**3GPP SA3LI#85e-a *S3i220430r6***

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| *CR-Form-v12.1* |
| **CHANGE REQUEST** |
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|  |  | **CR** |  | **rev** | **1** | **Current version:** |  |  |
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| *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** |

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| --- |
|  |
| ***Title:***  |  |
|  |  |
| ***Source to WG:*** | SA3 LI (PIDS, NTAC, OTD, PSC, LKA Niedersachsen, Ministère Economie et Finances)  |
| ***Source to TSG:*** |  |
|  |  |
| ***Work item code:*** | LI18 |  | ***Date:*** | 2022-09-02 |
|  |  |  |  |  |
| ***Category:*** |  |  | ***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:*** | 2, 3.3, 4.1, 4.2, 4.3, 5.3.X (new), 5.4.X (new), 5.X (new), 5.Y (new), 6.2.2.2.4, 7.3.X (new), 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:*** | 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/19215cb9c84afec5b23689cd514e9a1ca596e315> |
|  |  |
| ***This CR's revision history:*** | S3i220430 |

\*\*\* 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\_X2\_LA Lawful Interception Internal Interface 2 Location Acquisition

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\_LAFC | Used to pass information from LICF to LAF. | Out of scope of the present document. |  |
| LI\_LAFP | 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\_X2\_LA | 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 \*\*\*

### 5.3.X Usage for realising LI\_X2\_LA

Functions having an LI\_X2\_LA interface shall use the protocols for LI\_X2 as defined in clause 5.3.2 to realise the interface with the following additions.

The LI function sending the message over LI\_X2\_LA shall set the Payload Direction field in the PDU header to *not applicable* (Direction Value 5, see ETSI TS 103 221-2 [8] clause 5.2.6).

\*\*\* 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 5.4.X-1. If the delivery method is the delivery via MDF2, the LIPF shall ensure that the MDF2 (clause 7.3.Y.3) is provisioned and the destination endpoints in the IRI-POIs are created (clause 7.3.Y.2). Subsequently, the LAF will use this information while processing location acquisiton requests received over the LI\_HILA interface.

Table 5.4.X-1: LATaskFlag Dictionary for LI\_HI1

|  |  |
| --- | --- |
| Dictionary Owner | Dictionary Name |
| 3GPP | LATaskFlag |
|  |
| Defined DictionaryEntries |
| Value | Meaning |
| HILADelivery | The location information shall be delivered via the LI\_HILA interface. |
| HI2Delivery | The location information shall be delivered via the LI\_HI2 interface. |

\*\*\* 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.

Prior to issuing of location acquisition requests, the LEA shall provide an authorization for these requests 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 |
| Type | Shall be set to one of the HILARequestType values as defined in table 5.X.2.1-3. | M |
| ReqCurrentLoc | The LARF shall invoke a ProvideLocationInfo service operation (see TS 29.518 [16] clause 5.5.2.4) as described in clause 7.3.X.4. | M |
| RequestValues | Set to the target identifier (see clause 5.X.2.2). | M |

Table 5.X.2.1-3: RequestType Dictionary for LI\_HILA

|  |  |
| --- | --- |
| Dictionary Owner | Dictionary Name |
| 3GPP | RequestType |
|  |  |
| Defined DictionaryEntries |
| Value | Meaning |
| LocationAcquisition | A request for location information of the target, consisting at least of the TAI and the NCGI.  |

#### 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 LI\_HI2 is required, the LARF will send the acquisition response as a SeparatedLocationReporting xIRI record to the MDF2 via LI\_X2\_LA. Full details are given in clause 7.3.X.6.

If delivery via the LI\_HILA 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 LocationOutcome records.

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

Table 5.X.2.3-1: LocationResponseDetails

|  |  |  |
| --- | --- | --- |
| Field | Description/Value | M/C/O |
| LocationOutcomes | Locations of the target if determined by the network, or failure causes. The format of each LocationOutcome shall be set as defined in table 5.X.2.3-2. | C |

Table 5.X.2.3-2: LocationOutcome

|  |  |  |
| --- | --- | --- |
| Field | Description/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 |
| Location | Location of the target if determined by the network. * It shall include the following:a JSON ProvideLocInfo structure as defined in TS 29.518 [22] clause 6.4.6.2.6, in base-64 encoding, in case the location could be determined.
 | C |
| FailureCause | If the location acquisition procedure fails, this parameter shall be included.The values for this parameter shall be derived from values of the failure response received from the AMF.* If a ProblemDetails structure is returned, the errorDetails field shall be populated with a JSON ProblemDetails structure as defined in TS 29.571 [17] clause 5.2.4.1 in base-64 encoding.
 | C |

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

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

|  |  |  |
| --- | --- | --- |
| Field | Description | M/C/O |
| RequestValues | Set to the target identifier specified in the LI\_HILA request (see clause 5.X.2). | M |
| ReqCurrentLoc | The LARF shall invoke a ProvideLocationInfo service operation (see TS 29.518 [16] clause 5.5.2.4) as described in clause 7.3.X.4. This parameter shall be set to true if the request received over LI\_HILA had the ReqCurrentLoc flag set and shall be set to false if the request received over LI\_HILA did not have the ReqCurrentLoc flag. | M |
| HILADelivery | Based on the information received over the LI\_HI1 interface (see 5.4.X). If set, the LARF shall return the location information to the LAF (see NOTE). | C |
| HI2Delivery  | Based on the information received from the LI\_HI1 interface (see 5.4.X). If present, the format shall be as defined in table 5.Y.2.1-2 (See NOTE). | C |
| NOTE: At least one delivery method is required |

Table 5.Y.2.1-2: HI2Delivery structure

|  |  |  |
| --- | --- | --- |
| Field | Description | M/C/O |
| XID | 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 (see clause 7.3.X.6.2). | M |
| ListOfDestinations | Delivery endpoints for LI\_X2\_LA 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 ETSI TS 103 221-1 [7].

LI\_XLA query responses are represented in XML following the LocationAcquisitionResponse schema (see Annex X). If delivery via the LI\_HILA was specified, the fields of the LocationAcquisitionResponse record shall be populated as described in clause 5.X.2.3. If delivery via the LI\_HI2 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] the location update xIRIs 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 is specified in TS 33.127 [5].

#### 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 that the UE is registered at the AMF. If it is registered the LARF will 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 ReqCurrentLoc parameter (see table 5.Y.2.1-1) is set to true in the location acquisition request message received over LI\_XLA, the LARF shall invoke a ProvideLocationInfo service operation in the AMF (see TS 29.518 [22] clause 5.5.2.4) using the information received in the location acquistion request message to generate the RequestLocInfo parameters. The LARF shall set the reqCurrentLoc parameter of the RequestLocInfo IE to true (see TS 29.518 [22] clause 5.5.2.4).

- If the ReqCurrentLoc parameter (see table 5.Y.2.1-1) is set to false 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, the LARF shall invoke a ProvideLocationInfo service operation in the AMF (see TS 29.518 [22] clause 5.5.2.4) using the information received in the location acquistion request message to generate the RequestLocInfo parameters.

The LARF/AMF shall override any user consent, privacy and paging restrictions concerned with location acquisition that may apply to the target UE. The LARF/AMF shall ensure that overriding these restrictions does not result in additional detectability issues.

#### 7.3.X.5 Location acquisition delivery via the LI\_HILA

##### 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 that the response is returned as an HILAResponse 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 delivery via the LI\_HI2

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

The MDF2 listed as the delivery endpoint for xIRI generated by the LARF 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”. (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.6.1-2. | 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\_LA 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 record. The XID of the xIRI record shall be set to the XID specified in the original request (see clause 5.Y.2).

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

The MDF2 shall generate the IRI message based on the SeparatedLocationReporting xIRI record from the LARF and deliver it to the LEMF over LI\_HI2. \*\*\* 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:complexType name="IdentityAssociationRequest">

 <xs:complexContent>

 <xs:extension base="liqr:LIQueryRequest"></xs:extension>

 </xs:complexContent>

 </xs:complexType>

 <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:complexType name="LocationAcquisitionRequest">

 <xs:complexContent>

 <xs:extension base="liqr:LIQueryRequest">

 <xs:sequence>

 <xs:element name="ReqCurrentLoc" type="xs:boolean" default="false" />

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

 <xs:element name="HI2Delivery" type="MDF2DeliveryStructure" minOccurs="0" />

 </xs:sequence>

 </xs:extension>

 </xs:complexContent>

 </xs:complexType>

 <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:complexType name="MDF2DeliveryStructure">

 <xs:sequence>

 <xs:element name="XID" type="x1:XId" />

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

 </xs:sequence>

 </xs:complexType>

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

<xs:complexType name="ListOfDestinations">

 <xs:sequence>

 <xs:element name="Destination" type="x1:DestinationDetails" maxOccurs="unbounded"/>

 </xs:sequence>

</xs:complexType>

<xs:complexType name="LocationResponseDetails">

 <xs:sequence>

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

 </xs:sequence>

 </xs:complexType>

 <xs:complexType name="LocationOutcomes">

 <xs:sequence>

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

 </xs:sequence>

 </xs:complexType>

 <xs:complexType name="LocationOutcome">

 <xs:sequence>

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

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

 <xs:element name="Location" type="liqr:TS29518Location" minOccurs="0"/>

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

 </xs:sequence>

 </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" minOccurs="0"/>

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

 <xs:element name="errorDetails" type="TS29571ProblemDetails" minOccurs="0"/>

 </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 \*\*\*