**3GPP SA3LI#85e-a *S3i220430r1***

**Sophia-Antipolis, France, 30th Aug 2022 - 2nd Sep 2022**

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| --- |
| *CR-Form-v12.1* |
| **CHANGE REQUEST** |
|  |
|  | **33.128** | **CR** | **396** | **rev** | **1** | **Current version:** | **18.0.0** |  |
|  |
| *For* [***HE******LP***](http://www.3gpp.org/3G_Specs/CRs.htm#_blank)*on using this form: comprehensive instructions can be found at* [*http://www.3gpp.org/Change-Requests*](http://www.3gpp.org/Change-Requests)*.* |
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|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| ***Proposed change affects:*** | UICC apps |  | ME |  | Radio Access Network |  | Core Network | **x** |

|  |
| --- |
|  |
| ***Title:***  | Location acquisition interfaces |
|  |  |
| ***Source to WG:*** | SA3 LI (PIDS, NTAC, OTD)  |
| ***Source to TSG:*** | SA3 |
|  |  |
| ***Work item code:*** | LI18 |  | ***Date:*** | 2022-08-31 |
|  |  |  |  |  |
| ***Category:*** | **B** |  | ***Release:*** | Rel-18 |
|  | *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-15 (Release 15)Rel-16 (Release 16)Rel-17 (Release 17)Rel-18 (Release 18)* |
|  |  |
| ***Reason for change:*** | LEAs have a requierment to get the UEs current network location. The CR adds the capability to acquire UE (network) location. |
|  |  |
| ***Summary of change:*** | Add location acquisition capability |
|  |  |
| ***Consequences if not approved:*** | CSP will be unable to meet the LI requierments for location acquisition capability |
|  |  |
| ***Clauses affected:*** | 3.3, 4.1, 4.2, 4.3, 5.4.X (new), 5.X (new), 5.Y (new), 6.2.2.2.4, 7.3.X (new), Annex A, Annex E, Annex X (new), Annex Y (new) |
|  |  |
|  | **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:*** | The ASN.1 and XSD part of this change can be found on the Forge:Merge Request: <https://forge.3gpp.org/rep/sa3/li/-/merge_requests/87>Commit hash: <https://forge.3gpp.org/rep/sa3/li/-/commit/6c1ac21e94004148323e796306239fe0086c0a9f> |
|  |  |
| ***This CR's revision history:*** |  |

\*\*\* First Change \*\*\*

# 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-12: "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".

[xx] ETSI TS 103 280: "Lawful Interception (LI); Dictionary for common parameters".

\*\*\* Next Change \*\*\*

## 3.3 Abbreviations

For the purposes of the present document, the abbreviations given in 3GPP TR 21.905 [1] and the following apply. An abbreviation defined in the present document takes precedence over the definition of the same abbreviation, if any, in 3GPP TR 21.905 [1].

ADMF LI Administration Function

CC Content of Communication

CSP Communication Service Provider

CUPS Control and User Plane Separation

DNAI Data Network Access Identifier

ICF Identity Caching Function

IEF Identity Event Function

IQF Identity Query Function

IRI Intercept Related Information

LAF Location Acquisition Function

LALS Lawful Access Location Services

LARF Location Acquisition Requesting Function

LEA Law Enforcement Agency

LEMF Law Enforcement Monitoring Facility

LI Lawful Interception

LICF Lawful Interception Control Function

LI\_HI1 LI\_Handover Interface 1

LI\_HI2 LI\_Handover Interface 2

LI\_HI3 LI\_Handover Interface 3

LI\_HI4 LI\_Handover Interface 4

LI\_HILA Lawful Interception Handover Interface Location Acquisition

LI\_HIQR Lawful Interception Handover Interface Query Response

LIPF Lawful Interception Provisioning Function

LIR Location Immediate Request

LI\_SI Lawful Interception System Information Interface

LISSF Lawful Interception State Storage Function

LI\_ST Lawful Interception State Transfer Interface

LI\_X1 Lawful Interception Internal Interface 1

LI\_X2 Lawful Interception Internal Interface 2

LI\_X2RF Lawful Interception Internal Interface 2 Requesting Function

LI\_X3 Lawful Interception Internal Interface 3

LI\_XEM1 Lawful Interception Internal Interface Event Management Interface 1

LI\_XER Lawful Interception Internal Interface Event Record

LI\_XLA Lawful Interception Internal Interface Location Acquisition

LI\_XQR Lawful Interception Internal Interface Query Response

LTF Location Triggering Function

MDF Mediation and Delivery Function

MDF2 Mediation and Delivery Function 2

MDF3 Mediation and Delivery Function 3

MM Multimedia Message

MMS Multimedia Message Service

NAT Network Address Translation

NPLI Network Provided Location Information

O&M Operations and Management

POI Point Of Interception

RCS Rich Communication Suite

SDP Session Description Protocol

SIP Session Initiation Protocol

SIRF System Information Retrieval Function

SOI Start Of Interception

TF Triggering Function

TNGF Trusted Non-3GPP Gateway Function

TWIF Trusted WLAN Interworking Function

xCC LI\_X3 Communications Content.

xIRI LI\_X2 Intercept Related Information

\*\*\* Next Change \*\*\*

## 4.1 Introduction

The present document provides details of the internal and external interfaces required for a network operator, access provider and/or service provider to provide the necessary information to a Law Enforcement Agency (LEA) required to meet LI requirements. LI requirements for 3GPP networks and services are given in TS 33.126 [3].

The high-level architecture that defines the necessary interfaces is specified in TS 33.127 [5]. The generic high-level interception architecture is as follows:



**Figure 4.1-1: High-level interception architecture diagram with key point-to-point LI interfaces**

The generic high-level acquisition architecture is as follows:



**Figure 4.1-2: High-level acquisition architecture diagram with key point-to-point LI interfaces**

The specification of the interfaces is split into two parts:

- Internal interfaces used between an operator’s network functions are described in clause 4.2.

- External interfaces used in communicating with a LEA are described in clause 4.3.

\*\*\* Next Change \*\*\*

## 4.2 Basic principles for internal interfaces

This clause lists the internal interfaces shown in clause 4.1, indicates the protocol used to realise each interface, and gives a reference to the relevant clauses of the present document that specify how the protocol is to be used for the given interface.

Table 4.2-1: Internal interfaces and related protocols

|  |  |  |  |
| --- | --- | --- | --- |
| Interface | Description | Protocol used to realise interface | Usage |
| LI\_ADMF | Used to pass intercept provisioning information form the LICF to the LIPF. | Out of scope of the present document. |  |
| LI\_IQF | Used to pass information related to IEFs and ICF to IQF. | Out of scope of the present document. |  |
| LI\_LAF | Used to pass information from LIPF to LAF. | Out of scope of the present document. |  |
| LI\_MDF | Used by MDF2 and MDF3 in interactions necessary to correctly generate CC and IRI from xCC and xIRI. | Out of scope of the present document. |  |
| LI\_SI | Used to provide system information to the LIPF from the SIRF. | Out of scope of the present document. |  |
| LI\_ST | Used to transfer LI state information to and from the LISSF. | 3GPP TS 29.598 [64]. | See clauses 5.10 and 6.2.3.10 |
| LI\_T2 | Used to pass triggering information from the IRI-TF to a Triggered IRI-POI. | ETSI TS 103 221-1 [7]. | See clause 5.2.4 |
| LI\_T3 | Used to pass triggering information from a CC-TF to a Triggered CC-POI. | ETSI TS 103 221-1 [7]. | See clause 5.2.4 |
| LI\_X1 | Used to configure and audit Directly-provisioned POIs, TFs and MDFs. | ETSI TS 103 221-1 [7]. | See clause 5.2.2 |
| LI\_X1 (Management) | Used to audit Triggered POIs. | ETSI TS 103 221-1 [7]. | See clause 5.2.3 |
| LI\_X2 | Used to pass xIRI from IRI-POIs to the MDF2. | ETSI TS 103 221-2 [8]. | See clause 5.3.2 |
| LI\_X2RF | Used to pass xIRI from LARF to the MDF2 | ETSI TS 103 221-2 [8]. | See clause 5.3.X |
| LI\_X3 | Used to pass xCC from CC-POIs to the MDF3. | ETSI TS 103 221-2 [8]. | See clause 5.3.3 |
| LI\_XEM1 | Used by the LICF/LIPF to manage IEFs and ICF. | ETSI TS 103 221-1 [7]. | See clause 5.2.7 |
| LI\_XER | Used to pass identifier association event records from IEFs to ICF. | See Clause 5.9. | See clause 5.9 |
| LI\_XLA | Used to send the location acquisition requests from LAF to LARF and used by the LARF to send the location acquisition responses to the LAF. | ETSI TS 103 221-1 [7]. | See clause 5.Y |
| LI\_XQR | Used to pass queries from IQF to ICF and responses from ICF to IQF. | ETSI TS 103 221-1 [7]. | See clause 5.8 |

\*\*\* Next Change \*\*\*

## 4.3 Basic principles for external handover interfaces

This clause lists the external handover interfaces shown in clause 4.1, indicates the protocol used to realise each interface, and gives a reference to the relevant clauses of the present document that specify how the protocol is to be used for the given interface.

Table 4.3-1: External handover interfaces and related protocols

|  |  |  |  |
| --- | --- | --- | --- |
| Interface | Description | Protocol used to realise interface | Usage |
| LI\_HI1 | Used to send warrant and other interception request information from LEA to operator. | ETSI TS 103 120 [6] shall be supported.Other methods (e.g. manual exchange) may be used depending on national regulatory requirements.  | See clause 5.4 |
| LI\_HI2 | Used to send IRI from the MDF2 to the LEMF. | ETSI TS 102 232-1 [9] and ETSI TS 102 232-7 [10] shall be supported. | See clause 5.5 |
| LI\_HI3 | Used to send CC from the MDF3 to the LEMF. | ETSI TS 102 232-1 [9] and ETSI TS 102 232-7 [10] shall be supported. | See clause 5.5 |
| LI\_HI4 | Used to send LI notification information from MDF2/3 to LEMF. | ETSI TS 102 232-1 [9] and ETSI TS 102 232-7 [10] shall be supported. | See clause 5.6 |
| LI\_HILA | Used to send the location acquisition requests from LEA to CSP and used by the CSP to send the location acquisition responses to the LEA. | ETSI TS 103 120 [6] shall be supported. | See clause 5.X |
| LI\_HIQR | Used to send warrant and other identifier association query information from LEA to CSP and used by the CSP to send query responses to the LEA. | ETSI TS 103 120 [6] shall be supported. | See clause 5.7 |

\*\*\* Next Change \*\*\*

### 5.4.X Usage for realising LI\_X2RF

For the purposes of realising LI\_X2RF between the LARF and an MDF2, the LARF plays the role of the IRI-POI.

\*\*\* Next Change \*\*\*

### 5.4.X Location acquisition

When required for location acquisition, the warrant sent over the LI\_HI1 interface will specify the delivery method using task flags populated as shown in table 5.X.1-1. Subsequently, the LIPF present in the ADMF will provision the LAF (over the LI\_LAF interface) with the information (e.g., delivery method, target identifier, XID) necessary to process location acquisiton requests received over the LI\_HILA interface. If the delivery method is the delivery via MDF2, the LIPF shall ensure that the MDF2 (clause 7.3.X.6.1) is provisioned.

Table 5.X.1-1: LATaskFlag Dictionary for LI\_HI1

|  |  |
| --- | --- |
| Dictionary Owner | Dictionary Name |
| 3GPP | LATaskFlag |
|  |
| Defined DictionaryEntries |
| Value | Meaning |
| LAFDelivery | The location information shall be delivered via the LAF. |
| MDF2Delivery | The location information shall be delivered via the MDF2. |
| AlwaysUpdateLocation | The LARF shall invoke a ProvideLocationInfo service operation (see TS 29.502 [16] clause 5.5.2.4) as described in clause 7.3.X.4. |

\*\*\* Next Change \*\*\*

## 5.X Protocols for LI\_HILA

### 5.X.1 General

Functions having a LI\_HILA interface shall support the use of ETSI TS 103 120 [6] to realise the interface.

In the event of a conflict between ETSI TS 103 120 [6] and the present document, the terms of the present document shall apply.

For each LI\_HILA request, the LEA shall provide a(n) (at least national or globally) unique legal authorization identifier. This is done by issuing a warrant over the LI\_HI1 interface prior to issuing the LI\_HILA requests as described in clause 5.4.X.

### 5.X.2 Usage for realising LI\_HILA

#### 5.X.2.1 Request structure

LI\_HILA requests are represented by issuing a CREATE request for an LDTaskObject (see ETSI TS 103 120 [6] clause 8.3), populated as follows:

Table 5.X.2.1-1: LDTaskObject representation of LI\_HILA request

|  |  |  |
| --- | --- | --- |
| Field | Value | M/C/O |
| Reference | The LDID (as in ETSI TS 103 280 [xx] with country code, unique LEA identifier, and the LIID used in the warrant as unique request identifier. | M |
| DesiredStatus | Shall be set to "AwaitingDisclosure". | M |
| RequestDetails | Set according to table 5.X.2.1-2 below. | M |

The use of any other LDTaskObject parameter is outside the scope of the present document.

Table 5.X.2.1-2: RequestDetails structure

|  |  |  |
| --- | --- | --- |
| Field | Value | M/C/O |
| RequestValues | Set to the target identifier (see clause 5.X.2.2). | M |

#### 5.X.2.2 Request parameters

The RequestValues field shall contain at least one of the following:

- SUPI, given in either SUPIIMSI or SUPINAI formats as defined in ETSI TS 103 120 [6] clause C.2.

- GPSI, given in either GPSIMSISDN or GPSINAI formats as defined in ETSI TS 103 120 [6] clause C.2.

#### 5.X.2.3 Response structure

The LI\_HILA request is used to generate a request to the LARF over LI\_XLA (see clause 5.Y.2) to retrieve the target's network-provided location.

If delivery via the MDF2 is required, the LARF instructs the IRI-POI to send the acquisition response as a SeparatedLocationReporting xIRI record to the MDF2 via LI\_X2. Full details are given in clause 7.3.X.6.

If delivery via the LAF is required, the LARF returns the acquisition response as part of the LI\_XLA response, which the LAF then transforms into a LI\_HILA responsegiven as a LocationResponseDetails structure (see Table 5.X.2.3-1). Full details are given in clause 7.3.X. LocationResponseDetails contains Location records.

The fields of the LocationResponseDetails structure shall be set as follows:

Table 5.X.2.3-1: LocationResponseDetails

|  |  |  |
| --- | --- | --- |
| Field | Value | M/C/O |
| SUPI | SUPI associated with the UE for which location is returned. | M |
| GPSI | GPSI associated with the UE for which location is returned. Shall be included if the GPSI of the UE for which location is returned is known. | C |
| LocationRecords | Locations of the target as determined by the network. The format of each LocationRecord shall be set as defined in Table 5.X.2.3-2. | M |

Table 5.X.2.3-2: LocationRecord

|  |  |  |
| --- | --- | --- |
| Field | Value | M/C/O |
| Location | Location of the target as determined by the network. It shall be given as a JSON locationInfo structure as defined in TS 29.518 [22] clauses 6.4.2.6, in base-64 encoding. | M |

\*\*\* Next Change \*\*\*

## 5.Y Protocols for LI\_XLA

### 5.Y.1 General

Functions having a LI\_XLA interface shall support the use of ETSI TS 103 221-1 [7] to realise the interface.

In the event of a conflict between ETSI TS 103 221-1 [7] and the present document, the terms of the present document shall apply.

### 5.Y.2 Usage for realising LI\_XLA

LI\_XLA requests are realised using TS 103 221-1 [7] to transport the LocationAcquisitionRequest and LocationAcquisitionResponse messages (which are derived from X1RequestMessage and X1ResponseMessage respectively, as defined in TS 103 221-1 [7]) as defined in Annex X. The LocationAcquisitionRequest message is populated as follows:

Table 5.Y.2.1-1: LocationAcquisitionRequest representation for an XLA request

|  |  |  |
| --- | --- | --- |
| ETSI TS 103 221-1 [7] field name | Description | M/C/O |
| RequestValues | Set to the target identifier specified in the LI\_HILA request (see clause 5.X.2) | M |
| LAFDelivery | Based on the information received from the LIPF. If set, the LARF shall return the location information to the LAF.  | C |
| MDF2Delivery  | Based on the information received from the LIPF. If present, the format shall be as defined inTable 5.Y.2.1-2. | C |

Table 5.Y.2.1-2: MDF2Delivery structure

|  |  |  |
| --- | --- | --- |
| ETSI TS 103 221-1 [7] field name | Description | M/C/O |
| XID | XID assigned (and provided to the LAF) by the LIPF. The value shall be used by the LARF to fill the XID field of the X2 PDUs. The value shall be the same as the one provisioned on the MDF2 (Clause 7.3.X.6.2). | M |
| ListOfDestinations | Delivery endpoints for LI\_X2 for the LARF in the AMF. This field shall be present unless the delivery details are known via other means.  | C |

Successful LI\_XLA responses are returned using the LocationAcquisitionResponse message. Error conditions are reported using the normal error reporting mechanisms described in TS 103 221-1 [7].

LI\_XLA query responses are represented in XML following the LocationAcquisitionResponse schema (see Annex X). If delivery via the LAF was specified, the fields of the LocationAcquisitionResponse record shall be populated as described in clause 5.X.2.3. If delivery via the MDF2 was specified in the original request, the LARF shall leave the LocationAcquisitionResponse record field unpopulated.

\*\*\* Next Change \*\*\*

##### 6.2.2.2.4 Location update

The IRI-POI in the AMF shall generate an xIRI containing an AMFLocationUpdate record each time the IRI-POI present in an AMF detects that the target’s UE location is updated due to target UE mobility or as a part of an AMF service procedure and the reporting of location information is not restricted by service scoping. 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. For the responses to location acquisition requests initiated by LARF, as described in TS 33.127 [5], clause 7.3.X, the location update IRIs shall not be generated.

The UE mobility events resulting in generation of an AMFLocationUpdate xIRI include the *N2 Path Switch Request* (*Xn based inter NG-RAN handover* procedure described in TS 23.502 [4] clause 4.9.1.2) and the *N2 Handover Notify* (*Inter NG-RAN node N2 based handover* procedure described in TS 23.502 [4] clause 4.9.1.3).

The AMFLocationUpdate xIRI is also generated when the AMF receives an NG-RAN NGAP *PDU Session Resource Modify Indication* message as a result of Dual Connectivity activation/release for the target UE, as described in TS 37.340 [37] clause 10.

Optionally, based on operator policy, other NG-RAN NGAP messages that do not generate separate xIRI but carry location information (e.g. RRC INACTIVE TRANSITION REPORT) may trigger the generation of an xIRI AMFLocationUpdate record.

Additionally, based on regulatory requirements and operator policy, the location information obtained by AMF from NG-RAN or LMF in the course of some service operation (e.g. emergency services, LCS) may generate xIRI AMFLocationUpdate record. The AMF services providing the location information in these cases include the AMF Location Service (ProvideLocInfo, ProvidePosInfo, NotifiedPosInfo and EventNotify service operations) and the AMF Exposure Service (AmfEventReport with LOCATION\_REPORT) (see TS 29.518 [22]). Additionally, the AMF Communication Service (Namf\_Communication\_N1MessageNotify service operation) may be monitored to capture the location information in the scenarios described in TS 23.273 [42] clause 6.3.1. Also, in the case of Mobile Originated LCS service invoked by the target, the location information may be derived from a Nlmf\_Location\_DetermineLocation Response to AMF (see TS 23.273 [42] clause 6.2).

Table 6.2.2-3: Payload for AMFLocationUpdate record

|  |  |  |
| --- | --- | --- |
| Field name | Description | M/C/O |
| sUPI | SUPI associated with the location update (see clause 6.2.2.4). | M |
| sUCI | SUCI associated with the location update, if available, see TS 24.501 [13]. | C |
| pEI | PEI associated with the location update, if available. | C |
| gPSI | GPSI associated with the location update, if available as part of the subscription profile. | C |
| gUTI | 5G-GUTI assigned during the location update, if available, see TS 33.501 [11] clause 6.12.3. | 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):1) as a *userLocation* parameter (*location>locationInfo>userLocation*) in the case the information is obtained from an NGAP message, except the LOCATION REPORT message (see TS 38.413 [23]);2) as a *locationInfo* parameter (*location>locationInfo*) in the case the information is obtained from a **ProvideLocInfo** (TS 29.518 [22] clause 6.4.6.2.6);3) as a *locationPresenceReport* parameter (*location>locationPresenceReport*) in the case the information is obtained from an **AmfEventReport** (TS 29.518 [22] clause 6.2.6.2.5) with event type **Location-Report** or **Presence-In-AOI-Report;**4) as a *positionInfo* parameter (*location>positioningInfo>positionInfo*) in the case the information is obtained from a **ProvidePosInfo** (TS 29.518 [22] clause 6.4.6.2.3) or a **NotifiedPosInfo** (TS 29.518 [22] clause 6.4.6.2.4). | M |
| sMSoverNASIndicator | Indicates whether SMS over NAS is supported. Provide, if included in registrationResult, see TS 24.501 [13] clause 9.11.3.6.  | C |
| oldGUTI | GUTI or 5G-GUTI, if provided (e.g. in REGISTRATION REQUEST message, when performing S1 to N1 inter-system change), see TS 24.501 [13] clause 8.2.6.12. | C |

\*\*\* Next Change \*\*\*

### 7.3.X Location Acquisition

#### 7.3.X.1 General description

The architecture for Location Acquisition with delivery via the LAF is specified in TS 33.127 [5], clause 7.3.X.2.2.

The architecture for Location Acquisition with delivery via the MDF2 is specified in TS 33.127 [5], clause 7.3.X.2.3.

#### 7.3.X.2 Acquisition request over LI\_HILA

The LAF is responsible for receiving acquisition requests from the LEA over the LI\_HILA interface. Further details of LI\_HILA messages are defined in clause 5.X.

#### 7.3.X.3 Acquisition request over LI\_XLA

LI\_HILA requests are used to generate a LI\_XLA request to the LARF over the LI\_XLA interface. Further details of LI\_XLA messages are defined in clause 5.Y.

#### 7.3.X.4 Location Acquisition Procedure at the LARF

Upon the receipt of a Location Acquisition Request over LI\_XLA, the LARF shall first check the UE context at the AMF to see if the current location for the UE is known.

If the current location for the UE is known:

- If the AlwaysUpdateLocation flag (see Table 5.X.1-1) is present in the Location Acquisition Request message received over LI\_XLA, the LARF shall invoke a ProvideLocationInfo service operation in the AMF as described in TS 29.502 [16] clause 5.5.2.4 using the information received in the Location Acquistion Request message to generate the RequestLocInfo message. The LARF shall set the reqCurrentLoc parameter of the RequestLocInfo IE to true.

- If the AlwaysUpdateLocation flag (see Table 5.X.1-1) is not present in the Location Acquisition Request message received over LI\_XLA, the LARF shall use the location information in the UE context at the AMF to generate and deliver a Location Acquisition Response based on the provisioned delivery method as described in clauses 7.3.X.5 and 7.3.X.6.

If the current location for the UE is not known at the AMF shall invoke a ProvideLocationInfo service operation in the AMF as described in TS 29.502 [16] clause 5.5.2.4 using the information received in the Location Acquistion Request message to generate the RequestLocInfo message.

#### 7.3.X.5 Location Acquisition Response via the LAF

##### 7.3.X.5.1 Location Acquisition Response over LI\_XLA

The LARF shall populate the LocationResponseDetails field in the LocationAcquisitionResponse message as specified in clause 5.X.2.3.

##### 7.3.X.5.2 Location Acquisition Response over LI\_HILA

On receiving a LocationAcquisitionResponse message containing a LocationResponseDetails field, the LAF shall return the results to the LEA over the LI\_HILA interface. The LI\_HILA response is represented as XML following the LocationResponseDetails type definition (see Annex X). Responses are delivered within a DELIVER Request (see ETSI TS 103 120 [6] clause 6.4.10) containing a DeliveryObject (see ETSI TS 103 120 [6] clause 10).

The DeliveryObject Reference field (see ETSI TS 103 120 [6] clause 10.2.1) shall be set to the Reference of the LDTaskObject used in the request to provide a correlation between request and response. The DeliveryID, SequenceNumber, and LastSequence fields shall be set according to ETSI TS 103 120 [6] clause 10.2.1.

The content manifest (see ETSI TS 103 120 [6] clause 10.2.2) shall be set to indicate the present document, using the following Specification Dictionary extension.

Table 7.3.X.5.2-1: Specification Dictionary

|  |  |
| --- | --- |
| Dictionary Owner | Dictionary Name |
| 3GPP | ManifestSpecification. |
|  |
| Defined DictionaryEntries |
| Value | Meaning |
| HILAResponse | The delivery contains a LocationResponseDetails (see Annex X) |

#### 7.3.X.6 Location Acquisition with delivery via the MDF2

##### 7.3.X.6.1 Provisioning of the MDF2

The MDF2 listed as the delivery endpoint for xIRI generated by the IRI-POI in the AMF shall be provisioned over LI\_X1 by the LIPF using the X1 protocol as described in clause 5.2.2 prior to issuing of LI\_XLA requests for the given target. Table 7.3.X.6.2-1 shows the minimum details of the LI\_X1 ActivateTask message used for provisioning the MDF2.

The MDF2 shall support the following target identifier formats in the ETSI TS 103 221-1 [7] messages (or equivalent if ETSI TS 103 221-1 [7] is not used):

- SUPIIMSI.

- SUPINAI.

- GPSIMSISDN.

- GPSINAI.

Table 7.3.X.6.1-1: ActivateTask message for MDF2

|  |  |  |
| --- | --- | --- |
| ETSI TS 103 221-1 [7] field name | Description | M/C/O |
| XID | XID assigned by LIPF.  | M |
| TargetIdentifiers | One or more of the target identifiers listed in the paragraph above. | M |
| DeliveryType | Set to “X2Only”, “X3Only” or “X2andX3” as needed to meet the requirements of the warrant. (Ignored by the MDF2). | M |
| ListOfDIDs | Delivery endpoints of LI\_HI2. These delivery endpoints shall be configured using the CreateDestination message as described in ETSI TS 103 221-1 [7] clause 6.3.1 prior to first use. | M |
| ListOfMediationDetails | Sequence of Mediation Details, See table 7.3.X.6.2-2. | M |

Table 7.3.X.6.1-2: Mediation Details for MDF2

|  |  |  |
| --- | --- | --- |
| ETSI TS 103 221-1 [7] field name | Description | M/C/O |
| LIID | Lawful Intercept ID associated with the task. | M |
| DeliveryType | Set to “HI2Only”. | M |
| ListOfDIDs | Details of where to send the IRI for this LIID. Shall be included if deviation from the ListofDIDs in the ActivateTask message is necessary. If included, the ListOfDIDs in the Mediation Details shall be used instead of any delivery destinations authorised by the ListOfDIDs field in the ActivateTask Message. | C |

##### 7.3.X.6.2 LI\_X2 delivery

The LARF shall generate the SeparatedLocationReporting xIRI only when it detects that AMF returns the location for the corresponding LARF transaction.

The acquisition response shall be given as a SeparatedLocationReporting xIRI message. The XID of the xIRI message shall be set to the XID specified in the original request (see clause 5.Y.2). The LARF shall allocate a new CorrelationID for each new acquisition response.

##### 7.3.X.6.3 LI\_HI2 delivery

The MDF2 shall generate the IRI message based on the SeparatedLocationReporting xIRI message and return it to the LEMF over LI\_HI2.

\*\*\* Next Change \*\*\*

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) r18(18) version0(0)}

DEFINITIONS IMPLICIT TAGS EXTENSIBILITY IMPLIED ::=

BEGIN

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

-- Relative OIDs

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

tS33128PayloadsOID RELATIVE-OID ::= {threeGPP(4) ts33128(19) r18(18) version0(0)}

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,

 -- AMF events, see 6.2.2.2.9 continued from choice 5

 aMFRANHandoverCommand [113] AMFRANHandoverCommand,

 aMFRANHandoverRequest [114] AMFRANHandoverRequest

}

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

-- 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,

 -- AMF events, see 6.2.2.2.9 continued from choice 5

 aMFRANHandoverCommand [113] AMFRANHandoverCommand,

 aMFRANHandoverRequest [114] AMFRANHandoverRequest

}

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,

 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

}

-- 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 6.2.2.2.9.2 for details of this structure

AMFRANHandoverCommand ::= SEQUENCE

{

 userIdentifiers [1] UserIdentifiers,

 aMFUENGAPID [2] AMFUENGAPID,

 rANUENGAPID [3] RANUENGAPID,

 handoverType [4] HandoverType,

 targetToSourceContainer [5] RANTargetToSourceContainer

}

-- See clause 6.2.2.2.9.3 for details of this structure

AMFRANHandoverRequest ::= SEQUENCE

{

 userIdentifiers [1] UserIdentifiers,

 aMFUENGAPID [2] AMFUENGAPID,

 rANUENGAPID [3] RANUENGAPID,

 handoverType [4] HandoverType,

 handoverCause [5] HandoverCause,

 pDUSessionResourceInformation [6] PDUSessionResourceInformation,

 mobilityRestrictionList [7] MobilityRestrictionList OPTIONAL,

 locationReportingRequestType [8] LocationReportingRequestType OPTIONAL,

 targetToSourceContainer [9] RANTargetToSourceContainer,

 nPNAccessInformation [10] NPNAccessInformation OPTIONAL,

 sourceToTargetContainer [11] RANSourceToTargetContainer

}

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

-- 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)

}

AMFSetID ::= INTEGER (0..1023)

AMFUENGAPID ::= INTEGER (0..1099511627775)

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

-- 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

}

-- 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

}

-- 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

}

-- 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

}

-- 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

}

-- 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

}

-- 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

}

-- 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

}

-- 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

}

-- 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 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 Parameters

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

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

}

QCI ::= INTEGER (0..255)

GTPTunnelInfo ::= SEQUENCE

{

 fiveGSGTPTunnels [1] FiveGSGTPTunnels OPTIONAL

}

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

-- 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

}

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

}

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

-- 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

}

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

-- 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)

}

AllowedNSSAI ::= SEQUENCE OF NSSAI

AllowedTACs ::= SEQUENCE (SIZE(1..MAX)) OF TAC

AreaOfInterest ::= SEQUENCE

{

 areaOfInterestTAIList [1] AreaOfInterestTAIList OPTIONAL,

 areaOfInterestCellList [2] AreaOfInterestCellList OPTIONAL,

 areaOfInterestRANNodeList [3] AreaOfInterestRANNodeList OPTIONAL

}

AreaOfInterestCellList ::= SEQUENCE (SIZE(1..MAX)) OF NCGI

AreaOfInterestItem ::= SEQUENCE

{

 areaOfInterest [1] AreaOfInterest

}

AreaOfInterestRANNodeList ::= SEQUENCE (SIZE(1..MAX)) OF GlobalRANNodeID

AreaOfInterestTAIList ::= SEQUENCE (SIZE(1..MAX)) OF TAI

CellCAGList ::= SEQUENCE (SIZE(1..MAX)) OF CAGID

CauseMisc ::= ENUMERATED

{

 controlProcessingOverload(1),

 notEnoughUserPlaneProcessingResources(2),

 hardwareFailure(3),

 oMIntervention(4),

 unknownPLMNOrSNPN(5),

 unspecified(6)

}

CauseNas ::= ENUMERATED

{

 normalRelease(1),

 authenticationFailure(2),

 deregister(3),

 unspecified(4)

}

CauseProtocol ::= ENUMERATED

{

 transferSyntaxError(1),

 abstractSyntaxError-reject(2),

 abstractSyntaxErrorIgnoreAndNotify(3),

 messageNotCompatibleWithReceiverState(4),

 semanticError(5),

 abstractSyntaxErrorFalselyConstructedMessage(6),

 unspecified(7)

}

CauseRadioNetwork ::= ENUMERATED

{

 unspecified(1),

 txnrelocoverallExpiry(2),

 successfulHandover(3),

 releaseDueToNGRANGeneratedReason(4),

 releaseDueTo5gcGeneratedReason(5),

 handoverCancelled(6),

 partialHandover(7),

 hoFailureInTarget5GCNGRANNodeOrTargetSystem(8),

 hoTargetNotAllowed(9),

 tNGRelocOverallExpiry(10),

 tNGRelocPrepExpiry(11),

 cellNotAvailable(12),

 unknownTargetID(13),

 noRadioResourcesAvailableInTargetCell(14),

 unknownLocalUENGAPID(15),

 inconsistentRemoteUENGAPID(16),

 handoverDesirableForRadioReason(17),

 timeCriticalHandover(18),

 resourceOptimisationHandover(19),

 reduceLoadInServingCell(20),

 userInactivity(21),

 radioConnectionWithUELost(22),

 radioResourcesNotAvailable(23),

 invalidQoSCombination(24),

 failureInRadioInterfaceProcedure(25),

 interactionWithOtherProcedure(26),

 unknownPDUSessionID(27),

 multiplePDUSessionIDInstances(29),

 multipleQoSFlowIDInstances(30),

 encryptionAndOrIntegrityProtectionAlgorithmsNotSupported(31),

 nGIntraSystemHandoverTriggered(32),

 nGInterSystemHandoverTriggered(33),

 xNHandoverTriggered(34),

 notSupported5QIValue(35),

 uEContextTransfer(36),

 iMSVoiceeEPSFallbackOrRATFallbackTriggered(37),

 uPIntegrityProtectioNotPossible(38),

 uPConfidentialityProtectionNotPossible(39),

 sliceNotSupported(40),

 uEInRRCInactiveStateNotReachable(41),

 redirection(42),

 resourcesNotAvailableForTheSlice(43),

 uEMaxIntegrityProtectedDataRateReason(44),

 releaseDueToCNDetectedMobility(45),

 n26InterfaceNotAvailable(46),

 releaseDueToPreemption(47),

 multipleLocationReportingReferenceIDInstances(48),

 rSNNotAvailableForTheUP(49),

 nPMAccessDenied(50),

 cAGOnlyAccessDenied(51),

 insufficientUECapabilities(52)

}

CauseTransport ::= ENUMERATED

{

 transportResourceUnavailable(1),

 unspecified(2)

}

Direction ::= ENUMERATED

{

 fromTarget(1),

 toTarget(2)

}

DNN ::= UTF8String

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

EmailAddress ::= UTF8String

EquivalentPLMNs ::= SEQUENCE (SIZE(1..MAX)) OF PLMNID

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

}

FiveGMMCause ::= INTEGER (0..255)

FiveGSSubscriberID ::= CHOICE

{

 sUPI [1] SUPI,

 sUCI [2] SUCI,

 pEI [3] PEI,

 gPSI [4] GPSI

}

FiveGSSubscriberIDs ::= SEQUENCE

{

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

}

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)

}

ForbiddenAreaInformation ::= SEQUENCE

{

 pLMNIdentity [1] PLMNID,

 forbiddenTACs [2] ForbiddenTACs

}

ForbiddenTACs ::= SEQUENCE (SIZE(1..MAX)) OF TAC

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

}

HandoverCause ::= CHOICE

{

 radioNetwork [1] CauseRadioNetwork,

 transport [2] CauseTransport,

 nas [3] CauseNas,

 protocol [4] CauseProtocol,

 misc [5] CauseMisc

}

HandoverType ::= ENUMERATED

{

 intra5GS(1),

 fiveGStoEPS(2),

 ePSto5GS(3),

 fiveGStoUTRA(4)

}

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))

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)

LocationAreaOfInterestList ::= SEQUENCE (SIZE(1..MAX)) OF AreaOfInterestItem

LocationEventType ::= ENUMERATED

{

 direct(1),

 changeOfServeCell(2),

 uEPrescenceInAreaOfInterest(3),

 stopChangeOfServeCell(4),

 stopUEPresenceInAreaOfInterest(5),

 cancelLocationReportingForTheUE(6)

}

LocationReportArea ::= ENUMERATED

{

 cell(1)

}

LocationReportingRequestType ::= SEQUENCE

{

 eventType [1] LocationEventType,

 reportArea [2] LocationReportArea,

 areaOfInterestList [3] LocationAreaOfInterestList

}

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

MobilityRestrictionList ::= SEQUENCE

{

 servingPLMN [1] PLMNID,

 equivalentPLMNs [2] EquivalentPLMNs OPTIONAL,

 rATRestrictions [3] RATRestrictions OPTIONAL,

 forbiddenAreaInformation [4] ForbiddenAreaInformation OPTIONAL,

 serviceAreaInformation [5] ServiceAreaInformation OPTIONAL

}

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

NAI ::= UTF8String

NextLayerProtocol ::= INTEGER(0..255)

NonLocalID ::= ENUMERATED

{

 local(1),

 nonLocal(2)

}

NonIMEISVPEI ::= CHOICE

{

 mACAddress [1] MACAddress

}

NPNAccessInformation ::= CHOICE

{

 pNINPNAccessInformation [1] CellCAGList

}

NSSAI ::= SEQUENCE OF SNSSAI

PLMNID ::= SEQUENCE

{

 mCC [1] MCC,

 mNC [2] MNC

}

PLMNList ::= SEQUENCE (SIZE(1..MAX)) OF PLMNID

PDUSessionID ::= INTEGER (0..255)

PDUSessionResourceInformation ::= SEQUENCE

{

 pDUSessionID [1] PDUSessionID

}

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)

RANUENGAPID ::= INTEGER (0..4294967295)

-- See clause 9.3.1.20 of TS 38.413 [23] for details

RANSourceToTargetContainer ::= OCTET STRING

-- See clause 9.3.1.21 of TS 38.413 [23] for details

RANTargetToSourceContainer ::= OCTET STRING

RATRestrictions ::= SEQUENCE (SIZE(1..MAX)) OF RATRestrictionItem

RATRestrictionInformation ::= BIT STRING (SIZE(8, ...))

RATRestrictionItem ::= SEQUENCE

{

 pLMNIdentity [1] PLMNID,

 rATRestrictionInformation [2] RATRestrictionInformation

}

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

ServiceAreaInformation ::= SEQUENCE (SIZE(1..MAX)) OF ServiceAreaInfo

ServiceAreaInfo ::= SEQUENCE

{

 pLMNIdentity [1] PLMNID,

 allowedTACs [2] AllowedTACs OPTIONAL,

 notAllowedTACs [3] ForbiddenTACs OPTIONAL

}

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

}

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,

 ePSLocationInfo [4] EPSLocationInfo OPTIONAL,

 tS29518ProvideLocInfo [5] SBIType 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))

-- 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], table 6.2.2-2

EPSLocationInfo ::= SEQUENCE

{

 locationData [1] LocationData,

 cGI [2] CGI OPTIONAL,

 sAI [3] SAI OPTIONAL,

 eSMLCCellInfo [4] ESMLCCellInfo 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 29.572 [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)

SBIType ::= UTF8String

END

\*\*\* Next Change \*\*\*

Annex E (normative):
XSD Schema for Identity Association

<?xml version="1.0" encoding="utf-8"?>

<xs:schema xmlns:xs="http://www.w3.org/2001/XMLSchema"

 xmlns="urn:3GPP:ns:li:3GPPIdentityExtensions:r17:v3"

 xmlns:x1="http://uri.etsi.org/03221/X1/2017/10"

 xmlns:common="http://uri.etsi.org/03280/common/2017/07"

 xmlns:liqr="urn:3GPP:ns:li:3GPPLIQueryExtensions:r17:v3"

 targetNamespace="urn:3GPP:ns:li:3GPPIdentityExtensions:r17:v3"

 elementFormDefault="qualified">

 <xs:import namespace="http://uri.etsi.org/03221/X1/2017/10"/>

 <xs:import namespace="http://uri.etsi.org/03280/common/2017/07"/>

 <xs:import namespace="urn:3GPP:ns:li:3GPPLIQueryExtensions:r17:v3"/>

 <xs:element name="IdentityAssociationRequest" type="liqr:LIQueryRequest"/>

 <xs:complexType name="IdentityAssociationResponse">

 <xs:complexContent>

 <xs:extension base="x1:X1ResponseMessage">

 <xs:sequence>

 <xs:element name="ResponseDetails" type="IdentityResponseDetails"/>

 </xs:sequence>

 </xs:extension>

 </xs:complexContent>

 </xs:complexType>

<xs:element name="LIHIQRResponse" type="IdentityResponseDetails"/>

<xs:complexType name="IdentityResponseDetails">

 <xs:sequence>

 <xs:element name="Associations" type="IdentityAssociationRecords"/>

 </xs:sequence>

 </xs:complexType>

 <xs:complexType name="IdentityAssociationRecords">

 <xs:sequence>

 <xs:element name="IdentityAssociationRecord" type="IdentityAssociationRecord" minOccurs="0" maxOccurs="unbounded"/>

 </xs:sequence>

 </xs:complexType>

 <xs:complexType name="IdentityAssociationRecord">

 <xs:sequence>

 <xs:element name="SUPI" type="liqr:SUPI"/>

 <xs:element name="SUCI" type="liqr:SUCI" minOccurs="0"/>

 <xs:element name="FiveGGUTI" type="liqr:FiveGGUTI"/>

 <xs:element name="PEI" type="liqr:PEI" minOccurs="0"/>

 <xs:element name="AssociationStartTime" type="common:QualifiedMicrosecondDateTime"/>

 <xs:element name="AssociationEndTime" type="common:QualifiedMicrosecondDateTime" minOccurs="0"/>

 <xs:element name="FiveGSTAIList" type="liqr:FiveGSTAIList" minOccurs="0"/>

 <xs:element name="GPSI" type="liqr:GPSI" minOccurs="0"/>

 </xs:sequence>

 </xs:complexType>

 <xs:complexType name="ActivateAssociationUpdates">

 <xs:complexContent>

 <xs:extension base="x1:X1RequestMessage">

 <xs:sequence>

 <xs:element name="OngoingAssociationTaskID" type="common:UUID"></xs:element>

 <xs:element name="SUPI" type="liqr:SUPI"></xs:element>

 </xs:sequence>

 </xs:extension>

 </xs:complexContent>

 </xs:complexType>

 <xs:complexType name="ActivateAssociationUpdatesAcknowledgement">

 <xs:complexContent>

 <xs:extension base="x1:X1ResponseMessage">

 <xs:sequence>

 <xs:element name="oK" type="x1:OKAckAndComplete"/>

 <xs:element name="CurrentAssociations" type="IdentityResponseDetails"></xs:element>

 </xs:sequence>

 </xs:extension>

 </xs:complexContent>

 </xs:complexType>

 <xs:complexType name="DeactivateAssociationUpdates">

 <xs:complexContent>

 <xs:extension base="x1:X1RequestMessage">

 <xs:sequence>

 <xs:element name="OngoingAssociationTaskID" type="common:UUID"></xs:element>

 </xs:sequence>

 </xs:extension>

 </xs:complexContent>

 </xs:complexType>

 <xs:complexType name="DeactivateAssociationUpdatesAcknowledgement">

 <xs:complexContent>

 <xs:extension base="x1:X1ResponseMessage">

 <xs:sequence>

 <xs:element name="oK" type="x1:OKAckAndComplete"/>

 </xs:sequence>

 </xs:extension>

 </xs:complexContent>

 </xs:complexType>

 <xs:complexType name="IdentityAssociationUpdate">

 <xs:complexContent>

 <xs:extension base="x1:X1RequestMessage">

 <xs:sequence>

 <xs:element name="OngoingAssociationTaskID" type="common:UUID"/>

 <xs:element name="UpdateDetails" type="IdentityResponseDetails"/>

 </xs:sequence>

 </xs:extension>

 </xs:complexContent>

 </xs:complexType>

 <xs:complexType name="IdentityAssociationUpdateAcknowledgement">

 <xs:complexContent>

 <xs:extension base="x1:X1ResponseMessage">

 <xs:sequence>

 <xs:element name="oK" type="x1:OKAckAndComplete"/>

 </xs:sequence>

 </xs:extension>

 </xs:complexContent>

 </xs:complexType>

</xs:schema>

\*\*\* Next Change \*\*\*

Annex X (normative):
XSD Schema for Location Acquisition

<?xml version="1.0" encoding="utf-8"?>

<xs:schema xmlns:xs="http://www.w3.org/2001/XMLSchema"

 xmlns="urn:3GPP:ns:li:3GPPXLAExtensions:r17:v1"

 xmlns:x1="http://uri.etsi.org/03221/X1/2017/10"

 xmlns:liqr="urn:3GPP:ns:li:3GPPLIQueryExtensions:r17:v3"

 targetNamespace="urn:3GPP:ns:li:3GPPXLAExtensions:r17:v1"

 elementFormDefault="qualified">

 <xs:import namespace="http://uri.etsi.org/03221/X1/2017/10"/>

 <xs:import namespace="urn:3GPP:ns:li:3GPPLIQueryExtensions:r17:v3"/>

 <xs:element name="LocationAcquisitionRequest" type="liqr:LIQueryRequest"/>

 <xs:complexType name="LocationAcquisitionResponse">

 <xs:complexContent>

 <xs:extension base="x1:X1ResponseMessage">

 <xs:sequence>

 <xs:element name="ResponseDetails" type="LocationResponseDetails" minOccurs="0"/>

 </xs:sequence>

 </xs:extension>

 </xs:complexContent>

 </xs:complexType>

<xs:element name="LIXQRResponse" type="LocationResponseDetails"/>

<xs:complexType name="LocationResponseDetails">

 <xs:sequence>

 <xs:element name="Locations" type="LocationRecords"/>

 </xs:sequence>

 </xs:complexType>

 <xs:complexType name="LocationRecords">

 <xs:sequence>

 <xs:element name="LocationRecord" type="LocationRecord" maxOccurs="unbounded"/>

 </xs:sequence>

 </xs:complexType>

 <xs:complexType name="LocationRecord">

 <xs:sequence>

 <xs:element name="Identifier" type="LocationAcquisitionIdentifier"/>

 <xs:element name="Location" type="liqr:TS29518Location"/>

 </xs:sequence>

 </xs:complexType>

 <xs:complexType name="LocationAcquisitionIdentifier">

 <xs:choice maxOccurs="unbounded">

 <xs:element name="SUPI" type="liqr:SUPI"/>

 </xs:choice>

 </xs:complexType>

</xs:schema>

\*\*\* Next Change \*\*\*

Annex Y (normative):
XSD Schema for LI Queries

<?xml version="1.0" encoding="utf-8"?>

<xs:schema xmlns:xs="http://www.w3.org/2001/XMLSchema"

 xmlns="urn:3GPP:ns:li:3GPPLIQueryExtensions:r17:v3"

 xmlns:x1="http://uri.etsi.org/03221/X1/2017/10"

 xmlns:common="http://uri.etsi.org/03280/common/2017/07"

 xmlns:etsi103120common="http://uri.etsi.org/03120/common/2016/02/Common"

 targetNamespace="urn:3GPP:ns:li:3GPPLIQueryExtensions:r17:v3"

 elementFormDefault="qualified">

 <xs:import namespace="http://uri.etsi.org/03221/X1/2017/10"/>

 <xs:import namespace="http://uri.etsi.org/03280/common/2017/07"/>

 <xs:import namespace="http://uri.etsi.org/03120/common/2016/02/Common"/>

 <xs:complexType name="LIQueryRequest">

 <xs:complexContent>

 <xs:extension base="x1:X1RequestMessage">

 <xs:sequence>

 <xs:element name="RequestDetails" type="RequestDetails"/>

 <xs:element name="Flags" type="TaskFlags"/>

 </xs:sequence>

 </xs:extension>

 </xs:complexContent>

 </xs:complexType>

 <xs:complexType name="RequestDetails">

 <xs:sequence>

 <xs:element name="Type" type="DictionaryEntry"/>

 <xs:element name="ObservedTime" type="common:QualifiedDateTime"/>

 <xs:element name="RequestValues" type="RequestValues"/>

 </xs:sequence>

 </xs:complexType>

 <xs:complexType name="TaskFlags">

 <xs:sequence>

 <xs:element name="TaskFlag" type="etsi103120common:DictionaryEntry" minOccurs="0" maxOccurs="unbounded" />

 </xs:sequence>

 </xs:complexType>

 <xs:complexType name="RequestValues">

 <xs:sequence>

 <xs:element name="RequestValue" type="RequestValue" maxOccurs="unbounded"/>

 </xs:sequence>

 </xs:complexType>

 <xs:complexType name="RequestValue">

 <xs:sequence>

 <xs:element name="FormatType" type="FormatType"/>

 <xs:element name="Value" type="common:LongString"/>

 </xs:sequence>

 </xs:complexType>

 <xs:complexType name="FormatType">

 <xs:sequence>

 <xs:element name="FormatOwner" type="common:ShortString"/>

 <xs:element name="FormatName" type="common:ShortString"/>

 </xs:sequence>

 </xs:complexType>

 <xs:complexType name="ErrorResponse">

 <xs:complexContent>

 <xs:extension base="x1:X1ResponseMessage">

 <xs:sequence>

 <xs:element name="errorInformation" type="ErrorInformation"/>

 </xs:sequence>

 </xs:extension>

 </xs:complexContent>

 </xs:complexType>

 <xs:complexType name="ErrorInformation">

 <xs:sequence>

 <xs:element name="errorCode" type="xs:integer"/>

 <xs:element name="errorDescription" type="xs:string"/>

 <xs:element name="errorDetails" type="TS29571ProblemDetails"/>

 </xs:sequence>

 </xs:complexType>

 <xs:complexType name="DictionaryEntry">

 <xs:sequence>

 <xs:element name="Owner" type="common:ShortString"/>

 <xs:element name="Name" type="common:ShortString"/>

 <xs:element name="Value" type="common:ShortString"/>

 </xs:sequence>

 </xs:complexType>

 <xs:complexType name="SUPI">

 <xs:choice>

 <xs:element name="SUPIIMSI" type="common:SUPIIMSI"/>

 <xs:element name="SUPINAI" type="common:SUPINAI"/>

 </xs:choice>

 </xs:complexType>

 <xs:simpleType name="SUCI">

 <xs:restriction base="xs:string"/>

 </xs:simpleType>

 <xs:simpleType name="FiveGGUTI">

 <xs:restriction base="xs:string"/>

 </xs:simpleType>

 <xs:complexType name="PEI">

 <xs:choice>

 <xs:element name="PEIIMEI" type="common:PEIIMEI"/>

 <xs:element name="PEIIMEISV" type="common:PEIIMEISV"/>

 <xs:element name="PEIMAC" type="common:MACAddress"/>

 </xs:choice>

 </xs:complexType>

 <xs:complexType name="FiveGSTAIList">

 <xs:sequence>

 <xs:element name="FiveGSTAI" type="FiveGSTAI" maxOccurs="unbounded"/>

 </xs:sequence>

 </xs:complexType>

 <xs:complexType name="FiveGSTAI">

 <xs:sequence>

 <xs:element name="MCC" type="MCC"/>

 <xs:element name="MNC" type="MNC"/>

 <xs:element name="TAC" type="TAC"/>

 <xs:element name="NID" type="NID" minOccurs="0"/>

 </xs:sequence>

 </xs:complexType>

 <xs:complexType name="GPSI">

 <xs:choice>

 <xs:element name="GPSIMSISDN" type="common:GPSIMSISDN"/>

 <xs:element name="GPSINAI" type="common:GPSINAI"/>

 </xs:choice>

 </xs:complexType>

 <xs:simpleType name="MCC">

 <xs:restriction base="xs:string">

 <xs:pattern value="[0-9]{3}"></xs:pattern>

 </xs:restriction>

 </xs:simpleType>

 <xs:simpleType name="MNC">

 <xs:restriction base="xs:string">

 <xs:pattern value="[0-9]{2,3}"></xs:pattern>

 </xs:restriction>

 </xs:simpleType>

 <xs:simpleType name="TAC">

 <xs:restriction base="xs:string">

 <xs:pattern value="([A-Fa-f0-9]{2}){2,3}"></xs:pattern>

 </xs:restriction>

 </xs:simpleType>

 <xs:simpleType name="NID">

 <xs:restriction base="xs:string">

 <xs:pattern value="[A-Fa-f0-9]{11}"></xs:pattern>

 </xs:restriction>

 </xs:simpleType>

 <xs:simpleType name="TS29571ProblemDetails">

 <xs:restriction base="xs:base64Binary"></xs:restriction>

 </xs:simpleType>

 <xs:simpleType name="TS29518Location">

 <xs:restriction base="xs:base64Binary"></xs:restriction>

 </xs:simpleType>

</xs:schema>

\*\*\* End of all changes \*\*\*