= SEQUENCE

{

 cCPayloadOID [1] RELATIVE-OID,

 pDU [2] CCPDU

}

CCPDU ::= CHOICE

{

 uPFCCPDU [1] UPFCCPDU,

 extendedUPFCCPDU [2] ExtendedUPFCCPDU,

 mMSCCPDU [3] MMSCCPDU,

 -- In Rel-16 (threeGPP(4) ts33128(19) r16(16) version9(9)),

 -- tag 4 is pTCCCPDU and tag 5 is not used.

 -- Rel-17 or newer decoders should decode tag 4 contents as PTCCCPDU if

 -- r16 is used in cCPayloadOID.

 nIDDCCPDU [4] NIDDCCPDU,

 pTCCCPDU [5] PTCCCPDU,

 iMSCCPDU [6] IMSCCPDU

}

-- ===========================

-- HI4 LI notification payload

-- ===========================

LINotificationPayload ::= SEQUENCE

{

 lINotificationPayloadOID [1] RELATIVE-OID,

 notification [2] LINotificationMessage

}

LINotificationMessage ::= CHOICE

{

 lINotification [1] LINotification

}

-- =================

-- HR LI definitions

-- =================

N9HRPDUSessionInfo ::= SEQUENCE

{

 sUPI [1] SUPI,

 pEI [2] PEI OPTIONAL,

 pDUSessionID [3] PDUSessionID,

 location [4] Location OPTIONAL,

 sNSSAI [5] SNSSAI OPTIONAL,

 dNN [6] DNN OPTIONAL,

 messageCause [7] N9HRMessageCause

}

S8HRBearerInfo ::= SEQUENCE

{

 iMSI [1] IMSI,

 iMEI [2] IMEI OPTIONAL,

 bearerID [3] EPSBearerID,

 linkedBearerID [4] EPSBearerID OPTIONAL,

 location [5] Location OPTIONAL,

 aPN [6] APN OPTIONAL,

 sGWIPAddress [7] IPAddress OPTIONAL,

 messageCause [8] S8HRMessageCause

}

-- ================

-- HR LI parameters

-- ================

N9HRMessageCause ::= ENUMERATED

{

 pDUSessionEstablished(1),

 pDUSessionModified(2),

 pDUSessionReleased(3),

 updatedLocationAvailable(4),

 sMFChanged(5),

 other(6),

 hRLIEnabled(7)

}

S8HRMessageCause ::= ENUMERATED

{

 bearerActivated(1),

 bearerModified(2),

 bearerDeleted(3),

 pDNDisconnected(4),

 updatedLocationAvailable(5),

 sGWChanged(6),

 other(7),

 hRLIEnabled(8)

}

-- ==================

-- 5G NEF definitions

-- ==================

-- See clause 7.7.2.1.2 for details of this structure

NEFPDUSessionEstablishment ::= SEQUENCE

{

 sUPI [1] SUPI,

 gPSI [2] GPSI,

 pDUSessionID [3] PDUSessionID,

 sNSSAI [4] SNSSAI,

 nEFID [5] NEFID,

 dNN [6] DNN,

 rDSSupport [7] RDSSupport,

 sMFID [8] SMFID,

 aFID [9] AFID

}

-- See clause 7.7.2.1.3 for details of this structure

NEFPDUSessionModification ::= SEQUENCE

{

 sUPI [1] SUPI,

 gPSI [2] GPSI,

 sNSSAI [3] SNSSAI,

 initiator [4] Initiator,

 rDSSourcePortNumber [5] RDSPortNumber OPTIONAL,

 rDSDestinationPortNumber [6] RDSPortNumber OPTIONAL,

 applicationID [7] ApplicationID OPTIONAL,

 aFID [8] AFID OPTIONAL,

 rDSAction [9] RDSAction OPTIONAL,

 serializationFormat [10] SerializationFormat OPTIONAL

}

-- See clause 7.7.2.1.4 for details of this structure

NEFPDUSessionRelease ::= SEQUENCE

{

 sUPI [1] SUPI,

 gPSI [2] GPSI,

 pDUSessionID [3] PDUSessionID,

 timeOfFirstPacket [4] Timestamp OPTIONAL,

 timeOfLastPacket [5] Timestamp OPTIONAL,

 uplinkVolume [6] INTEGER OPTIONAL,

 downlinkVolume [7] INTEGER OPTIONAL,

 releaseCause [8] NEFReleaseCause

}

-- See clause 7.7.2.1.5 for details of this structure

NEFUnsuccessfulProcedure ::= SEQUENCE

{

 failureCause [1] NEFFailureCause,

 sUPI [2] SUPI,

 gPSI [3] GPSI OPTIONAL,

 pDUSessionID [4] PDUSessionID,

 dNN [5] DNN OPTIONAL,

 sNSSAI [6] SNSSAI OPTIONAL,

 rDSDestinationPortNumber [7] RDSPortNumber,

 applicationID [8] ApplicationID,

 aFID [9] AFID

}

-- See clause 7.7.2.1.6 for details of this structure

NEFStartOfInterceptionWithEstablishedPDUSession ::= SEQUENCE

{

 sUPI [1] SUPI,

 gPSI [2] GPSI,

 pDUSessionID [3] PDUSessionID,

 dNN [4] DNN,

 sNSSAI [5] SNSSAI,

 nEFID [6] NEFID,

 rDSSupport [7] RDSSupport,

 sMFID [8] SMFID,

 aFID [9] AFID

}

-- See clause 7.7.3.1.1 for details of this structure

NEFDeviceTrigger ::= SEQUENCE

{

 sUPI [1] SUPI,

 gPSI [2] GPSI,

 triggerId [3] TriggerID,

 aFID [4] AFID,

 triggerPayload [5] TriggerPayload OPTIONAL,

 validityPeriod [6] INTEGER OPTIONAL,

 priorityDT [7] PriorityDT OPTIONAL,

 sourcePortId [8] PortNumber OPTIONAL,

 destinationPortId [9] PortNumber OPTIONAL

}

-- See clause 7.7.3.1.2 for details of this structure

NEFDeviceTriggerReplace ::= SEQUENCE

{

 sUPI [1] SUPI,

 gPSI [2] GPSI,

 triggerId [3] TriggerID,

 aFID [4] AFID,

 triggerPayload [5] TriggerPayload OPTIONAL,

 validityPeriod [6] INTEGER OPTIONAL,

 priorityDT [7] PriorityDT OPTIONAL,

 sourcePortId [8] PortNumber OPTIONAL,

 destinationPortId [9] PortNumber OPTIONAL

}

-- See clause 7.7.3.1.3 for details of this structure

NEFDeviceTriggerCancellation ::= SEQUENCE

{

 sUPI [1] SUPI,

 gPSI [2] GPSI,

 triggerId [3] TriggerID

}

-- See clause 7.7.3.1.4 for details of this structure

NEFDeviceTriggerReportNotify ::= SEQUENCE

{

 sUPI [1] SUPI,

 gPSI [2] GPSI,

 triggerId [3] TriggerID,

 deviceTriggerDeliveryResult [4] DeviceTriggerDeliveryResult

}

-- See clause 7.7.4.1.1 for details of this structure

NEFMSISDNLessMOSMS ::= SEQUENCE

{

 sUPI [1] SUPI,

 gPSI [2] GPSI,

 terminatingSMSParty [3] AFID,

 sMS [4] SMSTPDUData OPTIONAL,

 sourcePort [5] PortNumber OPTIONAL,

 destinationPort [6] PortNumber OPTIONAL

}

-- See clause 7.7.5.1.1 for details of this structure

NEFExpectedUEBehaviourUpdate ::= SEQUENCE

{

 gPSI [1] GPSI,

 expectedUEMovingTrajectory [2] SEQUENCE OF UMTLocationArea5G OPTIONAL,

 stationaryIndication [3] StationaryIndication OPTIONAL,

 communicationDurationTime [4] INTEGER OPTIONAL,

 periodicTime [5] INTEGER OPTIONAL,

 scheduledCommunicationTime [6] ScheduledCommunicationTime OPTIONAL,

 scheduledCommunicationType [7] ScheduledCommunicationType OPTIONAL,

 batteryIndication [8] BatteryIndication OPTIONAL,

 trafficProfile [9] TrafficProfile OPTIONAL,

 expectedTimeAndDayOfWeekInTrajectory [10] SEQUENCE OF UMTLocationArea5G OPTIONAL,

 aFID [11] AFID,

 validityTime [12] Timestamp OPTIONAL

}

-- ==========================

-- Common SCEF/NEF parameters

-- ==========================

RDSSupport ::= BOOLEAN

RDSPortNumber ::= INTEGER (0..15)

RDSAction ::= ENUMERATED

{

 reservePort(1),

 releasePort(2)

}

SerializationFormat ::= ENUMERATED

{

 xml(1),

 json(2),

 cbor(3)

}

ApplicationID ::= OCTET STRING

NIDDCCPDU ::= OCTET STRING

TriggerID ::= UTF8String

PriorityDT ::= ENUMERATED

{

 noPriority(1),

 priority(2)

}

TriggerPayload ::= OCTET STRING

DeviceTriggerDeliveryResult ::= ENUMERATED

{

 success(1),

 unknown(2),

 failure(3),

 triggered(4),

 expired(5),

 unconfirmed(6),

 replaced(7),

 terminate(8)

}

StationaryIndication ::= ENUMERATED

{

 stationary(1),

 mobile(2)

}

BatteryIndication ::= ENUMERATED

{

 batteryRecharge(1),

 batteryReplace(2),

 batteryNoRecharge(3),

 batteryNoReplace(4),

 noBattery(5)

}

ScheduledCommunicationTime ::= SEQUENCE

{

 days [1] SEQUENCE OF Daytime

}

UMTLocationArea5G ::= SEQUENCE

{

 timeOfDay [1] Daytime,

 durationSec [2] INTEGER,

 location [3] NRLocation

}

Daytime ::= SEQUENCE

{

 daysOfWeek [1] Day OPTIONAL,

 timeOfDayStart [2] Timestamp OPTIONAL,

 timeOfDayEnd [3] Timestamp OPTIONAL

}

Day ::= ENUMERATED

{

 monday(1),

 tuesday(2),

 wednesday(3),

 thursday(4),

 friday(5),

 saturday(6),

 sunday(7)

}

TrafficProfile ::= ENUMERATED

{

 singleTransUL(1),

 singleTransDL(2),

 dualTransULFirst(3),

 dualTransDLFirst(4),

 multiTrans(5)

}

ScheduledCommunicationType ::= ENUMERATED

{

 downlinkOnly(1),

 uplinkOnly(2),

 bidirectional(3)

}

-- =================

-- 5G NEF parameters

-- =================

NEFFailureCause ::= ENUMERATED

{

 userUnknown(1),

 niddConfigurationNotAvailable(2),

 contextNotFound(3),

 portNotFree(4),

 portNotAssociatedWithSpecifiedApplication(5)

}

NEFReleaseCause ::= ENUMERATED

{

 sMFRelease(1),

 dNRelease(2),

 uDMRelease(3),

 cHFRelease(4),

 localConfigurationPolicy(5),

 unknownCause(6)

}

AFID ::= UTF8String

NEFID ::= UTF8String

-- ==================

-- SCEF definitions

-- ==================

-- See clause 7.8.2.1.2 for details of this structure

SCEFPDNConnectionEstablishment ::= SEQUENCE

{

 iMSI [1] IMSI OPTIONAL,

 mSISDN [2] MSISDN OPTIONAL,

 externalIdentifier [3] NAI OPTIONAL,

 iMEI [4] IMEI OPTIONAL,

 ePSBearerID [5] EPSBearerID,

 sCEFID [6] SCEFID,

 aPN [7] APN,

 rDSSupport [8] RDSSupport,

 sCSASID [9] SCSASID

}

-- See clause 7.8.2.1.3 for details of this structure

SCEFPDNConnectionUpdate ::= SEQUENCE

{

 iMSI [1] IMSI OPTIONAL,

 mSISDN [2] MSISDN OPTIONAL,

 externalIdentifier [3] NAI OPTIONAL,

 initiator [4] Initiator,

 rDSSourcePortNumber [5] RDSPortNumber OPTIONAL,

 rDSDestinationPortNumber [6] RDSPortNumber OPTIONAL,

 applicationID [7] ApplicationID OPTIONAL,

 sCSASID [8] SCSASID OPTIONAL,

 rDSAction [9] RDSAction OPTIONAL,

 serializationFormat [10] SerializationFormat OPTIONAL

}

-- See clause 7.8.2.1.4 for details of this structure

SCEFPDNConnectionRelease ::= SEQUENCE

{

 iMSI [1] IMSI OPTIONAL,

 mSISDN [2] MSISDN OPTIONAL,

 externalIdentifier [3] NAI OPTIONAL,

 ePSBearerID [4] EPSBearerID,

 timeOfFirstPacket [5] Timestamp OPTIONAL,

 timeOfLastPacket [6] Timestamp OPTIONAL,

 uplinkVolume [7] INTEGER OPTIONAL,

 downlinkVolume [8] INTEGER OPTIONAL,

 releaseCause [9] SCEFReleaseCause

}

-- See clause 7.8.2.1.5 for details of this structure

SCEFUnsuccessfulProcedure ::= SEQUENCE

{

 failureCause [1] SCEFFailureCause,

 iMSI [2] IMSI OPTIONAL,

 mSISDN [3] MSISDN OPTIONAL,

 externalIdentifier [4] NAI OPTIONAL,

 ePSBearerID [5] EPSBearerID,

 aPN [6] APN,

 rDSDestinationPortNumber [7] RDSPortNumber OPTIONAL,

 applicationID [8] ApplicationID OPTIONAL,

 sCSASID [9] SCSASID

}

-- See clause 7.8.2.1.6 for details of this structure

SCEFStartOfInterceptionWithEstablishedPDNConnection ::= SEQUENCE

{

 iMSI [1] IMSI OPTIONAL,

 mSISDN [2] MSISDN OPTIONAL,

 externalIdentifier [3] NAI OPTIONAL,

 iMEI [4] IMEI OPTIONAL,

 ePSBearerID [5] EPSBearerID,

 sCEFID [6] SCEFID,

 aPN [7] APN,

 rDSSupport [8] RDSSupport,

 sCSASID [9] SCSASID

}

-- See clause 7.8.3.1.1 for details of this structure

SCEFDeviceTrigger ::= SEQUENCE

{

 iMSI [1] IMSI,

 mSISDN [2] MSISDN,

 externalIdentifier [3] NAI,

 triggerId [4] TriggerID,

 sCSASID [5] SCSASID OPTIONAL,

 triggerPayload [6] TriggerPayload OPTIONAL,

 validityPeriod [7] INTEGER OPTIONAL,

 priorityDT [8] PriorityDT OPTIONAL,

 sourcePortId [9] PortNumber OPTIONAL,

 destinationPortId [10] PortNumber OPTIONAL

}

-- See clause 7.8.3.1.2 for details of this structure

SCEFDeviceTriggerReplace ::= SEQUENCE

{

 iMSI [1] IMSI OPTIONAL,

 mSISDN [2] MSISDN OPTIONAL,

 externalIdentifier [3] NAI OPTIONAL,

 triggerId [4] TriggerID,

 sCSASID [5] SCSASID OPTIONAL,

 triggerPayload [6] TriggerPayload OPTIONAL,

 validityPeriod [7] INTEGER OPTIONAL,

 priorityDT [8] PriorityDT OPTIONAL,

 sourcePortId [9] PortNumber OPTIONAL,

 destinationPortId [10] PortNumber OPTIONAL

}

-- See clause 7.8.3.1.3 for details of this structure

SCEFDeviceTriggerCancellation ::= SEQUENCE

{

 iMSI [1] IMSI OPTIONAL,

 mSISDN [2] MSISDN OPTIONAL,

 externalIdentifier [3] NAI OPTIONAL,

 triggerId [4] TriggerID

}

-- See clause 7.8.3.1.4 for details of this structure

SCEFDeviceTriggerReportNotify ::= SEQUENCE

{

 iMSI [1] IMSI OPTIONAL,

 mSISDN [2] MSISDN OPTIONAL,

 externalIdentifier [3] NAI OPTIONAL,

 triggerId [4] TriggerID,

 deviceTriggerDeliveryResult [5] DeviceTriggerDeliveryResult

}

-- See clause 7.8.4.1.1 for details of this structure

SCEFMSISDNLessMOSMS ::= SEQUENCE

{

 iMSI [1] IMSI OPTIONAL,

 mSISDN [2] MSISDN OPTIONAL,

 externalIdentifie [3] NAI OPTIONAL,

 terminatingSMSParty [4] SCSASID,

 sMS [5] SMSTPDUData OPTIONAL,

 sourcePort [6] PortNumber OPTIONAL,

 destinationPort [7] PortNumber OPTIONAL

}

-- See clause 7.8.5.1.1 for details of this structure

SCEFCommunicationPatternUpdate ::= SEQUENCE

{

 mSISDN [1] MSISDN OPTIONAL,

 externalIdentifier [2] NAI OPTIONAL,

 periodicCommunicationIndicator [3] PeriodicCommunicationIndicator OPTIONAL,

 communicationDurationTime [4] INTEGER OPTIONAL,

 periodicTime [5] INTEGER OPTIONAL,

 scheduledCommunicationTime [6] ScheduledCommunicationTime OPTIONAL,

 scheduledCommunicationType [7] ScheduledCommunicationType OPTIONAL,

 stationaryIndication [8] StationaryIndication OPTIONAL,

 batteryIndication [9] BatteryIndication OPTIONAL,

 trafficProfile [10] TrafficProfile OPTIONAL,

 expectedUEMovingTrajectory [11] SEQUENCE OF UMTLocationArea5G OPTIONAL,

 sCSASID [13] SCSASID,

 validityTime [14] Timestamp OPTIONAL

}

-- =================

-- SCEF parameters

-- =================

SCEFFailureCause ::= ENUMERATED

{

 userUnknown(1),

 niddConfigurationNotAvailable(2),

 invalidEPSBearer(3),

 operationNotAllowed(4),

 portNotFree(5),

 portNotAssociatedWithSpecifiedApplication(6)

}

SCEFReleaseCause ::= ENUMERATED

{

 mMERelease(1),

 dNRelease(2),

 hSSRelease(3),

 localConfigurationPolicy(4),

 unknownCause(5)

}

SCSASID ::= UTF8String

SCEFID ::= UTF8String

PeriodicCommunicationIndicator ::= ENUMERATED

{

 periodic(1),

 nonPeriodic(2)

}

EPSBearerID ::= INTEGER (0..255)

APN ::= UTF8String

-- =======================

-- AKMA AAnF definitions

-- =======================

AAnFAnchorKeyRegister ::= SEQUENCE

{

 aKID [1] NAI,

 sUPI [2] SUPI,

 kAKMA [3] KAKMA OPTIONAL

}

AAnFKAKMAApplicationKeyGet ::= SEQUENCE

{

 type [1] KeyGetType,

 aKID [2] NAI,

 keyInfo [3] AFKeyInfo

}

AAnFStartOfInterceptWithEstablishedAKMAKeyMaterial ::= SEQUENCE

{

 aKID [1] NAI,

 kAKMA [2] KAKMA OPTIONAL,

 aFKeyList [3] SEQUENCE OF AFKeyInfo OPTIONAL

}

AAnFAKMAContextRemovalRecord ::= SEQUENCE

{

 aKID [1] NAI,

 nFID [2] NFID

}

-- ======================

-- AKMA common parameters

-- ======================

FQDN ::= UTF8String

NFID ::= UTF8String

UAProtocolID ::= OCTET STRING (SIZE(5))

AKMAAFID ::= SEQUENCE

{

 aFFQDN [1] FQDN,

 uaProtocolID [2] UAProtocolID

}

UAStarParams ::= CHOICE

{

 tls12 [1] TLS12UAStarParams,

 generic [2] GenericUAStarParams

}

GenericUAStarParams ::= SEQUENCE

{

 genericClientParams [1] OCTET STRING,

 genericServerParams [2] OCTET STRING

}

-- ===========================================

-- Specific UaStarParmas for TLS 1.2 (RFC5246)

-- ===========================================

TLSCipherType ::= ENUMERATED

{

 stream(1),

 block(2),

 aead(3)

}

TLSCompressionAlgorithm ::= ENUMERATED

{

 null(1),

 deflate(2)

}

TLSPRFAlgorithm ::= ENUMERATED

{

 rfc5246(1)

}

TLSCipherSuite ::= SEQUENCE (SIZE(2)) OF INTEGER (0..255)

TLS12UAStarParams ::= SEQUENCE

{

 preMasterSecret [1] OCTET STRING (SIZE(6)) OPTIONAL,

 masterSecret [2] OCTET STRING (SIZE(6)),

 pRFAlgorithm [3] TLSPRFAlgorithm,

 cipherSuite [4] TLSCipherSuite,

 cipherType [5] TLSCipherType,

 encKeyLength [6] INTEGER (0..255),

 blockLength [7] INTEGER (0..255),

 fixedIVLength [8] INTEGER (0..255),

 recordIVLength [9] INTEGER (0..255),

 macLength [10] INTEGER (0..255),

 macKeyLength [11] INTEGER (0..255),

 compressionAlgorithm [12] TLSCompressionAlgorithm,

 clientRandom [13] OCTET STRING (SIZE(4)),

 serverRandom [14] OCTET STRING (SIZE(4)),

 clientSequenceNumber [15] INTEGER,

 serverSequenceNumber [16] INTEGER,

 sessionID [17] OCTET STRING (SIZE(0..32)),

 tLSExtensions [18] OCTET STRING (SIZE(0..65535))

}

KAF ::= OCTET STRING

KAKMA ::= OCTET STRING

-- ====================

-- AKMA AAnF parameters

-- ====================

KeyGetType ::= ENUMERATED

{

 internal(1),

 external(2)

}

AFKeyInfo ::= SEQUENCE

{

 aFID [1] AKMAAFID,

 kAF [2] KAF,

 kAFExpTime [3] KAFExpiryTime

}

-- =======================

-- AKMA AF definitions

-- =======================

AFAKMAApplicationKeyRefresh ::= SEQUENCE

{

 aFID [1] AFID,

 aKID [2] NAI,

 kAF [3] KAF,

 uaStarParams [4] UAStarParams OPTIONAL

}

AFStartOfInterceptWithEstablishedAKMAApplicationKey ::= SEQUENCE

{

 aFID [1] FQDN,

 aKID [2] NAI,

 kAFParamList [3] SEQUENCE OF AFSecurityParams

}

AFAuxiliarySecurityParameterEstablishment ::= SEQUENCE

{

 aFSecurityParams [1] AFSecurityParams

}

AFSecurityParams ::= SEQUENCE

{

 aFID [1] AFID,

 aKID [2] NAI,

 kAF [3] KAF,

 uaStarParams [4] UAStarParams

}

AFApplicationKeyRemoval ::= SEQUENCE

{

 aFID [1] AFID,

 aKID [2] NAI,

 removalCause [3] AFKeyRemovalCause

}

-- ===================

-- AKMA AF parameters

-- ===================

KAFParams ::= SEQUENCE

{

 aKID [1] NAI,

 kAF [2] KAF,

 kAFExpTime [3] KAFExpiryTime,

 uaStarParams [4] UAStarParams

}

KAFExpiryTime ::= GeneralizedTime

AFKeyRemovalCause ::= ENUMERATED

{

 unknown(1),

 keyExpiry(2),

 applicationSpecific(3)

}

-- ==================

-- 5G AMF definitions

-- ==================

-- See clause 6.2.2.2.2 for details of this structure

AMFRegistration ::= SEQUENCE

{

 registrationType [1] AMFRegistrationType,

 registrationResult [2] AMFRegistrationResult,

 slice [3] Slice OPTIONAL,

 sUPI [4] SUPI,

 sUCI [5] SUCI OPTIONAL,

 pEI [6] PEI OPTIONAL,

 gPSI [7] GPSI OPTIONAL,

 gUTI [8] FiveGGUTI,

 location [9] Location OPTIONAL,

 non3GPPAccessEndpoint [10] UEEndpointAddress OPTIONAL,

 fiveGSTAIList [11] TAIList OPTIONAL,

 sMSOverNasIndicator [12] SMSOverNASIndicator OPTIONAL,

 oldGUTI [13] EPS5GGUTI OPTIONAL,

 eMM5GRegStatus [14] EMM5GMMStatus OPTIONAL,

 nonIMEISVPEI [15] NonIMEISVPEI OPTIONAL,

 mACRestIndicator [16] MACRestrictionIndicator OPTIONAL,

 pagingRestrictionIndicator [17] PagingRestrictionIndicator OPTIONAL

}

-- See clause 6.2.2.2.3 for details of this structure

AMFDeregistration ::= SEQUENCE

{

 deregistrationDirection [1] AMFDirection,

 accessType [2] AccessType,

 sUPI [3] SUPI OPTIONAL,

 sUCI [4] SUCI OPTIONAL,

 pEI [5] PEI OPTIONAL,

 gPSI [6] GPSI OPTIONAL,

 gUTI [7] FiveGGUTI OPTIONAL,

 cause [8] FiveGMMCause OPTIONAL,

 location [9] Location OPTIONAL,

 switchOffIndicator [10] SwitchOffIndicator OPTIONAL,

 reRegRequiredIndicator [11] ReRegRequiredIndicator OPTIONAL

}

-- See clause 6.2.2.2.4 for details of this structure

AMFLocationUpdate ::= SEQUENCE

{

 sUPI [1] SUPI,

 sUCI [2] SUCI OPTIONAL,

 pEI [3] PEI OPTIONAL,

 gPSI [4] GPSI OPTIONAL,

 gUTI [5] FiveGGUTI OPTIONAL,

 location [6] Location,

 sMSOverNASIndicator [7] SMSOverNASIndicator OPTIONAL,

 oldGUTI [8] EPS5GGUTI OPTIONAL

}

-- See clause 6.2.2.2.5 for details of this structure

AMFStartOfInterceptionWithRegisteredUE ::= SEQUENCE

{

 registrationResult [1] AMFRegistrationResult,

 registrationType [2] AMFRegistrationType OPTIONAL,

 slice [3] Slice OPTIONAL,

 sUPI [4] SUPI,

 sUCI [5] SUCI OPTIONAL,

 pEI [6] PEI OPTIONAL,

 gPSI [7] GPSI OPTIONAL,

 gUTI [8] FiveGGUTI,

 location [9] Location OPTIONAL,

 non3GPPAccessEndpoint [10] UEEndpointAddress OPTIONAL,

 timeOfRegistration [11] Timestamp OPTIONAL,

 fiveGSTAIList [12] TAIList OPTIONAL,

 sMSOverNASIndicator [13] SMSOverNASIndicator OPTIONAL,

 oldGUTI [14] EPS5GGUTI OPTIONAL,

 eMM5GRegStatus [15] EMM5GMMStatus OPTIONAL

}

-- See clause 6.2.2.2.6 for details of this structure

AMFUnsuccessfulProcedure ::= SEQUENCE

{

 failedProcedureType [1] AMFFailedProcedureType,

 failureCause [2] AMFFailureCause,

 requestedSlice [3] NSSAI OPTIONAL,

 sUPI [4] SUPI OPTIONAL,

 sUCI [5] SUCI OPTIONAL,

 pEI [6] PEI OPTIONAL,

 gPSI [7] GPSI OPTIONAL,

 gUTI [8] FiveGGUTI OPTIONAL,

 location [9] Location OPTIONAL

}

-- See clause 6.2.2.2.8 on for details of this structure

AMFPositioningInfoTransfer ::= SEQUENCE

{

 sUPI [1] SUPI,

 sUCI [2] SUCI OPTIONAL,

 pEI [3] PEI OPTIONAL,

 gPSI [4] GPSI OPTIONAL,

 gUTI [5] FiveGGUTI OPTIONAL,

 nRPPaMessage [6] OCTET STRING OPTIONAL,

 lPPMessage [7] OCTET STRING OPTIONAL,

 lcsCorrelationId [8] UTF8String (SIZE(1..255))

}

--See clause 6.2.2.2.9 on for details of this structure

AMFUEConfigurationUpdate ::= SEQUENCE

{

 userIdentifiers [1] UserIdentifiers,

 gUTI [2] GUTI,

 oldGUTI [3] EPS5GGUTI OPTIONAL,

 fiveGSTAIList [4] TAIList OPTIONAL,

 slice [5] Slice OPTIONAL,

 serviceAreaList [6] ServiceAreaList OPTIONAL,

 registrationResult [7] AMFRegistrationResult OPTIONAL,

 sMSOverNASIndicator [8] SMSOverNASIndicator OPTIONAL

}

-- =================

-- 5G AMF parameters

-- =================

AMFID ::= SEQUENCE

{

 aMFRegionID [1] AMFRegionID,

 aMFSetID [2] AMFSetID,

 aMFPointer [3] AMFPointer

}

AMFDirection ::= ENUMERATED

{

 networkInitiated(1),

 uEInitiated(2)

}

AMFFailedProcedureType ::= ENUMERATED

{

 registration(1),

 sMS(2),

 pDUSessionEstablishment(3)

}

AMFFailureCause ::= CHOICE

{

 fiveGMMCause [1] FiveGMMCause,

 fiveGSMCause [2] FiveGSMCause

}

AMFPointer ::= INTEGER (0..63)

AMFRegistrationResult ::= ENUMERATED

{

 threeGPPAccess(1),

 nonThreeGPPAccess(2),

 threeGPPAndNonThreeGPPAccess(3)

}

AMFRegionID ::= INTEGER (0..255)

AMFRegistrationType ::= ENUMERATED

{

 initial(1),

 mobility(2),

 periodic(3),

 emergency(4),

 sNPNOnboarding(5),

 disasterMobility(6),

 disasterInitial(7)

}

AMFSetID ::= INTEGER (0..1023)

-- TS 24.501 [13], clause 9.11.3.49

ServiceAreaList ::= OCTET STRING (SIZE(4..112))

-- ==================

-- 5G SMF definitions

-- ==================

-- See clause 6.2.3.2.2 for details of this structure

SMFPDUSessionEstablishment ::= SEQUENCE

{

 sUPI [1] SUPI OPTIONAL,

 sUPIUnauthenticated [2] SUPIUnauthenticatedIndication OPTIONAL,

 pEI [3] PEI OPTIONAL,

 gPSI [4] GPSI OPTIONAL,

 pDUSessionID [5] PDUSessionID,

 gTPTunnelID [6] FTEID,

 pDUSessionType [7] PDUSessionType,

 sNSSAI [8] SNSSAI OPTIONAL,

 uEEndpoint [9] SEQUENCE OF UEEndpointAddress OPTIONAL,

 non3GPPAccessEndpoint [10] UEEndpointAddress OPTIONAL,

 location [11] Location OPTIONAL,

 dNN [12] DNN,

 aMFID [13] AMFID OPTIONAL,

 hSMFURI [14] HSMFURI OPTIONAL,

 requestType [15] FiveGSMRequestType,

 accessType [16] AccessType OPTIONAL,

 rATType [17] RATType OPTIONAL,

 sMPDUDNRequest [18] SMPDUDNRequest OPTIONAL,

 uEEPSPDNConnection [19] UEEPSPDNConnection OPTIONAL,

 ePS5GSComboInfo [20] EPS5GSComboInfo OPTIONAL,

 selectedDNN [21] DNN OPTIONAL,

 servingNetwork [22] SMFServingNetwork OPTIONAL,

 oldPDUSessionID [23] PDUSessionID OPTIONAL,

 handoverState [24] HandoverState OPTIONAL,

 gTPTunnelInfo [25] GTPTunnelInfo OPTIONAL,

 pCCRules [26] PCCRuleSet OPTIONAL,

 ePSPDNConnectionEstablishment [27] EPSPDNConnectionEstablishment OPTIONAL

}

-- See clause 6.2.3.2.3 for details of this structure

SMFPDUSessionModification ::= SEQUENCE

{

 sUPI [1] SUPI OPTIONAL,

 sUPIUnauthenticated [2] SUPIUnauthenticatedIndication OPTIONAL,

 pEI [3] PEI OPTIONAL,

 gPSI [4] GPSI OPTIONAL,

 sNSSAI [5] SNSSAI OPTIONAL,

 non3GPPAccessEndpoint [6] UEEndpointAddress OPTIONAL,

 location [7] Location OPTIONAL,

 requestType [8] FiveGSMRequestType,

 accessType [9] AccessType OPTIONAL,

 rATType [10] RATType OPTIONAL,

 pDUSessionID [11] PDUSessionID OPTIONAL,

 ePS5GSComboInfo [12] EPS5GSComboInfo OPTIONAL,

 uEEndpoint [13] UEEndpointAddress OPTIONAL,

 servingNetwork [14] SMFServingNetwork OPTIONAL,

 handoverState [15] HandoverState OPTIONAL,

 gTPTunnelInfo [16] GTPTunnelInfo OPTIONAL,

 pCCRules [17] PCCRuleSet OPTIONAL,

 ePSPDNConnectionModification[18] EPSPDNConnectionModification OPTIONAL,

 uPPathChange [19] UPPathChange OPTIONAL,

 pFDDataForApp [20] PFDDataForApp OPTIONAL

}

-- See clause 6.2.3.2.4 for details of this structure

SMFPDUSessionRelease ::= SEQUENCE

{

 sUPI [1] SUPI,

 pEI [2] PEI OPTIONAL,

 gPSI [3] GPSI OPTIONAL,

 pDUSessionID [4] PDUSessionID,

 timeOfFirstPacket [5] Timestamp OPTIONAL,

 timeOfLastPacket [6] Timestamp OPTIONAL,

 uplinkVolume [7] INTEGER OPTIONAL,

 downlinkVolume [8] INTEGER OPTIONAL,

 location [9] Location OPTIONAL,

 cause [10] SMFErrorCodes OPTIONAL,

 ePS5GSComboInfo [11] EPS5GSComboInfo OPTIONAL,

 nGAPCause [12] NGAPCauseInt OPTIONAL,

 fiveGMMCause [13] FiveGMMCause OPTIONAL,

 pCCRuleIDs [14] PCCRuleIDSet OPTIONAL,

 ePSPDNConnectionRelease [15] EPSPDNConnectionRelease OPTIONAL

}

-- See clause 6.2.3.2.5 for details of this structure

SMFStartOfInterceptionWithEstablishedPDUSession ::= SEQUENCE

{

 sUPI [1] SUPI OPTIONAL,

 sUPIUnauthenticated [2] SUPIUnauthenticatedIndication OPTIONAL,

 pEI [3] PEI OPTIONAL,

 gPSI [4] GPSI OPTIONAL,

 pDUSessionID [5] PDUSessionID,

 gTPTunnelID [6] FTEID,

 pDUSessionType [7] PDUSessionType,

 sNSSAI [8] SNSSAI OPTIONAL,

 uEEndpoint [9] SEQUENCE OF UEEndpointAddress,

 non3GPPAccessEndpoint [10] UEEndpointAddress OPTIONAL,

 location [11] Location OPTIONAL,

 dNN [12] DNN,

 aMFID [13] AMFID OPTIONAL,

 hSMFURI [14] HSMFURI OPTIONAL,

 requestType [15] FiveGSMRequestType,

 accessType [16] AccessType OPTIONAL,

 rATType [17] RATType OPTIONAL,

 sMPDUDNRequest [18] SMPDUDNRequest OPTIONAL,

 timeOfSessionEstablishment [19] Timestamp OPTIONAL,

 ePS5GSComboInfo [20] EPS5GSComboInfo OPTIONAL,

 uEEPSPDNConnection [21] UEEPSPDNConnection OPTIONAL,

 servingNetwork [22] SMFServingNetwork OPTIONAL,

 gTPTunnelInfo [23] GTPTunnelInfo OPTIONAL,

 pCCRules [24] PCCRuleSet OPTIONAL,

 ePSStartOfInterceptionWithEstablishedPDNConnection [25] EPSStartOfInterceptionWithEstablishedPDNConnection OPTIONAL,

 pFDDataForApps [26] PFDDataForApps OPTIONAL

}

-- See clause 6.2.3.2.6 for details of this structure

SMFUnsuccessfulProcedure ::= SEQUENCE

{

 failedProcedureType [1] SMFFailedProcedureType,

 failureCause [2] FiveGSMCause,

 initiator [3] Initiator,

 requestedSlice [4] NSSAI OPTIONAL,

 sUPI [5] SUPI OPTIONAL,

 sUPIUnauthenticated [6] SUPIUnauthenticatedIndication OPTIONAL,

 pEI [7] PEI OPTIONAL,

 gPSI [8] GPSI OPTIONAL,

 pDUSessionID [9] PDUSessionID OPTIONAL,

 uEEndpoint [10] SEQUENCE OF UEEndpointAddress OPTIONAL,

 non3GPPAccessEndpoint [11] UEEndpointAddress OPTIONAL,

 dNN [12] DNN OPTIONAL,

 aMFID [13] AMFID OPTIONAL,

 hSMFURI [14] HSMFURI OPTIONAL,

 requestType [15] FiveGSMRequestType OPTIONAL,

 accessType [16] AccessType OPTIONAL,

 rATType [17] RATType OPTIONAL,

 sMPDUDNRequest [18] SMPDUDNRequest OPTIONAL,

 location [19] Location OPTIONAL

}

-- See clause 6.2.3.2.8 for details of this structure

SMFPDUtoMAPDUSessionModification ::= SEQUENCE

{

 sUPI [1] SUPI OPTIONAL,

 sUPIUnauthenticated [2] SUPIUnauthenticatedIndication OPTIONAL,

 pEI [3] PEI OPTIONAL,

 gPSI [4] GPSI OPTIONAL,

 sNSSAI [5] SNSSAI OPTIONAL,

 non3GPPAccessEndpoint [6] UEEndpointAddress OPTIONAL,

 location [7] Location OPTIONAL,

 requestType [8] FiveGSMRequestType,

 accessType [9] AccessType OPTIONAL,

 rATType [10] RATType OPTIONAL,

 pDUSessionID [11] PDUSessionID,

 requestIndication [12] RequestIndication,

 aTSSSContainer [13] ATSSSContainer,

 uEEndpoint [14] UEEndpointAddress OPTIONAL,

 servingNetwork [15] SMFServingNetwork OPTIONAL,

 handoverState [16] HandoverState OPTIONAL,

 gTPTunnelInfo [17] GTPTunnelInfo OPTIONAL,

 ePSPDNConnectionModification [18] EPSPDNConnectionModification OPTIONAL

}

-- See clause 6.2.3.2.7.1 for details of this structure

SMFMAPDUSessionEstablishment ::= SEQUENCE

{

 sUPI [1] SUPI OPTIONAL,

 sUPIUnauthenticated [2] SUPIUnauthenticatedIndication OPTIONAL,

 pEI [3] PEI OPTIONAL,

 gPSI [4] GPSI OPTIONAL,

 pDUSessionID [5] PDUSessionID,

 pDUSessionType [6] PDUSessionType,

 accessInfo [7] SEQUENCE OF AccessInfo,

 sNSSAI [8] SNSSAI OPTIONAL,

 uEEndpoint [9] SEQUENCE OF UEEndpointAddress OPTIONAL,

 location [10] Location OPTIONAL,

 dNN [11] DNN,

 aMFID [12] AMFID OPTIONAL,

 hSMFURI [13] HSMFURI OPTIONAL,

 requestType [14] FiveGSMRequestType,

 sMPDUDNRequest [15] SMPDUDNRequest OPTIONAL,

 servingNetwork [16] SMFServingNetwork,

 oldPDUSessionID [17] PDUSessionID OPTIONAL,

 mAUpgradeIndication [18] SMFMAUpgradeIndication OPTIONAL,

 ePSPDNCnxInfo [19] SMFEPSPDNCnxInfo OPTIONAL,

 mAAcceptedIndication [20] SMFMAAcceptedIndication,

 aTSSSContainer [21] ATSSSContainer OPTIONAL,

 uEEPSPDNConnection [22] UEEPSPDNConnection OPTIONAL,

 ePS5GSComboInfo [23] EPS5GSComboInfo OPTIONAL,

 selectedDNN [24] DNN OPTIONAL,

 handoverState [25] HandoverState OPTIONAL,

 pCCRules [26] PCCRuleSet OPTIONAL,

 ePSPDNConnectionEstablishment [27] EPSPDNConnectionEstablishment OPTIONAL

}

-- See clause 6.2.3.2.7.2 for details of this structure

SMFMAPDUSessionModification ::= SEQUENCE

{

 sUPI [1] SUPI OPTIONAL,

 sUPIUnauthenticated [2] SUPIUnauthenticatedIndication OPTIONAL,

 pEI [3] PEI OPTIONAL,

 gPSI [4] GPSI OPTIONAL,

 pDUSessionID [5] PDUSessionID,

 accessInfo [6] SEQUENCE OF AccessInfo OPTIONAL,

 sNSSAI [7] SNSSAI OPTIONAL,

 location [8] Location OPTIONAL,

 requestType [9] FiveGSMRequestType OPTIONAL,

 servingNetwork [10] SMFServingNetwork,

 oldPDUSessionID [11] PDUSessionID OPTIONAL,

 mAUpgradeIndication [12] SMFMAUpgradeIndication OPTIONAL,

 ePSPDNCnxInfo [13] SMFEPSPDNCnxInfo OPTIONAL,

 mAAcceptedIndication [14] SMFMAAcceptedIndication,

 aTSSSContainer [15] ATSSSContainer OPTIONAL,

 uEEPSPDNConnection [16] UEEPSPDNConnection OPTIONAL,

 ePS5GSComboInfo [17] EPS5GSComboInfo OPTIONAL,

 handoverState [18] HandoverState OPTIONAL,

 pCCRules [19] PCCRuleSet OPTIONAL,

 uPPathChange [20] UPPathChange OPTIONAL,

 pFDDataForApp [21] PFDDataForApp OPTIONAL,

 ePSPDNConnectionModification [22] EPSPDNConnectionModification OPTIONAL

}

-- See clause 6.2.3.2.7.3 for details of this structure

SMFMAPDUSessionRelease ::= SEQUENCE

{

 sUPI [1] SUPI,

 pEI [2] PEI OPTIONAL,

 gPSI [3] GPSI OPTIONAL,

 pDUSessionID [4] PDUSessionID,

 timeOfFirstPacket [5] Timestamp OPTIONAL,

 timeOfLastPacket [6] Timestamp OPTIONAL,

 uplinkVolume [7] INTEGER OPTIONAL,

 downlinkVolume [8] INTEGER OPTIONAL,

 location [9] Location OPTIONAL,

 cause [10] SMFErrorCodes OPTIONAL,

 nGAPCause [11] NGAPCauseInt OPTIONAL,

 fiveGMMCause [12] FiveGMMCause OPTIONAL,

 pCCRuleIDs [13] PCCRuleIDSet OPTIONAL,

 ePSPDNConnectionRelease [14] EPSPDNConnectionRelease OPTIONAL

}

-- See clause 6.2.3.2.7.4 for details of this structure

SMFStartOfInterceptionWithEstablishedMAPDUSession ::= SEQUENCE

{

 sUPI [1] SUPI OPTIONAL,

 sUPIUnauthenticated [2] SUPIUnauthenticatedIndication OPTIONAL,

 pEI [3] PEI OPTIONAL,

 gPSI [4] GPSI OPTIONAL,

 pDUSessionID [5] PDUSessionID,

 pDUSessionType [6] PDUSessionType,

 accessInfo [7] SEQUENCE OF AccessInfo,

 sNSSAI [8] SNSSAI OPTIONAL,

 uEEndpoint [9] SEQUENCE OF UEEndpointAddress OPTIONAL,

 location [10] Location OPTIONAL,

 dNN [11] DNN,

 aMFID [12] AMFID OPTIONAL,

 hSMFURI [13] HSMFURI OPTIONAL,

 requestType [14] FiveGSMRequestType OPTIONAL,

 sMPDUDNRequest [15] SMPDUDNRequest OPTIONAL,

 servingNetwork [16] SMFServingNetwork,

 oldPDUSessionID [17] PDUSessionID OPTIONAL,

 mAUpgradeIndication [18] SMFMAUpgradeIndication OPTIONAL,

 ePSPDNCnxInfo [19] SMFEPSPDNCnxInfo OPTIONAL,

 mAAcceptedIndication [20] SMFMAAcceptedIndication,

 aTSSSContainer [21] ATSSSContainer OPTIONAL,

 ePS5GSComboInfo [22] EPS5GSComboInfo OPTIONAL,

 uEEPSPDNConnection [23] UEEPSPDNConnection OPTIONAL,

 pCCRules [24] PCCRuleSet OPTIONAL,

 pFDDataForApps [25] PFDDataForApps OPTIONAL,

 ePSStartOfInterceptionWithEstablishedPDNConnection [26] EPSStartOfInterceptionWithEstablishedPDNConnection OPTIONAL

}

-- See clause 6.2.3.2.7.5 for details of this structure

SMFMAUnsuccessfulProcedure ::= SEQUENCE

{

 failedProcedureType [1] SMFFailedProcedureType,

 failureCause [2] FiveGSMCause,

 requestedSlice [3] NSSAI OPTIONAL,

 initiator [4] Initiator,

 sUPI [5] SUPI OPTIONAL,

 sUPIUnauthenticated [6] SUPIUnauthenticatedIndication OPTIONAL,

 pEI [7] PEI OPTIONAL,

 gPSI [8] GPSI OPTIONAL,

 pDUSessionID [9] PDUSessionID OPTIONAL,

 accessInfo [10] SEQUENCE OF AccessInfo,

 uEEndpoint [11] SEQUENCE OF UEEndpointAddress OPTIONAL,

 location [12] Location OPTIONAL,

 dNN [13] DNN OPTIONAL,

 aMFID [14] AMFID OPTIONAL,

 hSMFURI [15] HSMFURI OPTIONAL,

 requestType [16] FiveGSMRequestType OPTIONAL,

 sMPDUDNRequest [17] SMPDUDNRequest OPTIONAL

}

-- =================

-- 5G SMF parameters

-- =================

SMFID ::= UTF8String

SMFFailedProcedureType ::= ENUMERATED

{

 pDUSessionEstablishment(1),

 pDUSessionModification(2),

 pDUSessionRelease(3)

}

SMFServingNetwork ::= SEQUENCE

{

 pLMNID [1] PLMNID,

 nID [2] NID OPTIONAL

}

AccessInfo ::= SEQUENCE

{

 accessType [1] AccessType,

 rATType [2] RATType OPTIONAL,

 gTPTunnelID [3] FTEID,

 non3GPPAccessEndpoint [4] UEEndpointAddress OPTIONAL,

 establishmentStatus [5] EstablishmentStatus,

 aNTypeToReactivate [6] AccessType OPTIONAL,

 gTPTunnelInfo [7] GTPTunnelInfo OPTIONAL

}

-- see Clause 6.1.2 of TS 24.193[44] for the details of the ATSSS container contents.

ATSSSContainer ::= OCTET STRING

DLRANTunnelInformation ::= SEQUENCE

{

 dLQOSFlowTunnelInformation [1] QOSFlowTunnelInformation OPTIONAL,

 additionalDLQOSFlowTunnelInformation [2] QOSFlowTunnelInformationList OPTIONAL,

 redundantDLQOSFlowTunnelInformation [3] QOSFlowTunnelInformationList OPTIONAL,

 additionalredundantDLQOSFlowTunnelInformation [4] QOSFlowTunnelInformationList OPTIONAL

}

EstablishmentStatus ::= ENUMERATED

{

 established(0),

 released(1)

}

FiveGSGTPTunnels ::= SEQUENCE

{

 uLNGUUPTunnelInformation [1] FTEID OPTIONAL,

 additionalULNGUUPTunnelInformation [2] FTEIDList OPTIONAL,

 dLRANTunnelInformation [3] DLRANTunnelInformation OPTIONAL

}

FiveQI ::= INTEGER (0..255)

HandoverState ::= ENUMERATED

{

 none(1),

 preparing(2),

 prepared(3),

 completed(4),

 cancelled(5)

}

NGAPCauseInt ::= SEQUENCE

{

 group [1] NGAPCauseGroupInt,

 value [2] NGAPCauseValueInt

}

-- Derived as described in TS 29.571 [17] clause 5.4.4.12

NGAPCauseGroupInt ::= INTEGER

NGAPCauseValueInt ::= INTEGER

SMFMAUpgradeIndication ::= BOOLEAN

-- Given in YAML encoding as defined in clause 6.1.6.2.31 of TS 29.502[16]

SMFEPSPDNCnxInfo ::= UTF8String

SMFMAAcceptedIndication ::= BOOLEAN

-- see Clause 6.1.6.3.8 of TS 29.502[16] for the details of this structure.

SMFErrorCodes ::= UTF8String

-- see Clause 6.1.6.3.2 of TS 29.502[16] for details of this structure.

UEEPSPDNConnection ::= OCTET STRING

-- see Clause 6.1.6.3.6 of TS 29.502[16] for the details of this structure.

RequestIndication ::= ENUMERATED

{

 uEREQPDUSESMOD(0),

 uEREQPDUSESREL(1),

 pDUSESMOB(2),

 nWREQPDUSESAUTH(3),

 nWREQPDUSESMOD(4),

 nWREQPDUSESREL(5),

 eBIASSIGNMENTREQ(6),

 rELDUETO5GANREQUEST(7)

}

QOSFlowTunnelInformation ::= SEQUENCE

{

 uPTunnelInformation [1] FTEID,

 associatedQOSFlowList [2] QOSFlowLists

}

QOSFlowTunnelInformationList ::= SEQUENCE OF QOSFlowTunnelInformation

QOSFlowDescription ::= OCTET STRING

QOSFlowLists ::= SEQUENCE OF QOSFlowList

QOSFlowList ::= SEQUENCE

{

 qFI [1] QFI,

 qOSRules [2] QOSRules OPTIONAL,

 eBI [3] EPSBearerID OPTIONAL,

 qOSFlowDescription [4] QOSFlowDescription OPTIONAL,

 qOSFlowProfile [5] QOSFlowProfile OPTIONAL,

 associatedANType [6] AccessType OPTIONAL,

 defaultQOSRuleIndication [7] BOOLEAN OPTIONAL

}

QOSFlowProfile ::= SEQUENCE

{

 fiveQI [1] FiveQI

}

QOSRules ::= OCTET STRING

-- See clauses 5.6.2.6-1 and 5.6.2.9-1 of TS 29.512 [89], clause table 5.6.2.5-1 of TS 29.508 [90] for the details of this structure

PCCRule ::= SEQUENCE

{

 pCCRuleID [1] PCCRuleID OPTIONAL,

 appId [2] UTF8String OPTIONAL,

 flowInfos [3] FlowInformationSet OPTIONAL,

 appReloc [4] BOOLEAN OPTIONAL,

 simConnInd [5] BOOLEAN OPTIONAL,

 simConnTerm [6] INTEGER OPTIONAL,

 maxAllowedUpLat [7] INTEGER OPTIONAL,

 trafficRoutes [8] RouteToLocationSet,

 trafficSteeringPolIdDl [9] UTF8String OPTIONAL,

 trafficSteeringPolIdUl [10] UTF8String OPTIONAL,

 sourceDNAI [11] DNAI OPTIONAL,

 targetDNAI [12] DNAI OPTIONAL,

 dNAIChangeType [13] DNAIChangeType OPTIONAL,

 sourceUEIPAddr [14] IPAddress OPTIONAL,

 targetUEIPAddr [15] IPAddress OPTIONAL,

 sourceTrafficRouting [16] RouteToLocation OPTIONAL,

 targetTrafficRouting [17] RouteToLocation OPTIONAL,

 eASIPReplaceInfos [18] EASIPReplaceInfos OPTIONAL

}

--See clause table 5.6.2.5-1 of TS 29.508 [90] for the details of this structure.

UPPathChange ::= SEQUENCE

{

 sourceDNAI [1] DNAI OPTIONAL,

 targetDNAI [2] DNAI OPTIONAL,

 dNAIChangeType [3] DNAIChangeType OPTIONAL,

 sourceUEIPAddr [4] IPAddress OPTIONAL,

 targetUEIPAddr [5] IPAddress OPTIONAL,

 sourceTrafficRouting [6] RouteToLocation OPTIONAL,

 targetTrafficRouting [7] RouteToLocation OPTIONAL,

 mACAddress [8] MACAddress OPTIONAL

}

-- See table 5.6.2.14-1 of TS 29.512 [89]

PCCRuleID ::= UTF8String

PCCRuleSet ::= SET OF PCCRule

PCCRuleIDSet ::= SET OF PCCRuleID

FlowInformationSet ::= SET OF FlowInformation

RouteToLocationSet ::= SET OF RouteToLocation

-- See table 5.6.2.14 of TS 29.512 [89]

FlowInformation ::= SEQUENCE

{

 flowDescription [1] FlowDescription OPTIONAL,

 ethFlowDescription [2] EthFlowDescription OPTIONAL,

 tosTrafficClass [3] OCTET STRING (SIZE(2)) OPTIONAL,

 spi [4] OCTET STRING (SIZE(4)) OPTIONAL,

 flowLabel [5] OCTET STRING (SIZE(3)) OPTIONAL,

 flowDirection [6] FlowDirection OPTIONAL

}

-- See table 5.6.2.14 of TS 29.512 [89]

FlowDescription ::= SEQUENCE

{

 sourceIPAddress [1] IPAddressOrRangeOrAny,

 destinationIPAddress [2] IPAddressOrRangeOrAny,

 sourcePortNumber [3] PortNumber OPTIONAL,

 destinationPortNumber [4] PortNumber OPTIONAL,

 protocol [5] NextLayerProtocolOrAny

}

IPAddressOrRangeOrAny ::= CHOICE

{

 iPAddress [1] IPAddress,

 ipAddressRange [2] IPMask,

 anyIPAddress [3] AnyIPAddress

}

IPMask ::= SEQUENCE

{

 fromIPAddress [1] IPAddress,

 toIPAddress [2] IPAddress

}

AnyIPAddress ::= ENUMERATED

{

 any(1)

}

NextLayerProtocolOrAny ::= CHOICE

{

 nextLayerProtocol [1] NextLayerProtocol,

 anyNextLayerProtocol [2] AnyNextLayerProtocol

}

AnyNextLayerProtocol ::= ENUMERATED

{

 ip(1)

}

-- See table 5.6.2.17-1 of TS 29.514 [91]

EthFlowDescription ::= SEQUENCE

{

 destMacAddress [1] MACAddress OPTIONAL,

 ethType [2] OCTET STRING (SIZE(2)),

 fDesc [3] FlowDescription OPTIONAL,

 fDir [4] FDir OPTIONAL,

 sourceMacAddress [5] MACAddress OPTIONAL,

 vlanTags [6] SET OF VLANTag,

 srcMacAddrEnd [7] MACAddress OPTIONAL,

 destMacAddrEnd [8] MACAddress OPTIONAL

}

-- See table 5.6.2.17-1 of TS 29.514 [91]

FDir ::= ENUMERATED

{

 downlink(1)

}

-- See table 5.6.2.17-1 of TS 29.514 [91]

VLANTag ::= SEQUENCE

{

 priority [1] BIT STRING (SIZE(3)),

 cFI [2] BIT STRING (SIZE(1)),

 vLANID [3] BIT STRING (SIZE(12))

}

-- See table 5.6.2.14 of TS 29.512 [89]

FlowDirection ::= ENUMERATED

{

 downlinkOnly(1),

 uplinkOnly(2),

 dowlinkAndUplink(3)

}

-- See table 5.4.2.1 of TS 29.571 [17]

DNAIChangeType ::= ENUMERATED

{

 early(1),

 earlyAndLate(2),

 late(3)

}

-- See table 5.6.2.15 of TS 29.571 [17]

RouteToLocation ::= SEQUENCE

{

 dNAI [1] DNAI,

 routeInfo [2] RouteInfo

}

-- See table 5.4.2.1 of TS 29.571 [17]

DNAI ::= UTF8String

-- See table 5.4.4.16 of TS 29.571 [17]

RouteInfo ::= SEQUENCE

{

 iPAddressTunnelEndpoint [1] IPAddress,

 uDPPortNumberTunnelEndpoint [2] PortNumber

}

-- See clause 4.1.4.2 of TS 29.512 [89]

EASIPReplaceInfos ::= SEQUENCE

{

 sourceEASAddress [1] EASServerAddress,

 targetEASAddress [2] EASServerAddress

}

-- See clause 4.1.4.2 of TS 29.512 [89]

EASServerAddress ::= SEQUENCE

{

 iPAddress [1] IPAddress,

 port [2] PortNumber

}

-- ================================

-- PGW-C + SMF PDNConnection Events

-- ================================

EPSPDNConnectionEstablishment ::= SEQUENCE

{

 ePSSubscriberIDs [1] EPSSubscriberIDs,

 iMSIUnauthenticated [2] IMSIUnauthenticatedIndication OPTIONAL,

 defaultBearerID [3] EPSBearerID,

 gTPTunnelInfo [4] GTPTunnelInfo OPTIONAL,

 pDNConnectionType [5] PDNConnectionType,

 uEEndpoints [6] SEQUENCE OF UEEndpointAddress OPTIONAL,

 non3GPPAccessEndpoint [7] UEEndpointAddress OPTIONAL,

 location [8] Location OPTIONAL,

 additionalLocation [9] Location OPTIONAL,

 aPN [10] APN,

 requestType [11] EPSPDNConnectionRequestType OPTIONAL,

 accessType [12] AccessType OPTIONAL,

 rATType [13] RATType OPTIONAL,

 protocolConfigurationOptions [14] PDNProtocolConfigurationOptions OPTIONAL,

 servingNetwork [15] SMFServingNetwork OPTIONAL,

 sMPDUDNRequest [16] SMPDUDNRequest OPTIONAL,

 bearerContextsCreated [17] SEQUENCE OF EPSBearerContextCreated,

 bearerContextsMarkedForRemoval [18] SEQUENCE OF EPSBearerContextForRemoval OPTIONAL,

 indicationFlags [19] PDNConnectionIndicationFlags OPTIONAL,

 handoverIndication [20] PDNHandoverIndication OPTIONAL,

 nBIFOMSupport [21] PDNNBIFOMSupport OPTIONAL,

 fiveGSInterworkingInfo [22] FiveGSInterworkingInfo OPTIONAL,

 cSRMFI [23] CSRMFI OPTIONAL,

 restorationOfPDNConnectionsSupport [24] RestorationOfPDNConnectionsSupport OPTIONAL,

 pGWChangeIndication [25] PGWChangeIndication OPTIONAL,

 pGWRNSI [26] PGWRNSI OPTIONAL

}

EPSPDNConnectionModification ::= SEQUENCE

{

 ePSSubscriberIDs [1] EPSSubscriberIDs,

 iMSIUnauthenticated [2] IMSIUnauthenticatedIndication OPTIONAL,

 defaultBearerID [3] EPSBearerID,

 gTPTunnelInfo [4] GTPTunnelInfo OPTIONAL,

 pDNConnectionType [5] PDNConnectionType,

 uEEndpoints [6] SEQUENCE OF UEEndpointAddress OPTIONAL,

 non3GPPAccessEndpoint [7] UEEndpointAddress OPTIONAL,

 location [8] Location OPTIONAL,

 additionalLocation [9] Location OPTIONAL,

 aPN [10] APN,

 requestType [11] EPSPDNConnectionRequestType OPTIONAL,

 accessType [12] AccessType OPTIONAL,

 rATType [13] RATType OPTIONAL,

 protocolConfigurationOptions [14] PDNProtocolConfigurationOptions OPTIONAL,

 servingNetwork [15] SMFServingNetwork OPTIONAL,

 sMPDUDNRequest [16] SMPDUDNRequest OPTIONAL,

 bearerContextsCreated [17] SEQUENCE OF EPSBearerContextCreated OPTIONAL,

 bearerConcextsModified [18] SEQUENCE OF EPSBearerContextModified,

 bearerContextsMarkedForRemoval [19] SEQUENCE OF EPSBearerContextForRemoval OPTIONAL,

 bearersDeleted [20] SEQUENCE OF EPSBearersDeleted OPTIONAL,

 indicationFlags [21] PDNConnectionIndicationFlags OPTIONAL,

 handoverIndication [22] PDNHandoverIndication OPTIONAL,

 nBIFOMSupport [23] PDNNBIFOMSupport OPTIONAL,

 fiveGSInterworkingInfo [24] FiveGSInterworkingInfo OPTIONAL,

 cSRMFI [25] CSRMFI OPTIONAL,

 restorationOfPDNConnectionsSupport [26] RestorationOfPDNConnectionsSupport OPTIONAL,

 pGWChangeIndication [27] PGWChangeIndication OPTIONAL,

 pGWRNSI [28] PGWRNSI OPTIONAL

}

EPSPDNConnectionRelease ::= SEQUENCE

{

 ePSSubscriberIDs [1] EPSSubscriberIDs,

 iMSIUnauthenticated [2] IMSIUnauthenticatedIndication OPTIONAL,

 defaultBearerID [3] EPSBearerID,

 location [4] Location OPTIONAL,

 gTPTunnelInfo [5] GTPTunnelInfo OPTIONAL,

 rANNASCause [6] EPSRANNASCause OPTIONAL,

 pDNConnectionType [7] PDNConnectionType,

 indicationFlags [8] PDNConnectionIndicationFlags OPTIONAL,

 scopeIndication [9] EPSPDNConnectionReleaseScopeIndication OPTIONAL,

 bearersDeleted [10] SEQUENCE OF EPSBearersDeleted OPTIONAL

}

EPSStartOfInterceptionWithEstablishedPDNConnection ::= SEQUENCE

{

 ePSSubscriberIDs [1] EPSSubscriberIDs,

 iMSIUnauthenticated [2] IMSIUnauthenticatedIndication OPTIONAL,

 defaultBearerID [3] EPSBearerID,

 gTPTunnelInfo [4] GTPTunnelInfo OPTIONAL,

 pDNConnectionType [5] PDNConnectionType,

 uEEndpoints [6] SEQUENCE OF UEEndpointAddress OPTIONAL,

 non3GPPAccessEndpoint [7] UEEndpointAddress OPTIONAL,

 location [8] Location OPTIONAL,

 additionalLocation [9] Location OPTIONAL,

 aPN [10] APN,

 requestType [11] EPSPDNConnectionRequestType OPTIONAL,

 accessType [12] AccessType OPTIONAL,

 rATType [13] RATType OPTIONAL,

 protocolConfigurationOptions [14] PDNProtocolConfigurationOptions OPTIONAL,

 servingNetwork [15] SMFServingNetwork OPTIONAL,

 sMPDUDNRequest [16] SMPDUDNRequest OPTIONAL,

 bearerContexts [17] SEQUENCE OF EPSBearerContext

}

PFDDataForApps ::= SET OF PFDDataForApp

PFDDataForApp ::= SEQUENCE

{

 aPPId [1] UTF8String,

 pFDs [2] PFDs

}

PFDs ::= SET OF PFD

-- See table 5.6.2.5-1 of TS 29.551 [94]

PFD ::= SEQUENCE

{

 pFDId [1] UTF8String,

 pFDFlowDescriptions [2] PFDFlowDescriptions,

 urls [3] PFDURLs,

 domainNames [4] DomainNames,

 dnProtocol [5] DnProtocol

}

PFDURLs ::= SET OF UTF8String

PFDFlowDescriptions ::= SET OF PFDFlowDescription

DomainNames ::= SET OF UTF8String

PFDFlowDescription ::= SEQUENCE

{

 nextLayerProtocol [1] NextLayerProtocol,

 serverIPAddress [2] IPAddress,

 serverPortNumber [3] PortNumber

}

-- See table 5.14.2.2.4-1 of TS 29.122 [63]

DnProtocol ::= ENUMERATED

{

 dnsQname(1),

 tlsSni(2),

 tlsSan(3),

 tlsScn(4)

}

-- ======================

-- PGW-C + SMF Parameters

-- ======================

CSRMFI ::= BOOLEAN

EPS5GSComboInfo ::= SEQUENCE

{

 ePSInterworkingIndication [1] EPSInterworkingIndication,

 ePSSubscriberIDs [2] EPSSubscriberIDs,

 ePSPDNCnxInfo [3] EPSPDNCnxInfo OPTIONAL,

 ePSBearerInfo [4] EPSBearerInfo OPTIONAL

}

EPSInterworkingIndication ::= ENUMERATED

{

 none(1),

 withN26(2),

 withoutN26(3),

 iwkNon3GPP(4)

}

EPSSubscriberIDs ::= SEQUENCE

{

 iMSI [1] IMSI OPTIONAL,

 mSISDN [2] MSISDN OPTIONAL,

 iMEI [3] IMEI OPTIONAL

}

EPSPDNCnxInfo ::= SEQUENCE

{

 pGWS8ControlPlaneFTEID [1] FTEID,

 linkedBearerID [2] EPSBearerID OPTIONAL

}

EPSBearerInfo ::= SEQUENCE OF EPSBearers

EPSBearers ::= SEQUENCE

{

 ePSBearerID [1] EPSBearerID,

 pGWS8UserPlaneFTEID [2] FTEID,

 qCI [3] QCI

}

EPSBearerContext ::= SEQUENCE

{

 ePSBearerID [1] EPSBearerID,

 uPGTPTunnelInfo [2] GTPTunnelInfo,

 bearerQOS [3] EPSBearerQOS

}

EPSBearerContextCreated ::= SEQUENCE

{

 ePSBearerID [1] EPSBearerID,

 cause [2] EPSBearerCreationCauseValue,

 gTPTunnelInfo [3] GTPTunnelInfo OPTIONAL,

 bearerQOS [4] EPSBearerQOS OPTIONAL,

 protocolConfigurationOptions [5] PDNProtocolConfigurationOptions OPTIONAL

}

EPSBearerContextModified ::= SEQUENCE

{

 ePSBearerID [1] EPSBearerID,

 cause [2] EPSBearerModificationCauseValue,

 gTPTunnelInfo [3] GTPTunnelInfo OPTIONAL,

 bearerQOS [4] EPSBearerQOS OPTIONAL,

 protocolConfigurationOptions [5] PDNProtocolConfigurationOptions OPTIONAL

}

EPSBearersDeleted ::= SEQUENCE

{

 linkedEPSBearerID [1] EPSBearerID OPTIONAL,

 ePSBearerIDs [2] SEQUENCE OF EPSBearerID OPTIONAL,

 protocolConfigurationOptions [3] PDNProtocolConfigurationOptions OPTIONAL,

 cause [4] EPSBearerDeletionCauseValue OPTIONAL,

 deleteBearerResponse [5] EPSDeleteBearerResponse

}

EPSDeleteBearerResponse ::= SEQUENCE

{

 cause [1] EPSBearerDeletionCauseValue,

 linkedEPSBearerID [2] EPSBearerID OPTIONAL,

 bearerContexts [3] SEQUENCE OF EPSDeleteBearerContext OPTIONAL,

 protocolConfigurationOptions [4] PDNProtocolConfigurationOptions OPTIONAL

}

EPSDeleteBearerContext ::= SEQUENCE

{

 cause [1] EPSBearerDeletionCauseValue,

 ePSBearerID [2] EPSBearerID,

 protocolConfigurationOptions [3] PDNProtocolConfigurationOptions OPTIONAL,

 rANNASCause [4] EPSRANNASCause OPTIONAL

}

EPSBearerContextForRemoval ::= SEQUENCE

{

 ePSBearerID [1] EPSBearerID,

 cause [2] EPSBearerRemovalCauseValue

}

EPSBearerCreationCauseValue ::= INTEGER (0..255)

EPSBearerDeletionCauseValue ::= INTEGER (0..255)

EPSBearerModificationCauseValue ::= INTEGER (0..255)

EPSBearerRemovalCauseValue ::= INTEGER (0..255)

EPSBearerQOS ::= SEQUENCE

{

 qCI [1] QCI OPTIONAL,

 maximumUplinkBitRate [2] BitrateBinKBPS OPTIONAL,

 maximumDownlinkBitRate [3] BitrateBinKBPS OPTIONAL,

 guaranteedUplinkBitRate [4] BitrateBinKBPS OPTIONAL,

 guaranteedDownlinkBitRate [5] BitrateBinKBPS OPTIONAL,

 priorityLevel [6] EPSQOSPriority OPTIONAL

}

EPSRANNASCause ::= OCTET STRING

EPSQOSPriority ::= INTEGER (1..15)

BitrateBinKBPS ::= OCTET STRING

EPSGTPTunnels ::= SEQUENCE

{

 controlPlaneSenderFTEID [1] FTEID OPTIONAL,

 controlPlanePGWS5S8FTEID [2] FTEID OPTIONAL,

 s1UeNodeBFTEID [3] FTEID OPTIONAL,

 s5S8SGWFTEID [4] FTEID OPTIONAL,

 s5S8PGWFTEID [5] FTEID OPTIONAL,

 s2bUePDGFTEID [6] FTEID OPTIONAL,

 s2aUePDGFTEID [7] FTEID OPTIONAL

}

EPSPDNConnectionRequestType ::= ENUMERATED

{

 initialRequest(1),

 handover(2),

 rLOS(3),

 emergency(4),

 handoverOfEmergencyBearerServices(5),

 reserved(6)

}

EPSPDNConnectionReleaseScopeIndication ::= BOOLEAN

FiveGSInterworkingInfo ::= SEQUENCE

{

 fiveGSInterworkingIndicator [1] FiveGSInterworkingIndicator,

 fiveGSInterworkingWithoutN26 [2] FiveGSInterworkingWithoutN26,

 fiveGCNotRestrictedSupport [3] FiveGCNotRestrictedSupport

}

FiveGSInterworkingIndicator ::= BOOLEAN

FiveGSInterworkingWithoutN26 ::= BOOLEAN

FiveGCNotRestrictedSupport ::= BOOLEAN

PDNConnectionIndicationFlags ::= OCTET STRING

PDNHandoverIndication ::= BOOLEAN

PDNNBIFOMSupport ::= BOOLEAN

PDNProtocolConfigurationOptions ::= SEQUENCE

{

 requestPCO [1] PDNPCO OPTIONAL,

 requestAPCO [2] PDNPCO OPTIONAL,

 requestEPCO [3] PDNPCO OPTIONAL,

 responsePCO [4] PDNPCO OPTIONAL,

 responseAPCO [5] PDNPCO OPTIONAL,

 responseEPCO [6] PDNPCO OPTIONAL

}

PDNPCO ::= OCTET STRING

PGWChangeIndication ::= BOOLEAN

PGWRNSI ::= BOOLEAN

QCI ::= INTEGER (0..255)

GTPTunnelInfo ::= SEQUENCE

{

 fiveGSGTPTunnels [1] FiveGSGTPTunnels OPTIONAL,

 ePSGTPTunnels [2] EPSGTPTunnels OPTIONAL

}

RestorationOfPDNConnectionsSupport ::= BOOLEAN

-- ==================

-- 5G UPF definitions

-- ==================

UPFCCPDU ::= OCTET STRING

-- See clause 6.2.3.8 for the details of this structure

ExtendedUPFCCPDU ::= SEQUENCE

{

 payload [1] UPFCCPDUPayload,

 qFI [2] QFI OPTIONAL

}

-- =================

-- 5G UPF parameters

-- =================

UPFCCPDUPayload ::= CHOICE

{

 uPFIPCC [1] OCTET STRING,

 uPFEthernetCC [2] OCTET STRING,

 uPFUnstructuredCC [3] OCTET STRING

}

QFI ::= INTEGER (0..63)

-- ==================

-- 5G UDM definitions

-- ==================

UDMServingSystemMessage ::= SEQUENCE

{

 sUPI [1] SUPI,

 pEI [2] PEI OPTIONAL,

 gPSI [3] GPSI OPTIONAL,

 gUAMI [4] GUAMI OPTIONAL,

 gUMMEI [5] GUMMEI OPTIONAL,

 pLMNID [6] PLMNID OPTIONAL,

 servingSystemMethod [7] UDMServingSystemMethod,

 serviceID [8] ServiceID OPTIONAL,

 roamingIndicator [9] RoamingIndicator OPTIONAL

}

UDMSubscriberRecordChangeMessage ::= SEQUENCE

{

 sUPI [1] SUPI OPTIONAL,

 pEI [2] PEI OPTIONAL,

 gPSI [3] GPSI OPTIONAL,

 oldPEI [4] PEI OPTIONAL,

 oldSUPI [5] SUPI OPTIONAL,

 oldGPSI [6] GPSI OPTIONAL,

 oldserviceID [7] ServiceID OPTIONAL,

 subscriberRecordChangeMethod [8] UDMSubscriberRecordChangeMethod,

 serviceID [9] ServiceID OPTIONAL

}

UDMCancelLocationMessage ::= SEQUENCE

{

 sUPI [1] SUPI,

 pEI [2] PEI OPTIONAL,

 gPSI [3] GPSI OPTIONAL,

 gUAMI [4] GUAMI OPTIONAL,

 pLMNID [5] PLMNID OPTIONAL,

 cancelLocationMethod [6] UDMCancelLocationMethod

}

UDMLocationInformationResult ::= SEQUENCE

{

 sUPI [1] SUPI,

 pEI [2] PEI OPTIONAL,

 gPSI [3] GPSI OPTIONAL,

 locationInfoRequest [4] UDMLocationInfoRequest,

 vPLMNID [5] PLMNID OPTIONAL,

 currentLocationIndicator [6] BOOLEAN OPTIONAL,

 aMFInstanceID [7] NFID OPTIONAL,

 sMSFInstanceID [8] NFID OPTIONAL,

 location [9] Location OPTIONAL,

 rATType [10] RATType OPTIONAL,

 problemDetails [11] UDMProblemDetails OPTIONAL

}

UDMUEInformationResponse ::= SEQUENCE

{

 sUPI [1] SUPI,

 tADSInfo [2] UEContextInfo OPTIONAL,

 fiveGSUserStateInfo [3] FiveGSUserStateInfo OPTIONAL,

 fiveGSRVCCInfo [4] FiveGSRVCCInfo OPTIONAL,

 problemDetails [5] UDMProblemDetails OPTIONAL

}

UDMUEAuthenticationResponse ::= SEQUENCE

{

 sUPI [1] SUPI,

 authenticationInfoRequest [2] UDMAuthenticationInfoRequest,

 aKMAIndicator [3] BOOLEAN OPTIONAL,

 problemDetails [4] UDMProblemDetails OPTIONAL

}

-- =================

-- 5G UDM parameters

-- =================

UDMServingSystemMethod ::= ENUMERATED

{

 amf3GPPAccessRegistration(0),

 amfNon3GPPAccessRegistration(1),

 unknown(2)

}

UDMSubscriberRecordChangeMethod ::= ENUMERATED

{

 pEIChange(1),

 sUPIChange(2),

 gPSIChange(3),

 uEDeprovisioning(4),

 unknown(5),

 serviceIDChange(6)

}

UDMCancelLocationMethod ::= ENUMERATED

{

 aMF3GPPAccessDeregistration(1),

 aMFNon3GPPAccessDeregistration(2),

 uDMDeregistration(3),

 unknown(4)

}

ServiceID ::= SEQUENCE

{

 nSSAI [1] NSSAI OPTIONAL,

 cAGID [2] SEQUENCE OF CAGID OPTIONAL

}

CAGID ::= UTF8String

UDMAuthenticationInfoRequest ::= SEQUENCE

{

 infoRequestType [1] UDMInfoRequestType,

 rGAuthCtx [2] SEQUENCE SIZE(1..MAX) OF SubscriberIdentifier,

 authType [3] PrimaryAuthenticationType,

 servingNetworkName [4] PLMNID,

 aUSFInstanceID [5] NFID OPTIONAL,

 cellCAGInfo [6] CAGID OPTIONAL,

 n5GCIndicator [7] BOOLEAN OPTIONAL

}

UDMLocationInfoRequest ::= SEQUENCE

{

 requested5GSLocation [1] BOOLEAN OPTIONAL,

 requestedCurrentLocation [2] BOOLEAN OPTIONAL,

 requestedRATType [3] BOOLEAN OPTIONAL,

 requestedTimeZone [4] BOOLEAN OPTIONAL,

 requestedServingNode [5] BOOLEAN OPTIONAL

}

UDMProblemDetails ::= SEQUENCE

{

 cause [1] UDMProblemDetailsCause OPTIONAL

}

UDMProblemDetailsCause ::= CHOICE

{

 uDMDefinedCause [1] UDMDefinedCause,

 otherCause [2] UDMProblemDetailsOtherCause

}

UDMDefinedCause ::= ENUMERATED

{

 userNotFound(1),

 dataNotFound(2),

 contextNotFound(3),

 subscriptionNotFound(4),

 other(5)

}

UDMInfoRequestType ::= ENUMERATED

{

 hSS(1),

 aUSF(2),

 other(3)

}

UDMProblemDetailsOtherCause ::= SEQUENCE

{

 problemDetailsType [1] UTF8String OPTIONAL,

 title [2] UTF8String OPTIONAL,

 status [3] INTEGER OPTIONAL,

 detail [4] UTF8String OPTIONAL,

 instance [5] UTF8String OPTIONAL,

 cause [6] UTF8String OPTIONAL,

 uDMInvalidParameters [7] UDMInvalidParameters,

 uDMSupportedFeatures [8] UTF8String

}

UDMInvalidParameters ::= SEQUENCE

{

 parameter [1] UTF8String OPTIONAL,

 reason [2] UTF8String OPTIONAL

}

RoamingIndicator ::= BOOLEAN

-- ===================

-- 5G SMSF definitions

-- ===================

-- See clause 6.2.5.3 for details of this structure

SMSMessage ::= SEQUENCE

{

 originatingSMSParty [1] SMSParty,

 terminatingSMSParty [2] SMSParty,

 direction [3] Direction,

 linkTransferStatus [4] SMSTransferStatus,

 otherMessage [5] SMSOtherMessageIndication OPTIONAL,

 location [6] Location OPTIONAL,

 peerNFAddress [7] SMSNFAddress OPTIONAL,

 peerNFType [8] SMSNFType OPTIONAL,

 sMSTPDUData [9] SMSTPDUData OPTIONAL,

 messageType [10] SMSMessageType OPTIONAL,

 rPMessageReference [11] SMSRPMessageReference OPTIONAL

}

SMSReport ::= SEQUENCE

{

 location [1] Location OPTIONAL,

 sMSTPDUData [2] SMSTPDUData,

 messageType [3] SMSMessageType,

 rPMessageReference [4] SMSRPMessageReference

}

-- ==================

-- 5G SMSF parameters

-- ==================

SMSAddress ::= OCTET STRING(SIZE(2..12))

SMSMessageType ::= ENUMERATED

{

 deliver(1),

 deliverReportAck(2),

 deliverReportError(3),

 statusReport(4),

 command(5),

 submit(6),

 submitReportAck(7),

 submitReportError(8),

 reserved(9)

}

SMSParty ::= SEQUENCE

{

 sUPI [1] SUPI OPTIONAL,

 pEI [2] PEI OPTIONAL,

 gPSI [3] GPSI OPTIONAL,

 sMSAddress [4] SMSAddress OPTIONAL

}

SMSTransferStatus ::= ENUMERATED

{

 transferSucceeded(1),

 transferFailed(2),

 undefined(3)

}

SMSOtherMessageIndication ::= BOOLEAN

SMSNFAddress ::= CHOICE

{

 iPAddress [1] IPAddress,

 e164Number [2] E164Number

}

SMSNFType ::= ENUMERATED

{

 sMSGMSC(1),

 iWMSC(2),

 sMSRouter(3)

}

SMSRPMessageReference ::= INTEGER (0..255)

SMSTPDUData ::= CHOICE

{

 sMSTPDU [1] SMSTPDU,

 truncatedSMSTPDU [2] TruncatedSMSTPDU

}

SMSTPDU ::= OCTET STRING (SIZE(1..270))

TruncatedSMSTPDU ::= OCTET STRING (SIZE(1..130))

-- ===============

-- MMS definitions

-- ===============

MMSSend ::= SEQUENCE

{

 transactionID [1] UTF8String,

 version [2] MMSVersion,

 dateTime [3] Timestamp,

 originatingMMSParty [4] MMSParty,

 terminatingMMSParty [5] SEQUENCE OF MMSParty OPTIONAL,

 cCRecipients [6] SEQUENCE OF MMSParty OPTIONAL,

 bCCRecipients [7] SEQUENCE OF MMSParty OPTIONAL,

 direction [8] MMSDirection,

 subject [9] MMSSubject OPTIONAL,

 messageClass [10] MMSMessageClass OPTIONAL,

 expiry [11] MMSExpiry,

 desiredDeliveryTime [12] Timestamp OPTIONAL,

 priority [13] MMSPriority OPTIONAL,

 senderVisibility [14] BOOLEAN OPTIONAL,

 deliveryReport [15] BOOLEAN OPTIONAL,

 readReport [16] BOOLEAN OPTIONAL,

 store [17] BOOLEAN OPTIONAL,

 state [18] MMState OPTIONAL,

 flags [19] MMFlags OPTIONAL,

 replyCharging [20] MMSReplyCharging OPTIONAL,

 applicID [21] UTF8String OPTIONAL,

 replyApplicID [22] UTF8String OPTIONAL,

 auxApplicInfo [23] UTF8String OPTIONAL,

 contentClass [24] MMSContentClass OPTIONAL,

 dRMContent [25] BOOLEAN OPTIONAL,

 adaptationAllowed [26] MMSAdaptation OPTIONAL,

 contentType [27] MMSContentType,

 responseStatus [28] MMSResponseStatus,

 responseStatusText [29] UTF8String OPTIONAL,

 messageID [30] UTF8String

}

MMSSendByNonLocalTarget ::= SEQUENCE

{

 version [1] MMSVersion,

 transactionID [2] UTF8String,

 messageID [3] UTF8String,

 terminatingMMSParty [4] SEQUENCE OF MMSParty,

 originatingMMSParty [5] MMSParty,

 direction [6] MMSDirection,

 contentType [7] MMSContentType,

 messageClass [8] MMSMessageClass OPTIONAL,

 dateTime [9] Timestamp,

 expiry [10] MMSExpiry OPTIONAL,

 deliveryReport [11] BOOLEAN OPTIONAL,

 priority [12] MMSPriority OPTIONAL,

 senderVisibility [13] BOOLEAN OPTIONAL,

 readReport [14] BOOLEAN OPTIONAL,

 subject [15] MMSSubject OPTIONAL,

 forwardCount [16] INTEGER OPTIONAL,

 previouslySentBy [17] MMSPreviouslySentBy OPTIONAL,

 prevSentByDateTime [18] Timestamp OPTIONAL,

 applicID [19] UTF8String OPTIONAL,

 replyApplicID [20] UTF8String OPTIONAL,

 auxApplicInfo [21] UTF8String OPTIONAL,

 contentClass [22] MMSContentClass OPTIONAL,

 dRMContent [23] BOOLEAN OPTIONAL,

 adaptationAllowed [24] MMSAdaptation OPTIONAL

}

MMSNotification ::= SEQUENCE

{

 transactionID [1] UTF8String,

 version [2] MMSVersion,

 originatingMMSParty [3] MMSParty OPTIONAL,

 direction [4] MMSDirection,

 subject [5] MMSSubject OPTIONAL,

 deliveryReportRequested [6] BOOLEAN OPTIONAL,

 stored [7] BOOLEAN OPTIONAL,

 messageClass [8] MMSMessageClass,

 priority [9] MMSPriority OPTIONAL,

 messageSize [10] INTEGER,

 expiry [11] MMSExpiry,

 replyCharging [12] MMSReplyCharging OPTIONAL

}

MMSSendToNonLocalTarget ::= SEQUENCE

{

 version [1] MMSVersion,

 transactionID [2] UTF8String,

 messageID [3] UTF8String,

 terminatingMMSParty [4] SEQUENCE OF MMSParty,

 originatingMMSParty [5] MMSParty,

 direction [6] MMSDirection,

 contentType [7] MMSContentType,

 messageClass [8] MMSMessageClass OPTIONAL,

 dateTime [9] Timestamp,

 expiry [10] MMSExpiry OPTIONAL,

 deliveryReport [11] BOOLEAN OPTIONAL,

 priority [12] MMSPriority OPTIONAL,

 senderVisibility [13] BOOLEAN OPTIONAL,

 readReport [14] BOOLEAN OPTIONAL,

 subject [15] MMSSubject OPTIONAL,

 forwardCount [16] INTEGER OPTIONAL,

 previouslySentBy [17] MMSPreviouslySentBy OPTIONAL,

 prevSentByDateTime [18] Timestamp OPTIONAL,

 applicID [19] UTF8String OPTIONAL,

 replyApplicID [20] UTF8String OPTIONAL,

 auxApplicInfo [21] UTF8String OPTIONAL,

 contentClass [22] MMSContentClass OPTIONAL,

 dRMContent [23] BOOLEAN OPTIONAL,

 adaptationAllowed [24] MMSAdaptation OPTIONAL

}

MMSNotificationResponse ::= SEQUENCE

{

 transactionID [1] UTF8String,

 version [2] MMSVersion,

 direction [3] MMSDirection,

 status [4] MMStatus,

 reportAllowed [5] BOOLEAN OPTIONAL

}

MMSRetrieval ::= SEQUENCE

{

 transactionID [1] UTF8String,

 version [2] MMSVersion,

 messageID [3] UTF8String,

 dateTime [4] Timestamp,

 originatingMMSParty [5] MMSParty OPTIONAL,

 previouslySentBy [6] MMSPreviouslySentBy OPTIONAL,

 prevSentByDateTime [7] Timestamp OPTIONAL,

 terminatingMMSParty [8] SEQUENCE OF MMSParty OPTIONAL,

 cCRecipients [9] SEQUENCE OF MMSParty OPTIONAL,

 direction [10] MMSDirection,

 subject [11] MMSSubject OPTIONAL,

 state [12] MMState OPTIONAL,

 flags [13] MMFlags OPTIONAL,

 messageClass [14] MMSMessageClass OPTIONAL,

 priority [15] MMSPriority,

 deliveryReport [16] BOOLEAN OPTIONAL,

 readReport [17] BOOLEAN OPTIONAL,

 replyCharging [18] MMSReplyCharging OPTIONAL,

 retrieveStatus [19] MMSRetrieveStatus OPTIONAL,

 retrieveStatusText [20] UTF8String OPTIONAL,

 applicID [21] UTF8String OPTIONAL,

 replyApplicID [22] UTF8String OPTIONAL,

 auxApplicInfo [23] UTF8String OPTIONAL,

 contentClass [24] MMSContentClass OPTIONAL,

 dRMContent [25] BOOLEAN OPTIONAL,

 replaceID [26] UTF8String OPTIONAL,

 contentType [27] UTF8String OPTIONAL

}

MMSDeliveryAck ::= SEQUENCE

{

 transactionID [1] UTF8String,

 version [2] MMSVersion,

 reportAllowed [3] BOOLEAN OPTIONAL,

 status [4] MMStatus,

 direction [5] MMSDirection

}

MMSForward ::= SEQUENCE

{

 transactionID [1] UTF8String,

 version [2] MMSVersion,

 dateTime [3] Timestamp OPTIONAL,

 originatingMMSParty [4] MMSParty,

 terminatingMMSParty [5] SEQUENCE OF MMSParty OPTIONAL,

 cCRecipients [6] SEQUENCE OF MMSParty OPTIONAL,

 bCCRecipients [7] SEQUENCE OF MMSParty OPTIONAL,

 direction [8] MMSDirection,

 expiry [9] MMSExpiry OPTIONAL,

 desiredDeliveryTime [10] Timestamp OPTIONAL,

 deliveryReportAllowed [11] BOOLEAN OPTIONAL,

 deliveryReport [12] BOOLEAN OPTIONAL,

 store [13] BOOLEAN OPTIONAL,

 state [14] MMState OPTIONAL,

 flags [15] MMFlags OPTIONAL,

 contentLocationReq [16] UTF8String,

 replyCharging [17] MMSReplyCharging OPTIONAL,

 responseStatus [18] MMSResponseStatus,

 responseStatusText [19] UTF8String OPTIONAL,

 messageID [20] UTF8String OPTIONAL,

 contentLocationConf [21] UTF8String OPTIONAL,

 storeStatus [22] MMSStoreStatus OPTIONAL,

 storeStatusText [23] UTF8String OPTIONAL

}

MMSDeleteFromRelay ::= SEQUENCE

{

 transactionID [1] UTF8String,

 version [2] MMSVersion,

 direction [3] MMSDirection,

 contentLocationReq [4] SEQUENCE OF UTF8String,

 contentLocationConf [5] SEQUENCE OF UTF8String,

 deleteResponseStatus [6] MMSDeleteResponseStatus,

 deleteResponseText [7] SEQUENCE OF UTF8String

}

MMSMBoxStore ::= SEQUENCE

{

 transactionID [1] UTF8String,

 version [2] MMSVersion,

 direction [3] MMSDirection,

 contentLocationReq [4] UTF8String,

 state [5] MMState OPTIONAL,

 flags [6] MMFlags OPTIONAL,

 contentLocationConf [7] UTF8String OPTIONAL,

 storeStatus [8] MMSStoreStatus,

 storeStatusText [9] UTF8String OPTIONAL

}

MMSMBoxUpload ::= SEQUENCE

{

 transactionID [1] UTF8String,

 version [2] MMSVersion,

 direction [3] MMSDirection,

 state [4] MMState OPTIONAL,

 flags [5] MMFlags OPTIONAL,

 contentType [6] UTF8String,

 contentLocation [7] UTF8String OPTIONAL,

 storeStatus [8] MMSStoreStatus,

 storeStatusText [9] UTF8String OPTIONAL,

 mMessages [10] SEQUENCE OF MMBoxDescription

}

MMSMBoxDelete ::= SEQUENCE

{

 transactionID [1] UTF8String,

 version [2] MMSVersion,

 direction [3] MMSDirection,

 contentLocationReq [4] SEQUENCE OF UTF8String,

 contentLocationConf [5] SEQUENCE OF UTF8String OPTIONAL,

 responseStatus [6] MMSDeleteResponseStatus,

 responseStatusText [7] UTF8String OPTIONAL

}

MMSDeliveryReport ::= SEQUENCE

{

 version [1] MMSVersion,

 messageID [2] UTF8String,

 terminatingMMSParty [3] SEQUENCE OF MMSParty,

 mMSDateTime [4] Timestamp,

 responseStatus [5] MMSResponseStatus,

 responseStatusText [6] UTF8String OPTIONAL,

 applicID [7] UTF8String OPTIONAL,

 replyApplicID [8] UTF8String OPTIONAL,

 auxApplicInfo [9] UTF8String OPTIONAL

}

MMSDeliveryReportNonLocalTarget ::= SEQUENCE

{

 version [1] MMSVersion,

 transactionID [2] UTF8String,

 messageID [3] UTF8String,

 terminatingMMSParty [4] SEQUENCE OF MMSParty,

 originatingMMSParty [5] MMSParty,

 direction [6] MMSDirection,

 mMSDateTime [7] Timestamp,

 forwardToOriginator [8] BOOLEAN OPTIONAL,

 status [9] MMStatus,

 statusExtension [10] MMStatusExtension,

 statusText [11] MMStatusText,

 applicID [12] UTF8String OPTIONAL,

 replyApplicID [13] UTF8String OPTIONAL,

 auxApplicInfo [14] UTF8String OPTIONAL

}

MMSReadReport ::= SEQUENCE

{

 version [1] MMSVersion,

 messageID [2] UTF8String,

 terminatingMMSParty [3] SEQUENCE OF MMSParty,

 originatingMMSParty [4] SEQUENCE OF MMSParty,

 direction [5] MMSDirection,

 mMSDateTime [6] Timestamp,

 readStatus [7] MMSReadStatus,

 applicID [8] UTF8String OPTIONAL,

 replyApplicID [9] UTF8String OPTIONAL,

 auxApplicInfo [10] UTF8String OPTIONAL

}

MMSReadReportNonLocalTarget ::= SEQUENCE

{

 version [1] MMSVersion,

 transactionID [2] UTF8String,

 terminatingMMSParty [3] SEQUENCE OF MMSParty,

 originatingMMSParty [4] SEQUENCE OF MMSParty,

 direction [5] MMSDirection,

 messageID [6] UTF8String,

 mMSDateTime [7] Timestamp,

 readStatus [8] MMSReadStatus,

 readStatusText [9] MMSReadStatusText OPTIONAL,

 applicID [10] UTF8String OPTIONAL,

 replyApplicID [11] UTF8String OPTIONAL,

 auxApplicInfo [12] UTF8String OPTIONAL

}

MMSCancel ::= SEQUENCE

{

 transactionID [1] UTF8String,

 version [2] MMSVersion,

 cancelID [3] UTF8String,

 direction [4] MMSDirection

}

MMSMBoxViewRequest ::= SEQUENCE

{

 transactionID [1] UTF8String,

 version [2] MMSVersion,

 contentLocation [3] UTF8String OPTIONAL,

 state [4] SEQUENCE OF MMState OPTIONAL,

 flags [5] SEQUENCE OF MMFlags OPTIONAL,

 start [6] INTEGER OPTIONAL,

 limit [7] INTEGER OPTIONAL,

 attributes [8] SEQUENCE OF UTF8String OPTIONAL,

 totals [9] INTEGER OPTIONAL,

 quotas [10] MMSQuota OPTIONAL

}

MMSMBoxViewResponse ::= SEQUENCE

{

 transactionID [1] UTF8String,

 version [2] MMSVersion,

 contentLocation [3] UTF8String OPTIONAL,

 state [4] SEQUENCE OF MMState OPTIONAL,

 flags [5] SEQUENCE OF MMFlags OPTIONAL,

 start [6] INTEGER OPTIONAL,

 limit [7] INTEGER OPTIONAL,

 attributes [8] SEQUENCE OF UTF8String OPTIONAL,

 mMSTotals [9] BOOLEAN OPTIONAL,

 mMSQuotas [10] BOOLEAN OPTIONAL,

 mMessages [11] SEQUENCE OF MMBoxDescription

}

MMBoxDescription ::= SEQUENCE

{

 contentLocation [1] UTF8String OPTIONAL,

 messageID [2] UTF8String OPTIONAL,

 state [3] MMState OPTIONAL,

 flags [4] SEQUENCE OF MMFlags OPTIONAL,

 dateTime [5] Timestamp OPTIONAL,

 originatingMMSParty [6] MMSParty OPTIONAL,

 terminatingMMSParty [7] SEQUENCE OF MMSParty OPTIONAL,

 cCRecipients [8] SEQUENCE OF MMSParty OPTIONAL,

 bCCRecipients [9] SEQUENCE OF MMSParty OPTIONAL,

 messageClass [10] MMSMessageClass OPTIONAL,

 subject [11] MMSSubject OPTIONAL,

 priority [12] MMSPriority OPTIONAL,

 deliveryTime [13] Timestamp OPTIONAL,

 readReport [14] BOOLEAN OPTIONAL,

 messageSize [15] INTEGER OPTIONAL,

 replyCharging [16] MMSReplyCharging OPTIONAL,

 previouslySentBy [17] MMSPreviouslySentBy OPTIONAL,

 previouslySentByDateTime [18] Timestamp OPTIONAL,

 contentType [19] UTF8String OPTIONAL

}

-- =========

-- MMS CCPDU

-- =========

MMSCCPDU ::= SEQUENCE

{

 version [1] MMSVersion,

 transactionID [2] UTF8String,

 mMSContent [3] OCTET STRING

}

-- ==============

-- MMS parameters

-- ==============

MMSAdaptation ::= SEQUENCE

{

 allowed [1] BOOLEAN,

 overriden [2] BOOLEAN

}

MMSCancelStatus ::= ENUMERATED

{

 cancelRequestSuccessfullyReceived(1),

 cancelRequestCorrupted(2)

}

MMSContentClass ::= ENUMERATED

{

 text(1),

 imageBasic(2),

 imageRich(3),

 videoBasic(4),

 videoRich(5),

 megaPixel(6),

 contentBasic(7),

 contentRich(8)

}

MMSContentType ::= UTF8String

MMSDeleteResponseStatus ::= ENUMERATED

{

 ok(1),

 errorUnspecified(2),

 errorServiceDenied(3),

 errorMessageFormatCorrupt(4),

 errorSendingAddressUnresolved(5),

 errorMessageNotFound(6),

 errorNetworkProblem(7),

 errorContentNotAccepted(8),

 errorUnsupportedMessage(9),

 errorTransientFailure(10),

 errorTransientSendingAddressUnresolved(11),

 errorTransientMessageNotFound(12),

 errorTransientNetworkProblem(13),

 errorTransientPartialSuccess(14),

 errorPermanentFailure(15),

 errorPermanentServiceDenied(16),

 errorPermanentMessageFormatCorrupt(17),

 errorPermanentSendingAddressUnresolved(18),

 errorPermanentMessageNotFound(19),

 errorPermanentContentNotAccepted(20),

 errorPermanentReplyChargingLimitationsNotMet(21),

 errorPermanentReplyChargingRequestNotAccepted(22),

 errorPermanentReplyChargingForwardingDenied(23),

 errorPermanentReplyChargingNotSupported(24),

 errorPermanentAddressHidingNotSupported(25),

 errorPermanentLackOfPrepaid(26)

}

MMSDirection ::= ENUMERATED

{

 fromTarget(0),

 toTarget(1)

}

MMSElementDescriptor ::= SEQUENCE

{

 reference [1] UTF8String,

 parameter [2] UTF8String OPTIONAL,

 value [3] UTF8String OPTIONAL

}

MMSExpiry ::= SEQUENCE

{

 expiryPeriod [1] INTEGER,

 periodFormat [2] MMSPeriodFormat

}

MMFlags ::= SEQUENCE

{

 length [1] INTEGER,

 flag [2] MMStateFlag,

 flagString [3] UTF8String

}

MMSMessageClass ::= ENUMERATED

{

 personal(1),

 advertisement(2),

 informational(3),

 auto(4)

}

MMSParty ::= SEQUENCE

{

 mMSPartyIDs [1] SEQUENCE OF MMSPartyID,

 nonLocalID [2] NonLocalID

}

MMSPartyID ::= CHOICE

{

 e164Number [1] E164Number,

 emailAddress [2] EmailAddress,

 iMSI [3] IMSI,

 iMPU [4] IMPU,

 iMPI [5] IMPI,

 sUPI [6] SUPI,

 gPSI [7] GPSI

}

MMSPeriodFormat ::= ENUMERATED

{

 absolute(1),

 relative(2)

}

MMSPreviouslySent ::= SEQUENCE

{

 previouslySentByParty [1] MMSParty,

 sequenceNumber [2] INTEGER,

 previousSendDateTime [3] Timestamp

}

MMSPreviouslySentBy ::= SEQUENCE OF MMSPreviouslySent

MMSPriority ::= ENUMERATED

{

 low(1),

 normal(2),

 high(3)

}

MMSQuota ::= SEQUENCE

{

 quota [1] INTEGER,

 quotaUnit [2] MMSQuotaUnit

}

MMSQuotaUnit ::= ENUMERATED

{

 numMessages(1),

 bytes(2)

}

MMSReadStatus ::= ENUMERATED

{

 read(1),

 deletedWithoutBeingRead(2)

}

MMSReadStatusText ::= UTF8String

MMSReplyCharging ::= ENUMERATED

{

 requested(0),

 requestedTextOnly(1),

 accepted(2),

 acceptedTextOnly(3)

}

MMSResponseStatus ::= ENUMERATED

{

 ok(1),

 errorUnspecified(2),

 errorServiceDenied(3),

 errorMessageFormatCorrupt(4),

 errorSendingAddressUnresolved(5),

 errorMessageNotFound(6),

 errorNetworkProblem(7),

 errorContentNotAccepted(8),

 errorUnsupportedMessage(9),

 errorTransientFailure(10),

 errorTransientSendingAddressUnresolved(11),

 errorTransientMessageNotFound(12),

 errorTransientNetworkProblem(13),

 errorTransientPartialSuccess(14),

 errorPermanentFailure(15),

 errorPermanentServiceDenied(16),

 errorPermanentMessageFormatCorrupt(17),

 errorPermanentSendingAddressUnresolved(18),

 errorPermanentMessageNotFound(19),

 errorPermanentContentNotAccepted(20),

 errorPermanentReplyChargingLimitationsNotMet(21),

 errorPermanentReplyChargingRequestNotAccepted(22),

 errorPermanentReplyChargingForwardingDenied(23),

 errorPermanentReplyChargingNotSupported(24),

 errorPermanentAddressHidingNotSupported(25),

 errorPermanentLackOfPrepaid(26)

}

MMSRetrieveStatus ::= ENUMERATED

{

 success(1),

 errorTransientFailure(2),

 errorTransientMessageNotFound(3),

 errorTransientNetworkProblem(4),

 errorPermanentFailure(5),

 errorPermanentServiceDenied(6),

 errorPermanentMessageNotFound(7),

 errorPermanentContentUnsupported(8)

}

MMSStoreStatus ::= ENUMERATED

{

 success(1),

 errorTransientFailure(2),

 errorTransientNetworkProblem(3),

 errorPermanentFailure(4),

 errorPermanentServiceDenied(5),

 errorPermanentMessageFormatCorrupt(6),

 errorPermanentMessageNotFound(7),

 errorMMBoxFull(8)

}

MMState ::= ENUMERATED

{

 draft(1),

 sent(2),

 new(3),

 retrieved(4),

 forwarded(5)

}

MMStateFlag ::= ENUMERATED

{

 add(1),

 remove(2),

 filter(3)

}

MMStatus ::= ENUMERATED

{

 expired(1),

 retrieved(2),

 rejected(3),

 deferred(4),

 unrecognized(5),

 indeterminate(6),

 forwarded(7),

 unreachable(8)

}

MMStatusExtension ::= ENUMERATED

{

 rejectionByMMSRecipient(0),

 rejectionByOtherRS(1)

}

MMStatusText ::= UTF8String

MMSSubject ::= UTF8String

MMSVersion ::= SEQUENCE

{

 majorVersion [1] INTEGER,

 minorVersion [2] INTEGER

}

-- ==================

-- 5G PTC definitions

-- ==================

PTCRegistration ::= SEQUENCE

{

 pTCTargetInformation [1] PTCTargetInformation,

 pTCServerURI [2] UTF8String,

 pTCRegistrationRequest [3] PTCRegistrationRequest,

 pTCRegistrationOutcome [4] PTCRegistrationOutcome

}

PTCSessionInitiation ::= SEQUENCE

{

 pTCTargetInformation [1] PTCTargetInformation,

 pTCDirection [2] Direction,

 pTCServerURI [3] UTF8String,

 pTCSessionInfo [4] PTCSessionInfo,

 pTCOriginatingID [5] PTCTargetInformation,

 pTCParticipants [6] SEQUENCE OF PTCTargetInformation OPTIONAL,

 pTCParticipantPresenceStatus [7] MultipleParticipantPresenceStatus OPTIONAL,

 location [8] Location OPTIONAL,

 pTCBearerCapability [9] UTF8String OPTIONAL,

 pTCHost [10] PTCTargetInformation OPTIONAL

}

PTCSessionAbandon ::= SEQUENCE

{

 pTCTargetInformation [1] PTCTargetInformation,

 pTCDirection [2] Direction,

 pTCSessionInfo [3] PTCSessionInfo,

 location [4] Location OPTIONAL,

 pTCAbandonCause [5] INTEGER

}

PTCSessionStart ::= SEQUENCE

{

 pTCTargetInformation [1] PTCTargetInformation,

 pTCDirection [2] Direction,

 pTCServerURI [3] UTF8String,

 pTCSessionInfo [4] PTCSessionInfo,

 pTCOriginatingID [5] PTCTargetInformation,

 pTCParticipants [6] SEQUENCE OF PTCTargetInformation OPTIONAL,

 pTCParticipantPresenceStatus [7] MultipleParticipantPresenceStatus OPTIONAL,

 location [8] Location OPTIONAL,

 pTCHost [9] PTCTargetInformation OPTIONAL,

 pTCBearerCapability [10] UTF8String OPTIONAL

}

PTCSessionEnd ::= SEQUENCE

{

 pTCTargetInformation [1] PTCTargetInformation,

 pTCDirection [2] Direction,

 pTCServerURI [3] UTF8String,

 pTCSessionInfo [4] PTCSessionInfo,

 pTCParticipants [5] SEQUENCE OF PTCTargetInformation OPTIONAL,

 location [6] Location OPTIONAL,

 pTCSessionEndCause [7] PTCSessionEndCause

}

PTCStartOfInterception ::= SEQUENCE

{

 pTCTargetInformation [1] PTCTargetInformation,

 pTCDirection [2] Direction,

 preEstSessionID [3] PTCSessionInfo OPTIONAL,

 pTCOriginatingID [4] PTCTargetInformation,

 pTCSessionInfo [5] PTCSessionInfo OPTIONAL,

 pTCHost [6] PTCTargetInformation OPTIONAL,

 pTCParticipants [7] SEQUENCE OF PTCTargetInformation OPTIONAL,

 pTCMediaStreamAvail [8] BOOLEAN OPTIONAL,

 pTCBearerCapability [9] UTF8String OPTIONAL

}

PTCPreEstablishedSession ::= SEQUENCE

{

 pTCTargetInformation [1] PTCTargetInformation,

 pTCServerURI [2] UTF8String,

 rTPSetting [3] RTPSetting,

 pTCMediaCapability [4] UTF8String,

 pTCPreEstSessionID [5] PTCSessionInfo,

 pTCPreEstStatus [6] PTCPreEstStatus,

 pTCMediaStreamAvail [7] BOOLEAN OPTIONAL,

 location [8] Location OPTIONAL,

 pTCFailureCode [9] PTCFailureCode OPTIONAL

}

PTCInstantPersonalAlert ::= SEQUENCE

{

 pTCTargetInformation [1] PTCTargetInformation,

 pTCIPAPartyID [2] PTCTargetInformation,

 pTCIPADirection [3] Direction

}

PTCPartyJoin ::= SEQUENCE

{

 pTCTargetInformation [1] PTCTargetInformation,

 pTCDirection [2] Direction,

 pTCSessionInfo [3] PTCSessionInfo,

 pTCParticipants [4] SEQUENCE OF PTCTargetInformation OPTIONAL,

 pTCParticipantPresenceStatus [5] MultipleParticipantPresenceStatus OPTIONAL,

 pTCMediaStreamAvail [6] BOOLEAN OPTIONAL,

 pTCBearerCapability [7] UTF8String OPTIONAL

}

PTCPartyDrop ::= SEQUENCE

{

 pTCTargetInformation [1] PTCTargetInformation,

 pTCDirection [2] Direction,

 pTCSessionInfo [3] PTCSessionInfo,

 pTCPartyDrop [4] PTCTargetInformation,

 pTCParticipantPresenceStatus [5] PTCParticipantPresenceStatus OPTIONAL

}

PTCPartyHold ::= SEQUENCE

{

 pTCTargetInformation [1] PTCTargetInformation,

 pTCDirection [2] Direction,

 pTCSessionInfo [3] PTCSessionInfo,

 pTCParticipants [4] SEQUENCE OF PTCTargetInformation OPTIONAL,

 pTCHoldID [5] SEQUENCE OF PTCTargetInformation,

 pTCHoldRetrieveInd [6] BOOLEAN

}

PTCMediaModification ::= SEQUENCE

{

 pTCTargetInformation [1] PTCTargetInformation,

 pTCDirection [2] Direction,

 pTCSessionInfo [3] PTCSessionInfo,

 pTCMediaStreamAvail [4] BOOLEAN OPTIONAL,

 pTCBearerCapability [5] UTF8String

}

PTCGroupAdvertisement ::=SEQUENCE

{

 pTCTargetInformation [1] PTCTargetInformation,

 pTCDirection [2] Direction,

 pTCIDList [3] SEQUENCE OF PTCTargetInformation OPTIONAL,

 pTCGroupAuthRule [4] PTCGroupAuthRule OPTIONAL,

 pTCGroupAdSender [5] PTCTargetInformation,

 pTCGroupNickname [6] UTF8String OPTIONAL

}

PTCFloorControl ::= SEQUENCE

{

 pTCTargetInformation [1] PTCTargetInformation,

 pTCDirection [2] Direction,

 pTCSessioninfo [3] PTCSessionInfo,

 pTCFloorActivity [4] SEQUENCE OF PTCFloorActivity,

 pTCFloorSpeakerID [5] PTCTargetInformation OPTIONAL,

 pTCMaxTBTime [6] INTEGER OPTIONAL,

 pTCQueuedFloorControl [7] BOOLEAN OPTIONAL,

 pTCQueuedPosition [8] INTEGER OPTIONAL,

 pTCTalkBurstPriority [9] PTCTBPriorityLevel OPTIONAL,

 pTCTalkBurstReason [10] PTCTBReasonCode OPTIONAL

}

PTCTargetPresence ::= SEQUENCE

{

 pTCTargetInformation [1] PTCTargetInformation,

 pTCTargetPresenceStatus [2] PTCParticipantPresenceStatus

}

PTCParticipantPresence ::= SEQUENCE

{

 pTCTargetInformation [1] PTCTargetInformation,

 pTCParticipantPresenceStatus [2] PTCParticipantPresenceStatus

}

PTCListManagement ::= SEQUENCE

{

 pTCTargetInformation [1] PTCTargetInformation,

 pTCDirection [2] Direction,

 pTCListManagementType [3] PTCListManagementType OPTIONAL,

 pTCListManagementAction [4] PTCListManagementAction OPTIONAL,

 pTCListManagementFailure [5] PTCListManagementFailure OPTIONAL,

 pTCContactID [6] PTCTargetInformation OPTIONAL,

 pTCIDList [7] SEQUENCE OF PTCIDList OPTIONAL,

 pTCHost [8] PTCTargetInformation OPTIONAL

}

PTCAccessPolicy ::= SEQUENCE

{

 pTCTargetInformation [1] PTCTargetInformation,

 pTCDirection [2] Direction,

 pTCAccessPolicyType [3] PTCAccessPolicyType OPTIONAL,

 pTCUserAccessPolicy [4] PTCUserAccessPolicy OPTIONAL,

 pTCGroupAuthRule [5] PTCGroupAuthRule OPTIONAL,

 pTCContactID [6] PTCTargetInformation OPTIONAL,

 pTCAccessPolicyFailure [7] PTCAccessPolicyFailure OPTIONAL

}

-- =========

-- PTC CCPDU

-- =========

PTCCCPDU ::= OCTET STRING

-- =================

-- 5G PTC parameters

-- =================

PTCRegistrationRequest ::= ENUMERATED

{

 register(1),

 reRegister(2),

 deRegister(3)

}

PTCRegistrationOutcome ::= ENUMERATED

{

 success(1),

 failure(2)

}

PTCSessionEndCause ::= ENUMERATED

{

 initiaterLeavesSession(1),

 definedParticipantLeaves(2),

 numberOfParticipants(3),

 sessionTimerExpired(4),

 pTCSpeechInactive(5),

 allMediaTypesInactive(6)

}

PTCTargetInformation ::= SEQUENCE

{

 identifiers [1] SEQUENCE SIZE(1..MAX) OF PTCIdentifiers

}

PTCIdentifiers ::= CHOICE

{

 mCPTTID [1] UTF8String,

 instanceIdentifierURN [2] UTF8String,

 pTCChatGroupID [3] PTCChatGroupID,

 iMPU [4] IMPU,

 iMPI [5] IMPI

}

PTCSessionInfo ::= SEQUENCE

{

 pTCSessionURI [1] UTF8String,

 pTCSessionType [2] PTCSessionType

}

PTCSessionType ::= ENUMERATED

{

 ondemand(1),

 preEstablished(2),

 adhoc(3),

 prearranged(4),

 groupSession(5)

}

MultipleParticipantPresenceStatus ::= SEQUENCE OF PTCParticipantPresenceStatus

PTCParticipantPresenceStatus ::= SEQUENCE

{

 presenceID [1] PTCTargetInformation,

 presenceType [2] PTCPresenceType,

 presenceStatus [3] BOOLEAN

}

PTCPresenceType ::= ENUMERATED

{

 pTCClient(1),

 pTCGroup(2)

}

PTCPreEstStatus ::= ENUMERATED

{

 established(1),

 modified(2),

 released(3)

}

RTPSetting ::= SEQUENCE

{

 iPAddress [1] IPAddress,

 portNumber [2] PortNumber

}

PTCIDList ::= SEQUENCE

{

 pTCPartyID [1] PTCTargetInformation,

 pTCChatGroupID [2] PTCChatGroupID

}

PTCChatGroupID ::= SEQUENCE

{

 groupIdentity [1] UTF8String

}

PTCFloorActivity ::= ENUMERATED

{

 tBCPRequest(1),

 tBCPGranted(2),

 tBCPDeny(3),

 tBCPIdle(4),

 tBCPTaken(5),

 tBCPRevoke(6),

 tBCPQueued(7),

 tBCPRelease(8)

}

PTCTBPriorityLevel ::= ENUMERATED

{

 preEmptive(1),

 highPriority(2),

 normalPriority(3),

 listenOnly(4)

}

PTCTBReasonCode ::= ENUMERATED

{

 noQueuingAllowed(1),

 oneParticipantSession(2),

 listenOnly(3),

 exceededMaxDuration(4),

 tBPrevented(5)

}

PTCListManagementType ::= ENUMERATED

{

 contactListManagementAttempt(1),

 groupListManagementAttempt(2),

 contactListManagementResult(3),

 groupListManagementResult(4),

 requestUnsuccessful(5)

}

PTCListManagementAction ::= ENUMERATED

{

 create(1),

 modify(2),

 retrieve(3),

 delete(4),

 notify(5)

}

PTCAccessPolicyType ::= ENUMERATED

{

 pTCUserAccessPolicyAttempt(1),

 groupAuthorizationRulesAttempt(2),

 pTCUserAccessPolicyQuery(3),

 groupAuthorizationRulesQuery(4),

 pTCUserAccessPolicyResult(5),

 groupAuthorizationRulesResult(6),

 requestUnsuccessful(7)

}

PTCUserAccessPolicy ::= ENUMERATED

{

 allowIncomingPTCSessionRequest(1),

 blockIncomingPTCSessionRequest(2),

 allowAutoAnswerMode(3),

 allowOverrideManualAnswerMode(4)

}

PTCGroupAuthRule ::= ENUMERATED

{

 allowInitiatingPTCSession(1),

 blockInitiatingPTCSession(2),

 allowJoiningPTCSession(3),

 blockJoiningPTCSession(4),

 allowAddParticipants(5),

 blockAddParticipants(6),

 allowSubscriptionPTCSessionState(7),

 blockSubscriptionPTCSessionState(8),

 allowAnonymity(9),

 forbidAnonymity(10)

}

PTCFailureCode ::= ENUMERATED

{

 sessionCannotBeEstablished(1),

 sessionCannotBeModified(2)

}

PTCListManagementFailure ::= ENUMERATED

{

 requestUnsuccessful(1),

 requestUnknown(2)

}

PTCAccessPolicyFailure ::= ENUMERATED

{

 requestUnsuccessful(1),

 requestUnknown(2)

}

-- ===============

-- IMS definitions

-- ===============

-- See clause 7.12.4.2.1 for details of this structure

IMSMessage ::= SEQUENCE

{

 payload [1] IMSPayload,

 sessionDirection [2] SessionDirection,

 voIPRoamingIndication [3] VoIPRoamingIndication OPTIONAL,

 location [6] Location OPTIONAL

}

-- See clause 7.12.4.2.2 for details of this structure

StartOfInterceptionForActiveIMSSession ::= SEQUENCE

{

 originatingId [1] SEQUENCE OF IMPU,

 terminatingId [2] IMPU,

 sDPState [3] SEQUENCE OF OCTET STRING OPTIONAL,

 diversionIdentity [4] IMPU OPTIONAL,

 voIPRoamingIndication [5] VoIPRoamingIndication OPTIONAL,

 location [7] Location OPTIONAL

}

-- See clause 7.12.4.2.3 for the details.

IMSCCUnavailable ::= SEQUENCE

{

 cCUnavailableReason [1] UTF8String,

 sDPState [2] OCTET STRING OPTIONAL

}

-- =========

-- IMS CCPDU

-- =========

IMSCCPDU ::= SEQUENCE

{

 payload [1] IMSCCPDUPayload,

 sDPInfo [2] OCTET STRING OPTIONAL

}

IMSCCPDUPayload ::= OCTET STRING

-- ==============

-- IMS parameters

-- ==============

IMSPayload ::= CHOICE

{

 encapsulatedSIPMessage [1] SIPMessage

}

SIPMessage ::= SEQUENCE

{

 iPSourceAddress [1] IPAddress,

 iPDestinationAddress [2] IPAddress,

 sIPContent [3] OCTET STRING

}

VoIPRoamingIndication ::= ENUMERATED

{

 roamingLBO(1),

 roamingS8HR(2),

 roamingN9HR(3)

}

SessionDirection ::= ENUMERATED

{

 fromTarget(1),

 toTarget(2),

 combined(3),

 indeterminate(4)

}

HeaderOnlyIndication ::= BOOLEAN

-- =================================

-- STIR/SHAKEN/RCD/eCNAM definitions

-- =================================

-- See clause 7.11.2.1.2 for details of this structure

STIRSHAKENSignatureGeneration ::= SEQUENCE

{

 pASSporTs [1] SEQUENCE OF PASSporT,

 encapsulatedSIPMessage [2] SIPMessage OPTIONAL

}

-- See clause 7.11.2.1.3 for details of this structure

STIRSHAKENSignatureValidation ::= SEQUENCE

{

 pASSporTs [1] SEQUENCE OF PASSporT OPTIONAL,

 rCDTerminalDisplayInfo [2] RCDDisplayInfo OPTIONAL,

 eCNAMTerminalDisplayInfo [3] ECNAMDisplayInfo OPTIONAL,

 sHAKENValidationResult [4] SHAKENValidationResult,

 sHAKENFailureStatusCode [5] SHAKENFailureStatusCode OPTIONAL,

 encapsulatedSIPMessage [6] SIPMessage OPTIONAL

}

-- ================================

-- STIR/SHAKEN/RCD/eCNAM parameters

-- ================================

PASSporT ::= SEQUENCE

{

 pASSporTHeader [1] PASSporTHeader,

 pASSporTPayload [2] PASSporTPayload,

 pASSporTSignature [3] OCTET STRING

}

PASSporTHeader ::= SEQUENCE

{

 type [1] JWSTokenType,

 algorithm [2] UTF8String,

 ppt [3] UTF8String OPTIONAL,

 x5u [4] UTF8String

}

JWSTokenType ::= ENUMERATED

{

 passport(1)

}

PASSporTPayload ::= SEQUENCE

{

 issuedAtTime [1] GeneralizedTime,

 originator [2] STIRSHAKENOriginator,

 destination [3] STIRSHAKENDestinations,

 attestation [4] Attestation,

 origId [5] UTF8String,

 diversion [6] STIRSHAKENDestination

}

STIRSHAKENOriginator ::= CHOICE

{

 telephoneNumber [1] STIRSHAKENTN,

 sTIRSHAKENURI [2] UTF8String

}

STIRSHAKENDestinations ::= SEQUENCE OF STIRSHAKENDestination

STIRSHAKENDestination ::= CHOICE

{

 telephoneNumber [1] STIRSHAKENTN,

 sTIRSHAKENURI [2] UTF8String

}

STIRSHAKENTN ::= CHOICE

{

 mSISDN [1] MSISDN

}

Attestation ::= ENUMERATED

{

 attestationA(1),

 attestationB(2),

 attestationC(3)

}

SHAKENValidationResult ::= ENUMERATED

{

 tNValidationPassed(1),

 tNValidationFailed(2),

 noTNValidation(3)

}

SHAKENFailureStatusCode ::= INTEGER

ECNAMDisplayInfo ::= SEQUENCE

{

 name [1] UTF8String,

 additionalInfo [2] OCTET STRING OPTIONAL

}

RCDDisplayInfo ::= SEQUENCE

{

 name [1] UTF8String,

 jcd [2] OCTET STRING OPTIONAL,

 jcl [3] OCTET STRING OPTIONAL

}

-- ===================

-- 5G LALS definitions

-- ===================

LALSReport ::= SEQUENCE

{

 sUPI [1] SUPI OPTIONAL,

-- pEI [2] PEI OPTIONAL, deprecated in Release-16, do not re-use this tag number

 gPSI [3] GPSI OPTIONAL,

 location [4] Location OPTIONAL,

 iMPU [5] IMPU OPTIONAL,

 iMSI [7] IMSI OPTIONAL,

 mSISDN [8] MSISDN OPTIONAL

}

-- =====================

-- PDHR/PDSR definitions

-- =====================

PDHeaderReport ::= SEQUENCE

{

 pDUSessionID [1] PDUSessionID,

 sourceIPAddress [2] IPAddress,

 sourcePort [3] PortNumber OPTIONAL,

 destinationIPAddress [4] IPAddress,

 destinationPort [5] PortNumber OPTIONAL,

 nextLayerProtocol [6] NextLayerProtocol,

 iPv6flowLabel [7] IPv6FlowLabel OPTIONAL,

 direction [8] Direction,

 packetSize [9] INTEGER

}

PDSummaryReport ::= SEQUENCE

{

 pDUSessionID [1] PDUSessionID,

 sourceIPAddress [2] IPAddress,

 sourcePort [3] PortNumber OPTIONAL,

 destinationIPAddress [4] IPAddress,

 destinationPort [5] PortNumber OPTIONAL,

 nextLayerProtocol [6] NextLayerProtocol,

 iPv6flowLabel [7] IPv6FlowLabel OPTIONAL,

 direction [8] Direction,

 pDSRSummaryTrigger [9] PDSRSummaryTrigger,

 firstPacketTimestamp [10] Timestamp,

 lastPacketTimestamp [11] Timestamp,

 packetCount [12] INTEGER,

 byteCount [13] INTEGER,

 perSessionTrigger [14] BOOLEAN

}

-- ====================

-- PDHR/PDSR parameters

-- ====================

PDSRSummaryTrigger ::= ENUMERATED

{

 timerExpiry(1),

 packetCount(2),

 byteCount(3),

 startOfFlow(4),

 endOfFlow(5)

}

-- ==================================

-- Identifier Association definitions

-- ==================================

AMFIdentifierAssociation ::= SEQUENCE

{

 sUPI [1] SUPI,

 sUCI [2] SUCI OPTIONAL,

 pEI [3] PEI OPTIONAL,

 gPSI [4] GPSI OPTIONAL,

 gUTI [5] FiveGGUTI,

 location [6] Location,

 fiveGSTAIList [7] TAIList OPTIONAL

}

MMEIdentifierAssociation ::= SEQUENCE

{

 iMSI [1] IMSI,

 iMEI [2] IMEI OPTIONAL,

 mSISDN [3] MSISDN OPTIONAL,

 gUTI [4] GUTI,

 location [5] Location,

 tAIList [6] TAIList OPTIONAL

}

-- =================================

-- Identifier Association parameters

-- =================================

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

MMECode ::= OCTET STRING (SIZE(1))

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

-- ===================

-- EPS MME definitions

-- ===================

MMEAttach ::= SEQUENCE

{

 attachType [1] EPSAttachType,

 attachResult [2] EPSAttachResult,

 iMSI [3] IMSI,

 iMEI [4] IMEI OPTIONAL,

 mSISDN [5] MSISDN OPTIONAL,

 gUTI [6] GUTI OPTIONAL,

 location [7] Location OPTIONAL,

 ePSTAIList [8] TAIList OPTIONAL,

 sMSServiceStatus [9] EPSSMSServiceStatus OPTIONAL,

 oldGUTI [10] GUTI OPTIONAL,

 eMM5GRegStatus [11] EMM5GMMStatus OPTIONAL

}

MMEDetach ::= SEQUENCE

{

 detachDirection [1] MMEDirection,

 detachType [2] EPSDetachType,

 iMSI [3] IMSI,

 iMEI [4] IMEI OPTIONAL,

 mSISDN [5] MSISDN OPTIONAL,

 gUTI [6] GUTI OPTIONAL,

 cause [7] EMMCause OPTIONAL,

 location [8] Location OPTIONAL,

 switchOffIndicator [9] SwitchOffIndicator OPTIONAL

}

MMELocationUpdate ::= SEQUENCE

{

 iMSI [1] IMSI,

 iMEI [2] IMEI OPTIONAL,

 mSISDN [3] MSISDN OPTIONAL,

 gUTI [4] GUTI OPTIONAL,

 location [5] Location OPTIONAL,

 oldGUTI [6] GUTI OPTIONAL,

 sMSServiceStatus [7] EPSSMSServiceStatus OPTIONAL

}

MMEStartOfInterceptionWithEPSAttachedUE ::= SEQUENCE

{

 attachType [1] EPSAttachType,

 attachResult [2] EPSAttachResult,

 iMSI [3] IMSI,

 iMEI [4] IMEI OPTIONAL,

 mSISDN [5] MSISDN OPTIONAL,

 gUTI [6] GUTI OPTIONAL,

 location [7] Location OPTIONAL,

 ePSTAIList [9] TAIList OPTIONAL,

 sMSServiceStatus [10] EPSSMSServiceStatus OPTIONAL,

 eMM5GRegStatus [12] EMM5GMMStatus OPTIONAL

}

MMEUnsuccessfulProcedure ::= SEQUENCE

{

 failedProcedureType [1] MMEFailedProcedureType,

 failureCause [2] MMEFailureCause,

 iMSI [3] IMSI OPTIONAL,

 iMEI [4] IMEI OPTIONAL,

 mSISDN [5] MSISDN OPTIONAL,

 gUTI [6] GUTI OPTIONAL,

 location [7] Location OPTIONAL

}

-- See clause 6.3.2.2.8 for details of this structure

MMEPositioningInfoTransfer ::= SEQUENCE

{

 iMSI [1] IMSI,

 iMEI [2] IMEI OPTIONAL,

 mSISDN [3] MSISDN OPTIONAL,

 gUTI [4] GUTI OPTIONAL,

 lPPaMessage [5] OCTET STRING OPTIONAL,

 lPPMessage [6] OCTET STRING OPTIONAL,

 mMELCSCorrelationId [7] OCTET STRING (SIZE(4))

}

-- ==================

-- EPS MME parameters

-- ==================

EMMCause ::= INTEGER (0..255)

ESMCause ::= INTEGER (0..255)

EPSAttachType ::= ENUMERATED

{

 ePSAttach(1),

 combinedEPSIMSIAttach(2),

 ePSRLOSAttach(3),

 ePSEmergencyAttach(4),

 reserved(5)

}

EPSAttachResult ::= ENUMERATED

{

 ePSOnly(1),

 combinedEPSIMSI(2)

}

EPSDetachType ::= ENUMERATED

{

 ePSDetach(1),

 iMSIDetach(2),

 combinedEPSIMSIDetach(3),

 reAttachRequired(4),

 reAttachNotRequired(5),

 reserved(6)

}

EPSSMSServiceStatus ::= ENUMERATED

{

 sMSServicesNotAvailable(1),

 sMSServicesNotAvailableInThisPLMN(2),

 networkFailure(3),

 congestion(4)

}

MMEDirection ::= ENUMERATED

{

 networkInitiated(1),

 uEInitiated(2)

}

MMEFailedProcedureType ::= ENUMERATED

{

 attachReject(1),

 authenticationReject(2),

 securityModeReject(3),

 serviceReject(4),

 trackingAreaUpdateReject(5),

 activateDedicatedEPSBearerContextReject(6),

 activateDefaultEPSBearerContextReject(7),

 bearerResourceAllocationReject(8),

 bearerResourceModificationReject(9),

 modifyEPSBearerContectReject(10),

 pDNConnectivityReject(11),

 pDNDisconnectReject(12)

}

MMEFailureCause ::= CHOICE

{

 eMMCause [1] EMMCause,

 eSMCause [2] ESMCause

}

-- ===========================

-- LI Notification definitions

-- ===========================

LINotification ::= SEQUENCE

{

 notificationType [1] LINotificationType,

 appliedTargetID [2] TargetIdentifier OPTIONAL,

 appliedDeliveryInformation [3] SEQUENCE OF LIAppliedDeliveryInformation OPTIONAL,

 appliedStartTime [4] Timestamp OPTIONAL,

 appliedEndTime [5] Timestamp OPTIONAL

}

-- ==========================

-- LI Notification parameters

-- ==========================

LINotificationType ::= ENUMERATED

{

 activation(1),

 deactivation(2),

 modification(3)

}

LIAppliedDeliveryInformation ::= SEQUENCE

{

 hI2DeliveryIPAddress [1] IPAddress OPTIONAL,

 hI2DeliveryPortNumber [2] PortNumber OPTIONAL,

 hI3DeliveryIPAddress [3] IPAddress OPTIONAL,

 hI3DeliveryPortNumber [4] PortNumber OPTIONAL

}

-- ===============

-- MDF definitions

-- ===============

MDFCellSiteReport ::= SEQUENCE OF CellInformation

-- ==============================

-- 5G EPS Interworking Parameters

-- ==============================

EMM5GMMStatus ::= SEQUENCE

{

 eMMRegStatus [1] EMMRegStatus OPTIONAL,

 fiveGMMStatus [2] FiveGMMStatus OPTIONAL

}

EPS5GGUTI ::= CHOICE

{

 gUTI [1] GUTI,

 fiveGGUTI [2] FiveGGUTI

}

EMMRegStatus ::= ENUMERATED

{

 uEEMMRegistered(1),

 uENotEMMRegistered(2)

}

FiveGMMStatus ::= ENUMERATED

{

 uE5GMMRegistered(1),

 uENot5GMMRegistered(2)

}

-- ========================================

-- Separated Location Reporting definitions

-- ========================================

SeparatedLocationReporting ::= SEQUENCE

{

 sUPI [1] SUPI,

 sUCI [2] SUCI OPTIONAL,

 pEI [3] PEI OPTIONAL,

 gPSI [4] GPSI OPTIONAL,

 gUTI [5] FiveGGUTI OPTIONAL,

 location [6] Location,

 non3GPPAccessEndpoint [7] UEEndpointAddress OPTIONAL,

 rATType [8] RATType OPTIONAL

}

-- =================

-- Common Parameters

-- =================

AccessType ::= ENUMERATED

{

 threeGPPAccess(1),

 nonThreeGPPAccess(2),

 threeGPPandNonThreeGPPAccess(3)

}

Direction ::= ENUMERATED

{

 fromTarget(1),

 toTarget(2)

}

DNN ::= UTF8String

E164Number ::= NumericString (SIZE(1..15))

EmailAddress ::= UTF8String

EUI64 ::= OCTET STRING (SIZE(8))

FiveGGUTI ::= SEQUENCE

{

 mCC [1] MCC,

 mNC [2] MNC,

 aMFRegionID [3] AMFRegionID,

 aMFSetID [4] AMFSetID,

 aMFPointer [5] AMFPointer,

 fiveGTMSI [6] FiveGTMSI

}

FiveGSSubscriberID ::= CHOICE

{

 sUPI [1] SUPI,

 sUCI [2] SUCI,

 pEI [3] PEI,

 gPSI [4] GPSI

}

FiveGSSubscriberIDs ::= SEQUENCE

{

 fiveGSSubscriberID [1] SEQUENCE SIZE(1..MAX) OF FiveGSSubscriberID

}

FiveGMMCause ::= INTEGER (0..255)

FiveGSMRequestType ::= ENUMERATED

{

 initialRequest(1),

 existingPDUSession(2),

 initialEmergencyRequest(3),

 existingEmergencyPDUSession(4),

 modificationRequest(5),

 reserved(6),

 mAPDURequest(7)

}

FiveGSMCause ::= INTEGER (0..255)

FiveGTMSI ::= INTEGER (0..4294967295)

FiveGSRVCCInfo ::= SEQUENCE

{

 uE5GSRVCCCapability [1] BOOLEAN,

 sessionTransferNumber [2] UTF8String OPTIONAL,

 correlationMSISDN [3] MSISDN OPTIONAL

}

FiveGSUserStateInfo ::= SEQUENCE

{

 fiveGSUserState [1] FiveGSUserState,

 accessType [2] AccessType

}

FiveGSUserState ::= ENUMERATED

{

 deregistered(1),

 registeredNotReachableForPaging(2),

 registeredReachableForPaging(3),

 connectedNotReachableForPaging(4),

 connectedReachableForPaging(5),

 notProvidedFromAMF(6)

}

FTEID ::= SEQUENCE

{

 tEID [1] INTEGER (0.. 4294967295),

 iPv4Address [2] IPv4Address OPTIONAL,

 iPv6Address [3] IPv6Address OPTIONAL

}

FTEIDList ::= SEQUENCE OF FTEID

GPSI ::= CHOICE

{

 mSISDN [1] MSISDN,

 nAI [2] NAI

}

GUAMI ::= SEQUENCE

{

 aMFID [1] AMFID,

 pLMNID [2] PLMNID

}

GUMMEI ::= SEQUENCE

{

 mMEID [1] MMEID,

 mCC [2] MCC,

 mNC [3] MNC

}

GUTI ::= SEQUENCE

{

 mCC [1] MCC,

 mNC [2] MNC,

 mMEGroupID [3] MMEGroupID,

 mMECode [4] MMECode,

 mTMSI [5] TMSI

}

HomeNetworkPublicKeyID ::= OCTET STRING

HSMFURI ::= UTF8String

IMEI ::= NumericString (SIZE(14))

IMEISV ::= NumericString (SIZE(16))

IMPI ::= NAI

IMPU ::= CHOICE

{

 sIPURI [1] SIPURI,

 tELURI [2] TELURI

}

IMSI ::= NumericString (SIZE(6..15))

IMSIUnauthenticatedIndication ::= BOOLEAN

Initiator ::= ENUMERATED

{

 uE(1),

 network(2),

 unknown(3)

}

IPAddress ::= CHOICE

{

 iPv4Address [1] IPv4Address,

 iPv6Address [2] IPv6Address

}

IPv4Address ::= OCTET STRING (SIZE(4))

IPv6Address ::= OCTET STRING (SIZE(16))

IPv6FlowLabel ::= INTEGER(0..1048575)

MACAddress ::= OCTET STRING (SIZE(6))

MACRestrictionIndicator ::= ENUMERATED

{

 noResrictions(1),

 mACAddressNotUseableAsEquipmentIdentifier(2),

 unknown(3)

}

MCC ::= NumericString (SIZE(3))

MNC ::= NumericString (SIZE(2..3))

MMEID ::= SEQUENCE

{

 mMEGI [1] MMEGI,

 mMEC [2] MMEC

}

MMEC ::= NumericString

MMEGI ::= NumericString

MSISDN ::= NumericString (SIZE(1..15))

NAI ::= UTF8String

NextLayerProtocol ::= INTEGER(0..255)

NonLocalID ::= ENUMERATED

{

 local(1),

 nonLocal(2)

}

NonIMEISVPEI ::= CHOICE

{

 mACAddress [1] MACAddress,

 eUI64 [2] EUI64

}

NSSAI ::= SEQUENCE OF SNSSAI

PagingRestrictionIndicator ::= OCTET STRING (SIZE(1..33))

PLMNID ::= SEQUENCE

{

 mCC [1] MCC,

 mNC [2] MNC

}

PDNConnectionType ::= ENUMERATED

{

 iPv4(1),

 iPv6(2),

 iPv4v6(3),

 nonIP(4),

 ethernet(5)

}

PDUSessionID ::= INTEGER (0..255)

PDUSessionType ::= ENUMERATED

{

 iPv4(1),

 iPv6(2),

 iPv4v6(3),

 unstructured(4),

 ethernet(5)

}

PEI ::= CHOICE

{

 iMEI [1] IMEI,

 iMEISV [2] IMEISV,

 mACAddress [3] MACAddress,

 eUI64 [4] EUI64

}

PortNumber ::= INTEGER (0..65535)

PrimaryAuthenticationType ::= ENUMERATED

{

 eAPAKAPrime(1),

 fiveGAKA(2),

 eAPTLS(3),

 none(4),

 ePSAKA(5),

 eAPAKA(6),

 iMSAKA(7),

 gBAAKA(8),

 uMTSAKA(9)

}

ProtectionSchemeID ::= INTEGER (0..15)

RATType ::= ENUMERATED

{

 nR(1),

 eUTRA(2),

 wLAN(3),

 virtual(4),

 nBIOT(5),

 wireline(6),

 wirelineCable(7),

 wirelineBBF(8),

 lTEM(9),

 nRU(10),

 eUTRAU(11),

 trustedN3GA(12),

 trustedWLAN(13),

 uTRA(14),

 gERA(15),

 nRLEO(16),

 nRMEO(17),

 nRGEO(18),

 nROTHERSAT(19),

 nRREDCAP(20)

}

RejectedNSSAI ::= SEQUENCE OF RejectedSNSSAI

RejectedSNSSAI ::= SEQUENCE

{

 causeValue [1] RejectedSliceCauseValue,

 sNSSAI [2] SNSSAI

}

RejectedSliceCauseValue ::= INTEGER (0..255)

ReRegRequiredIndicator ::= ENUMERATED

{

 reRegistrationRequired(1),

 reRegistrationNotRequired(2)

}

RoutingIndicator ::= INTEGER (0..9999)

SchemeOutput ::= OCTET STRING

SIPURI ::= UTF8String

Slice ::= SEQUENCE

{

 allowedNSSAI [1] NSSAI OPTIONAL,

 configuredNSSAI [2] NSSAI OPTIONAL,

 rejectedNSSAI [3] RejectedNSSAI OPTIONAL

}

SMPDUDNRequest ::= OCTET STRING

-- TS 24.501 [13], clause 9.11.3.6.1

SMSOverNASIndicator ::= ENUMERATED

{

 sMSOverNASNotAllowed(1),

 sMSOverNASAllowed(2)

}

SNSSAI ::= SEQUENCE

{

 sliceServiceType [1] INTEGER (0..255),

 sliceDifferentiator [2] OCTET STRING (SIZE(3)) OPTIONAL

}

SubscriberIdentifier ::= CHOICE

{

 sUCI [1] SUCI,

 sUPI [2] SUPI

}

SUCI ::= SEQUENCE

{

 mCC [1] MCC,

 mNC [2] MNC,

 routingIndicator [3] RoutingIndicator,

 protectionSchemeID [4] ProtectionSchemeID,

 homeNetworkPublicKeyID [5] HomeNetworkPublicKeyID,

 schemeOutput [6] SchemeOutput,

 routingIndicatorLength [7] INTEGER (1..4) OPTIONAL

 -- shall be included if different from the number of meaningful digits given

 -- in routingIndicator

}

SUPI ::= CHOICE

{

 iMSI [1] IMSI,

 nAI [2] NAI

}

SUPIUnauthenticatedIndication ::= BOOLEAN

SwitchOffIndicator ::= ENUMERATED

{

 normalDetach(1),

 switchOff(2)

}

TargetIdentifier ::= CHOICE

{

 sUPI [1] SUPI,

 iMSI [2] IMSI,

 pEI [3] PEI,

 iMEI [4] IMEI,

 gPSI [5] GPSI,

 mSISDN [6] MSISDN,

 nAI [7] NAI,

 iPv4Address [8] IPv4Address,

 iPv6Address [9] IPv6Address,

 ethernetAddress [10] MACAddress,

 iMPU [11] IMPU,

 iMPI [12] IMPI,

 e164Number [13] E164Number,

 emailAddress [14] EmailAddress,

 mCPTTID [15] UTF8String,

 instanceIdentifierURN [16] UTF8String,

 pTCChatGroupID [17] PTCChatGroupID

}

TargetIdentifierProvenance ::= ENUMERATED

{

 lEAProvided(1),

 observed(2),

 matchedOn(3),

 other(4)

}

TELURI ::= UTF8String

Timestamp ::= GeneralizedTime

UEContextInfo ::= SEQUENCE

{

 supportVoPS [1] BOOLEAN OPTIONAL,

 supportVoPSNon3GPP [2] BOOLEAN OPTIONAL,

 lastActiveTime [3] Timestamp OPTIONAL,

 accessType [4] AccessType OPTIONAL,

 rATType [5] RATType OPTIONAL

}

UEEndpointAddress ::= CHOICE

{

 iPv4Address [1] IPv4Address,

 iPv6Address [2] IPv6Address,

 ethernetAddress [3] MACAddress

}

UserIdentifiers ::= SEQUENCE

{

 fiveGSSubscriberIDs [1] FiveGSSubscriberIDs OPTIONAL,

 ePSSubscriberIDs [2] EPSSubscriberIDs OPTIONAL

}

-- ===================

-- Location parameters

-- ===================

Location ::= SEQUENCE

{

 locationInfo [1] LocationInfo OPTIONAL,

 positioningInfo [2] PositioningInfo OPTIONAL,

 locationPresenceReport [3] LocationPresenceReport OPTIONAL,

 fourGPositioningInfo [4] FourGPositioningInfo OPTIONAL,

 fourGLocationInfo [5] FourGLocationInfo OPTIONAL

}

CellSiteInformation ::= SEQUENCE

{

 geographicalCoordinates [1] GeographicalCoordinates,

 azimuth [2] INTEGER (0..359) OPTIONAL,

 operatorSpecificInformation [3] UTF8String OPTIONAL

}

-- TS 29.518 [22], clause 6.4.6.2.6

LocationInfo ::= SEQUENCE

{

 userLocation [1] UserLocation OPTIONAL,

 currentLoc [2] BOOLEAN OPTIONAL,

 geoInfo [3] GeographicArea OPTIONAL,

 rATType [4] RATType OPTIONAL,

 timeZone [5] TimeZone OPTIONAL,

 additionalCellIDs [6] SEQUENCE OF CellInformation OPTIONAL

}

-- TS 29.571 [17], clause 5.4.4.7

UserLocation ::= SEQUENCE

{

 eUTRALocation [1] EUTRALocation OPTIONAL,

 nRLocation [2] NRLocation OPTIONAL,

 n3GALocation [3] N3GALocation OPTIONAL

}

-- TS 29.571 [17], clause 5.4.4.8

EUTRALocation ::= SEQUENCE

{

 tAI [1] TAI,

 eCGI [2] ECGI,

 ageOfLocationInfo [3] INTEGER OPTIONAL,

 uELocationTimestamp [4] Timestamp OPTIONAL,

 geographicalInformation [5] UTF8String OPTIONAL,

 geodeticInformation [6] UTF8String OPTIONAL,

 globalNGENbID [7] GlobalRANNodeID OPTIONAL,

 cellSiteInformation [8] CellSiteInformation OPTIONAL,

 globalENbID [9] GlobalRANNodeID OPTIONAL

}

-- TS 29.571 [17], clause 5.4.4.9

NRLocation ::= SEQUENCE

{

 tAI [1] TAI,

 nCGI [2] NCGI,

 ageOfLocationInfo [3] INTEGER OPTIONAL,

 uELocationTimestamp [4] Timestamp OPTIONAL,

 geographicalInformation [5] UTF8String OPTIONAL,

 geodeticInformation [6] UTF8String OPTIONAL,

 globalGNbID [7] GlobalRANNodeID OPTIONAL,

 cellSiteInformation [8] CellSiteInformation OPTIONAL

}

-- TS 29.571 [17], clause 5.4.4.10

N3GALocation ::= SEQUENCE

{

 tAI [1] TAI OPTIONAL,

 n3IWFID [2] N3IWFIDNGAP OPTIONAL,

 uEIPAddr [3] IPAddr OPTIONAL,

 portNumber [4] INTEGER OPTIONAL,

 tNAPID [5] TNAPID OPTIONAL,

 tWAPID [6] TWAPID OPTIONAL,

 hFCNodeID [7] HFCNodeID OPTIONAL,

 gLI [8] GLI OPTIONAL,

 w5GBANLineType [9] W5GBANLineType OPTIONAL,

 gCI [10] GCI OPTIONAL,

 ageOfLocationInfo [11] INTEGER OPTIONAL,

 uELocationTimestamp [12] Timestamp OPTIONAL,

 protocol [13] TransportProtocol OPTIONAL

}

-- TS 38.413 [23], clause 9.3.2.4

IPAddr ::= SEQUENCE

{

 iPv4Addr [1] IPv4Address OPTIONAL,

 iPv6Addr [2] IPv6Address OPTIONAL

}

-- TS 29.571 [17], clause 5.4.4.28

GlobalRANNodeID ::= SEQUENCE

{

 pLMNID [1] PLMNID,

 aNNodeID [2] ANNodeID,

 nID [3] NID OPTIONAL

}

ANNodeID ::= CHOICE

{

 n3IWFID [1] N3IWFIDSBI,

 gNbID [2] GNbID,

 nGENbID [3] NGENbID,

 eNbID [4] ENbID,

 wAGFID [5] WAGFID,

 tNGFID [6] TNGFID

}

-- TS 38.413 [23], clause 9.3.1.6

GNbID ::= BIT STRING(SIZE(22..32))

-- TS 29.571 [17], clause 5.4.4.4

TAI ::= SEQUENCE

{

 pLMNID [1] PLMNID,

 tAC [2] TAC,

 nID [3] NID OPTIONAL

}

CGI ::= SEQUENCE

{

 lAI [1] LAI,

 cellID [2] CellID

}

LAI ::= SEQUENCE

{

 pLMNID [1] PLMNID,

 lAC [2] LAC

}

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

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

SAI ::= SEQUENCE

{

 pLMNID [1] PLMNID,

 lAC [2] LAC,

 sAC [3] SAC

}

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

RAI ::= SEQUENCE

{

 pLMNID [1] PLMNID,

 lAC [2] LAC,

 rAC [3] RAC

}

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

-- TS 29.571 [17], clause 5.4.4.5

ECGI ::= SEQUENCE

{

 pLMNID [1] PLMNID,

 eUTRACellID [2] EUTRACellID,

 nID [3] NID OPTIONAL

}

TAIList ::= SEQUENCE OF TAI

-- TS 29.571 [17], clause 5.4.4.6

NCGI ::= SEQUENCE

{

 pLMNID [1] PLMNID,

 nRCellID [2] NRCellID,

 nID [3] NID OPTIONAL

}

RANCGI ::= CHOICE

{

 eCGI [1] ECGI,

 nCGI [2] NCGI

}

CellInformation ::= SEQUENCE

{

 rANCGI [1] RANCGI,

 cellSiteinformation [2] CellSiteInformation OPTIONAL,

 timeOfLocation [3] Timestamp OPTIONAL

}

-- TS 38.413 [23], clause 9.3.1.57

N3IWFIDNGAP ::= BIT STRING (SIZE(16))

-- TS 29.571 [17], clause 5.4.4.28

N3IWFIDSBI ::= UTF8String

-- TS 29.571 [17], clause 5.4.4.28 and table 5.4.2-1

TNGFID ::= UTF8String

-- TS 29.571 [17], clause 5.4.4.28 and table 5.4.2-1

WAGFID ::= UTF8String

-- TS 29.571 [17], clause 5.4.4.62

TNAPID ::= SEQUENCE

{

 sSID [1] SSID OPTIONAL,

 bSSID [2] BSSID OPTIONAL,

 civicAddress [3] CivicAddressBytes OPTIONAL

}

-- TS 29.571 [17], clause 5.4.4.64

TWAPID ::= SEQUENCE

{

 sSID [1] SSID OPTIONAL,

 bSSID [2] BSSID OPTIONAL,

 civicAddress [3] CivicAddressBytes OPTIONAL

}

-- TS 29.571 [17], clause 5.4.4.62 and clause 5.4.4.64

SSID ::= UTF8String

-- TS 29.571 [17], clause 5.4.4.62 and clause 5.4.4.64

BSSID ::= UTF8String

-- TS 29.571 [17], clause 5.4.4.36 and table 5.4.2-1

HFCNodeID ::= UTF8String

-- TS 29.571 [17], clause 5.4.4.10 and table 5.4.2-1

-- Contains the original binary data i.e. value of the YAML field after base64 encoding is removed

GLI ::= OCTET STRING (SIZE(0..150))

-- TS 29.571 [17], clause 5.4.4.10 and table 5.4.2-1

GCI ::= UTF8String

-- TS 29.571 [17], clause 5.4.4.10 and table 5.4.3.38

TransportProtocol ::= ENUMERATED

{

 uDP(1),

 tCP(2)

}

-- TS 29.571 [17], clause 5.4.4.10 and clause 5.4.3.33

W5GBANLineType ::= ENUMERATED

{

 dSL(1),

 pON(2)

}

-- TS 29.571 [17], table 5.4.2-1

TAC ::= OCTET STRING (SIZE(2..3))

-- TS 38.413 [23], clause 9.3.1.9

EUTRACellID ::= BIT STRING (SIZE(28))

-- TS 38.413 [23], clause 9.3.1.7

NRCellID ::= BIT STRING (SIZE(36))

-- TS 38.413 [23], clause 9.3.1.8

NGENbID ::= CHOICE

{

 macroNGENbID [1] BIT STRING (SIZE(20)),

 shortMacroNGENbID [2] BIT STRING (SIZE(18)),

 longMacroNGENbID [3] BIT STRING (SIZE(21))

}

-- TS 23.003 [19], clause 12.7.1 encoded as per TS 29.571 [17], clause 5.4.2

NID ::= UTF8String (SIZE(11))

-- TS 36.413 [38], clause 9.2.1.37

ENbID ::= CHOICE

{

 macroENbID [1] BIT STRING (SIZE(20)),

 homeENbID [2] BIT STRING (SIZE(28)),

 shortMacroENbID [3] BIT STRING (SIZE(18)),

 longMacroENbID [4] BIT STRING (SIZE(21))

}

-- TS 29.518 [22], clause 6.4.6.2.3

PositioningInfo ::= SEQUENCE

{

 positionInfo [1] LocationData OPTIONAL,

 rawMLPResponse [2] RawMLPResponse OPTIONAL

}

RawMLPResponse ::= CHOICE

{

 -- The following parameter contains a copy of unparsed XML code of the

 -- MLP response message, i.e. the entire XML document containing

 -- a <slia> (described in OMA-TS-MLP-V3\_5-20181211-C [20], clause 5.2.3.2.2) or

 -- a <slirep> (described in OMA-TS-MLP-V3\_5-20181211-C [20], clause 5.2.3.2.3) MLP message.

 mLPPositionData [1] UTF8String,

 -- OMA MLP result id, defined in OMA-TS-MLP-V3\_5-20181211-C [20], Clause 5.4

 mLPErrorCode [2] INTEGER (1..699)

}

-- TS 29.572 [24], clause 6.1.6.2.3

LocationData ::= SEQUENCE

{

 locationEstimate [1] GeographicArea,

 accuracyFulfilmentIndicator [2] AccuracyFulfilmentIndicator OPTIONAL,

 ageOfLocationEstimate [3] AgeOfLocationEstimate OPTIONAL,

 velocityEstimate [4] VelocityEstimate OPTIONAL,

 civicAddress [5] CivicAddress OPTIONAL,

 positioningDataList [6] SET OF PositioningMethodAndUsage OPTIONAL,

 gNSSPositioningDataList [7] SET OF GNSSPositioningMethodAndUsage OPTIONAL,

 eCGI [8] ECGI OPTIONAL,

 nCGI [9] NCGI OPTIONAL,

 altitude [10] Altitude OPTIONAL,

 barometricPressure [11] BarometricPressure OPTIONAL

}

-- TS 29.172 [53], clause 7.4.29

GERANPositioningInfo ::= SEQUENCE

{

 gERANPositioningData [1] GERANPositioningData OPTIONAL,

 gERANGANSSPositioningData [2] GERANGANSSPositioningData OPTIONAL

}

-- TS 29.172 [53], clause 7.4.30

GERANPositioningData ::= OCTET STRING

-- TS 29.172 [53], clause 7.4.31

GERANGANSSPositioningData ::= OCTET STRING

-- TS 29.172 [53], clause 7.4.32

UTRANPositioningInfo ::= SEQUENCE

{

 uTRANPositioningData [1] UTRANPositioningData OPTIONAL,

 uTRANGANSSPositioningData [2] UTRANGANSSPositioningData OPTIONAL,

 uTRANAdditionalPositioningData [3] UTRANAdditionalPositioningData OPTIONAL

}

-- TS 29.172 [53], clause 7.4.33

UTRANPositioningData ::= OCTET STRING

-- TS 29.172 [53], clause 7.4.34

UTRANGANSSPositioningData ::= OCTET STRING

-- TS 29.172 [53], clause 7.4.63

UTRANAdditionalPositioningData ::= OCTET STRING

-- TS 29.172 [53], table 6.2.2-2

FourGPositioningInfo ::= SEQUENCE

{

 locationData [1] LocationData,

 cGI [2] CGI OPTIONAL,

 sAI [3] SAI OPTIONAL,

 eSMLCCellInfo [4] ESMLCCellInfo OPTIONAL,

 gERANPositioningInfo [5] GERANPositioningInfo OPTIONAL,

 uTRANPositioningInfo [6] UTRANPositioningInfo OPTIONAL,

 rawMLPResponse [7] RawMLPResponse OPTIONAL

}

FourGLocationInfo ::= CHOICE

{

 ePSLocationInformation [1] EPSLocationInformation,

 ePSUserLocationInformation [2] EPSUserLocationInformation

}

-- TS 29.272 [Re1], clause 7.3.111

EPSLocationInformation ::= SEQUENCE

{

 mMELocationInformation [1] MMELocationInformation OPTIONAL,

 sGSNLocationInformation [2] SGSNLocationInformation OPTIONAL

}

-- TS 29.274 [87], clause 8.21

EPSUserLocationInformation ::= OCTET STRING

-- TS 29.272 [Re1], clause 7.3.115

MMELocationInformation ::= SEQUENCE

{

 eCGI [1] ECGI OPTIONAL,

 tAI [2] TAI OPTIONAL,

 geographicalInformation [3] GeographicalInformationOctet OPTIONAL,

 geodeticInformation [4] GeodeticInformationOctet OPTIONAL,

 currentLocationRetrieved [5] BOOLEAN OPTIONAL,

 ageOfLocationInformation [6] INTEGER OPTIONAL,

 userCSGInformation [7] UserCSGInformation OPTIONAL,

 eNbID [8] ENbID OPTIONAL,

 additionalCellIDs [9] SEQUENCE OF CellInformation OPTIONAL

}

-- TS 32.299 [Re2], clause 7.3.240A

UserCSGInformation ::= SEQUENCE

{

 cSGID [1] CSGID,

 cSGAccessMode [2] CSGAccessMode,

 cSGMembershipIndication [3] CSGMembershipIndication

}

-- TS 29.272 [Re1], clause 7.3.79

CSGID ::= INTEGER

-- TS 32.299 [Re2], clause 7.2.46A

CSGAccessMode ::= ENUMERATED

{

 closedMode(1),

 hybridMode(2)

}

-- TS 32.299 [Re2], clause 7.2.46B

CSGMembershipIndication ::= ENUMERATED

{

 notCSGMember(1),

 cSGMember(2)

}

-- TS 29.272 [Re1], clause 7.3.116

SGSNLocationInformation ::= SEQUENCE

{

 cGI [1] CGI OPTIONAL,

 lAI [2] LAI OPTIONAL,

 sAI [3] SAI OPTIONAL,

 rAI [4] RAI OPTIONAL,

 geographicalInformation [5] GeographicalInformationOctet OPTIONAL,

 geodeticInformation [6] GeodeticInformationOctet OPTIONAL,

 currentLocationRetrieved [7] BOOLEAN OPTIONAL,

 ageOfLocationInformation [8] INTEGER OPTIONAL,

 userCSGInformation [9] UserCSGInformation OPTIONAL

}

-- TS 29.172 [53], clause 7.4.57

ESMLCCellInfo ::= SEQUENCE

{

 eCGI [1] ECGI,

 cellPortionID [2] CellPortionID

}

-- TS 29.171 [54], clause 7.4.31

CellPortionID ::= INTEGER (0..4095)

-- TS 29.518 [22], clause 6.2.6.2.5

LocationPresenceReport ::= SEQUENCE

{

 type [1] AMFEventType,

 timestamp [2] Timestamp,

 areaList [3] SET OF AMFEventArea OPTIONAL,

 timeZone [4] TimeZone OPTIONAL,

 accessTypes [5] SET OF AccessType OPTIONAL,

 rMInfoList [6] SET OF RMInfo OPTIONAL,

 cMInfoList [7] SET OF CMInfo OPTIONAL,

 reachability [8] UEReachability OPTIONAL,

 location [9] UserLocation OPTIONAL,

 additionalCellIDs [10] SEQUENCE OF CellInformation OPTIONAL

}

-- TS 29.518 [22], clause 6.2.6.3.3

AMFEventType ::= ENUMERATED

{

 locationReport(1),

 presenceInAOIReport(2)

}

-- TS 29.518 [22], clause 6.2.6.2.16

AMFEventArea ::= SEQUENCE

{

 presenceInfo [1] PresenceInfo OPTIONAL,

 lADNInfo [2] LADNInfo OPTIONAL

}

-- TS 29.571 [17], clause 5.4.4.27

PresenceInfo ::= SEQUENCE

{

 presenceState [1] PresenceState OPTIONAL,

 trackingAreaList [2] SET OF TAI OPTIONAL,

 eCGIList [3] SET OF ECGI OPTIONAL,

 nCGIList [4] SET OF NCGI OPTIONAL,

 globalRANNodeIDList [5] SET OF GlobalRANNodeID OPTIONAL,

 globalENbIDList [6] SET OF GlobalRANNodeID OPTIONAL

}

-- TS 29.518 [22], clause 6.2.6.2.17

LADNInfo ::= SEQUENCE

{

 lADN [1] UTF8String,

 presence [2] PresenceState OPTIONAL

}

-- TS 29.571 [17], clause 5.4.3.20

PresenceState ::= ENUMERATED

{

 inArea(1),

 outOfArea(2),

 unknown(3),

 inactive(4)

}

-- TS 29.518 [22], clause 6.2.6.2.8

RMInfo ::= SEQUENCE

{

 rMState [1] RMState,

 accessType [2] AccessType

}

-- TS 29.518 [22], clause 6.2.6.2.9

CMInfo ::= SEQUENCE

{

 cMState [1] CMState,

 accessType [2] AccessType

}

-- TS 29.518 [22], clause 6.2.6.3.7

UEReachability ::= ENUMERATED

{

 unreachable(1),

 reachable(2),

 regulatoryOnly(3)

}

-- TS 29.518 [22], clause 6.2.6.3.9

RMState ::= ENUMERATED

{

 registered(1),

 deregistered(2)

}

-- TS 29.518 [22], clause 6.2.6.3.10

CMState ::= ENUMERATED

{

 idle(1),

 connected(2)

}

-- TS 29.572 [24], clause 6.1.6.2.5

GeographicArea ::= CHOICE

{

 point [1] Point,

 pointUncertaintyCircle [2] PointUncertaintyCircle,

 pointUncertaintyEllipse [3] PointUncertaintyEllipse,

 polygon [4] Polygon,

 pointAltitude [5] PointAltitude,

 pointAltitudeUncertainty [6] PointAltitudeUncertainty,

 ellipsoidArc [7] EllipsoidArc

}

-- TS 29.002 [47], clause 17.7.1

GeographicalInformationOctet ::= OCTET STRING (SIZE (8))

-- TS 29.002 [47], clause 17.7.1

GeodeticInformationOctet ::= OCTET STRING (SIZE (10))

-- TS 29.572 [24], clause 6.1.6.3.12

AccuracyFulfilmentIndicator ::= ENUMERATED

{

 requestedAccuracyFulfilled(1),

 requestedAccuracyNotFulfilled(2)

}

-- TS 29.572 [24], clause 6.1.6.2.17

VelocityEstimate ::= CHOICE

{

 horVelocity [1] HorizontalVelocity,

 horWithVertVelocity [2] HorizontalWithVerticalVelocity,

 horVelocityWithUncertainty [3] HorizontalVelocityWithUncertainty,

 horWithVertVelocityAndUncertainty [4] HorizontalWithVerticalVelocityAndUncertainty

}

-- TS 29.572 [24], clause 6.1.6.2.14

CivicAddress ::= SEQUENCE

{

 country [1] UTF8String,

 a1 [2] UTF8String OPTIONAL,

 a2 [3] UTF8String OPTIONAL,

 a3 [4] UTF8String OPTIONAL,

 a4 [5] UTF8String OPTIONAL,

 a5 [6] UTF8String OPTIONAL,

 a6 [7] UTF8String OPTIONAL,

 prd [8] UTF8String OPTIONAL,

 pod [9] UTF8String OPTIONAL,

 sts [10] UTF8String OPTIONAL,

 hno [11] UTF8String OPTIONAL,

 hns [12] UTF8String OPTIONAL,

 lmk [13] UTF8String OPTIONAL,

 loc [14] UTF8String OPTIONAL,

 nam [15] UTF8String OPTIONAL,

 pc [16] UTF8String OPTIONAL,

 bld [17] UTF8String OPTIONAL,

 unit [18] UTF8String OPTIONAL,

 flr [19] UTF8String OPTIONAL,

 room [20] UTF8String OPTIONAL,

 plc [21] UTF8String OPTIONAL,

 pcn [22] UTF8String OPTIONAL,

 pobox [23] UTF8String OPTIONAL,

 addcode [24] UTF8String OPTIONAL,

 seat [25] UTF8String OPTIONAL,

 rd [26] UTF8String OPTIONAL,

 rdsec [27] UTF8String OPTIONAL,

 rdbr [28] UTF8String OPTIONAL,

 rdsubbr [29] UTF8String OPTIONAL,

 prm [30] UTF8String OPTIONAL,

 pom [31] UTF8String OPTIONAL

}

-- TS 29.571 [17], clauses 5.4.4.62 and 5.4.4.64

-- Contains the original binary data i.e. value of the YAML field after base64 encoding is removed

CivicAddressBytes ::= OCTET STRING

-- TS 29.572 [24], clause 6.1.6.2.15

PositioningMethodAndUsage ::= SEQUENCE

{

 method [1] PositioningMethod,

 mode [2] PositioningMode,

 usage [3] Usage,

 methodCode [4] MethodCode OPTIONAL

}

-- TS 29.572 [24], clause 6.1.6.2.16

GNSSPositioningMethodAndUsage ::= SEQUENCE

{

 mode [1] PositioningMode,

 gNSS [2] GNSSID,

 usage [3] Usage

}

-- TS 29.572 [24], clause 6.1.6.2.6

Point ::= SEQUENCE

{

 geographicalCoordinates [1] GeographicalCoordinates

}

-- TS 29.572 [24], clause 6.1.6.2.7

PointUncertaintyCircle ::= SEQUENCE

{

 geographicalCoordinates [1] GeographicalCoordinates,

 uncertainty [2] Uncertainty

}

-- TS 29.572 [24], clause 6.1.6.2.8

PointUncertaintyEllipse ::= SEQUENCE

{

 geographicalCoordinates [1] GeographicalCoordinates,

 uncertainty [2] UncertaintyEllipse,

 confidence [3] Confidence

}

-- TS 29.572 [24], clause 6.1.6.2.9

Polygon ::= SEQUENCE

{

 pointList [1] SET SIZE (3..15) OF GeographicalCoordinates

}

-- TS 29.572 [24], clause 6.1.6.2.10

PointAltitude ::= SEQUENCE

{

 point [1] GeographicalCoordinates,

 altitude [2] Altitude

}

-- TS 29.572 [24], clause 6.1.6.2.11

PointAltitudeUncertainty ::= SEQUENCE

{

 point [1] GeographicalCoordinates,

 altitude [2] Altitude,

 uncertaintyEllipse [3] UncertaintyEllipse,

 uncertaintyAltitude [4] Uncertainty,

 confidence [5] Confidence

}

-- TS 29.572 [24], clause 6.1.6.2.12

EllipsoidArc ::= SEQUENCE

{

 point [1] GeographicalCoordinates,

 innerRadius [2] InnerRadius,

 uncertaintyRadius [3] Uncertainty,

 offsetAngle [4] Angle,

 includedAngle [5] Angle,

 confidence [6] Confidence

}

-- TS 29.572 [24], clause 6.1.6.2.4

GeographicalCoordinates ::= SEQUENCE

{

 latitude [1] UTF8String,

 longitude [2] UTF8String,

 mapDatumInformation [3] OGCURN OPTIONAL

}

-- TS 29.572 [24], clause 6.1.6.2.22

UncertaintyEllipse ::= SEQUENCE

{

 semiMajor [1] Uncertainty,

 semiMinor [2] Uncertainty,

 orientationMajor [3] Orientation

}

-- TS 29.572 [24], clause 6.1.6.2.18

HorizontalVelocity ::= SEQUENCE

{

 hSpeed [1] HorizontalSpeed,

 bearing [2] Angle

}

-- TS 29.572 [24], clause 6.1.6.2.19

HorizontalWithVerticalVelocity ::= SEQUENCE

{

 hSpeed [1] HorizontalSpeed,

 bearing [2] Angle,

 vSpeed [3] VerticalSpeed,

 vDirection [4] VerticalDirection

}

-- TS 29.572 [24], clause 6.1.6.2.20

HorizontalVelocityWithUncertainty ::= SEQUENCE

{

 hSpeed [1] HorizontalSpeed,

 bearing [2] Angle,

 uncertainty [3] SpeedUncertainty

}

-- TS 29.572 [24], clause 6.1.6.2.21

HorizontalWithVerticalVelocityAndUncertainty ::= SEQUENCE

{

 hSpeed [1] HorizontalSpeed,

 bearing [2] Angle,

 vSpeed [3] VerticalSpeed,

 vDirection [4] VerticalDirection,

 hUncertainty [5] SpeedUncertainty,

 vUncertainty [6] SpeedUncertainty

}

-- The following types are described in TS 29.572 [24], table 6.1.6.3.2-1

Altitude ::= UTF8String

Angle ::= INTEGER (0..360)

Uncertainty ::= INTEGER (0..127)

Orientation ::= INTEGER (0..180)

Confidence ::= INTEGER (0..100)

InnerRadius ::= INTEGER (0..327675)

AgeOfLocationEstimate ::= INTEGER (0..32767)

HorizontalSpeed ::= UTF8String

VerticalSpeed ::= UTF8String

SpeedUncertainty ::= UTF8String

BarometricPressure ::= INTEGER (30000..115000)

-- TS 29.572 [24], clause 6.1.6.3.13

VerticalDirection ::= ENUMERATED

{

 upward(1),

 downward(2)

}

-- TS 29.572 [24], clause 6.1.6.3.6

PositioningMethod ::= ENUMERATED

{

 cellID(1),

 eCID(2),

 oTDOA(3),

 barometricPressure(4),

 wLAN(5),

 bluetooth(6),

 mBS(7),

 motionSensor(8),

 dLTDOA(9),

 dLAOD(10),

 multiRTT(11),

 nRECID(12),

 uLTDOA(13),

 uLAOA(14),

 networkSpecific(15)

}

-- TS 29.572 [24], clause 6.1.6.3.7

PositioningMode ::= ENUMERATED

{

 uEBased(1),

 uEAssisted(2),

 conventional(3)

}

-- TS 29.572 [24], clause 6.1.6.3.8

GNSSID ::= ENUMERATED

{

 gPS(1),

 galileo(2),

 sBAS(3),

 modernizedGPS(4),

 qZSS(5),

 gLONASS(6),

 bDS(7),

 nAVIC(8)

}

-- TS 29.572 [24], clause 6.1.6.3.9

Usage ::= ENUMERATED

{

 unsuccess(1),

 successResultsNotUsed(2),

 successResultsUsedToVerifyLocation(3),

 successResultsUsedToGenerateLocation(4),

 successMethodNotDetermined(5)

}

-- TS 29.571 [17], table 5.2.2-1

TimeZone ::= UTF8String

-- Open Geospatial Consortium URN [35]

OGCURN ::= UTF8String

-- TS 29.572 [24], clause 6.1.6.2.15

MethodCode ::= INTEGER (16..31)

END

## \*\*\*\* END OF ALL CHANGES \*\*\*