**3GPP TSG-SA3 Meeting #86-LI-e-a *s3i220351r6***

**Online, , 13th Jul 2022 - 15th Jul 2022**

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| *CR-Form-v12.2* | | | | | | | | |
| **CHANGE REQUEST** | | | | | | | | |
|  | | | | | | | | |
|  | **33.127** | **CR** | **0173** | **rev** | **2** | **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 | **\*** |

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|  | | | | | | | | | | |
| ***Title:*** | Edge Computing Aware UE | | | | | | | | | |
|  |  | | | | | | | | | |
| ***Source to WG:*** | SA3LI (Ministère Economie et Finances) | | | | | | | | | |
| ***Source to TSG:*** | SA3 | | | | | | | | | |
|  |  | | | | | | | | | |
| ***Work item code:*** | LI18 | | | | |  | ***Date:*** | | | 2022-07-15 |
|  |  | | | |  | |  | | |  |
| ***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 can be found in 3GPP [TR 21.900](http://www.3gpp.org/ftp/Specs/html-info/21900.htm). | | | | | | | | *Use one of the following releases: Rel-8 (Release 8) Rel-9 (Release 9) Rel-10 (Release 10) Rel-11 (Release 11) … Rel-16 (Release 16) Rel-17 (Release 17) Rel-18 (Release 18) Rel-19 (Release 19)* | |
|  |  | | | | | | | | | |
| ***Reason for change:*** | | Some control plane events and information are missing without such CR for Edge Computing based with Edge aware UE. | | | | | | | | |
|  | |  | | | | | | | | |
| ***Summary of change:*** | | New IRI-PoI in Edge Enabler Server with related LI events based on 3GPP specs on Edge Computing. | | | | | | | | |
|  | |  | | | | | | | | |
| ***Consequences if not approved:*** | | Regulatory issues for CSPs that develop Edge Computing systems without LI. | | | | | | | | |
|  | |  | | | | | | | | |
| ***Clauses affected:*** | | 2, 3.3, 7.X | | | | | | | | |
|  | |  | | | | | | | | |
|  | | **Y** | **N** |  | | | |  | | |
| ***Other specs*** | |  | **\*** | Other core specifications | | | | TS/TR ... CR ... | | |
| ***affected:*** | |  | **\*** | Test specifications | | | | TS/TR ... CR ... | | |
| ***(show related CRs)*** | |  | **\*** | O&M Specifications | | | | TS/TR ... CR ... | | |
|  | |  | | | | | | | | |
| ***Other comments:*** | |  | | | | | | | | |
|  | |  | | | | | | | | |
| ***This CR's revision history:*** | | s3i220310, s3i220351 | | | | | | | | |

**\*\*\* Start of 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 23.271: "Functional stage 2 description of Location Services (LCS)".

[6] 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>".

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

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

[9] 3GPP TS 33.501: "Security Architecture and Procedures for the 5G System".

[10] ETSI GR NFV-SEC 011: "Network Functions Virtualisation (NFV); Security; Report on NFV LI Architecture".

[11] 3GPP TS 33.107: "3G Security; Lawful interception architecture and functions".

[12] 3GPP TS 23.214: "Architecture enhancements for control and user plane separation of EPC nodes; Stage 2".

[13] 3GPP TS 23.228: "IP Multimedia Subsystem (IMS); Stage 2".

[14] 3GPP TS 38.413: "NG-RAN; NG Application Protocol (NGAP)".

[15] 3GPP TS 33.128: "Protocol and Procedures for Lawful Interception; Stage 3".

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

[17] MMS Architecture OMA-AD-MMS-V1\_3-20110913-A.

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

[19] 3GPP TS 22.140: "Multimedia Messaging Service (MMS); Stage 1".

[20] ETSI GS NFV-IFA 026: "Network Functions Virtualisation (NFV) Release 3; Management and Orchestration; Architecture enhancement for Security Management Specification".

[21] 3GPP TS 33.108: "Handover Interface for Lawful Interception (LI)".

[22] 3GPP TS 23.401: "General Packet Radio Service (GPRS) enhancements for   
Evolved Universal Terrestrial Radio Access Network (E-UTRAN) access".

[23] 3GPP TS 23.402: "Architecture enhancements for non-3GPP accesses".

[24] 3GPP TS 23.280: "Common functional architecture to support mission critical services; Stage 2".

[25] OMA-AD-PoC-V2\_1-20110802-A: "Push to talk over Cellular (PoC) Architecture".

[26] GSMA IR.92: "IMS Profile for Voice and SMS".

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

[28] 3GPP TS 24.147: "Conferencing using the IP Multimedia (IM) Core Network (CN) subsystem; Stage 3".

[29] ETSI GS NFV-SEC 012: "Network Functions Virtualisation (NFV) Release 3; Security; System architecture specification for execution of sensitive NFV components".

[30] 3GPP TS 23.273: "5G System (5GS) Location Services (LCS); Stage 2".

[31] 3GPP TS 29.522: "5G System; Network Exposure Function Northbound APIs; Stage3".

[32] 3GPP TS 29.122: "T8 reference point for Northbound APIs".

[33] 3GPP TS 23.682: "Architecture enhancements to facilitate communications with packet data networks and applications".

[34] OMA-AD-CPM-V2\_2-20170926-C: "Open Mobile Alliance, OMA Converged IP Messaging System Description", <http://www.openmobilealliance.org/release/CPM/V2_2-20200907-C/OMA-AD-CPM-V2_2-20170926-C.pdf>.

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

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

[37] IETF RFC 6714: "Connection Establishment for Media Anchoring (CEMA) for the Message Session Relay Protocol (MSRP)".

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

[39] 3GPP TS 24.229: "IP Multimedia call control protocol based on Session Initiation Protocol (SIP) and Session Description Protocol (SDP); Stage 3".

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

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

[42] 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.

[43] IETF RFC 7095: "jCard: The JSON Format for vCard".

[44] 3GPP TS 24.196: "Enhanced Calling Name (eCNAM)".

[45] IETF RFC 8816: "Secure Telephone Identity Revisited (STIR) Out-of-Band Architecture and Use Cases".

[46] IETF draft-ietf-stir-passport-messaging-00, "Messaging Use Cases and Extensions for STIR".

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

[47] 3GPP TS 33.535: "Authentication and Key Management for Applications (AKMA) based on 3GPP credentials in the 5G System (5GS)".

[48] 3GPP TS 33.220: "Generic Authentication Architecture (GAA); Generic Bootstrapping Architecture (GBA)".

[49] 3GPP TS 33.222: "Generic Authentication Architecture (GAA); Access to network application functions using Hypertext Transfer Protocol over Transport Layer Security (HTTPS)".

[50] 3GPP TS 23.040: "Technical realization of the Short Message Service (SMS)".

[XZ] 3GPP TS 23.558: "Architecture for enabling Edge Applications".

**\*\*\* End of First Change \*\*\***

**\*\*\* Start of Second 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].

5GC 5G Core Network

5GS 5G System

AAnF AKMA Anchor Function

ADMF LI Administration Function

AC Application Client

ACR Application Context Relocation

AF Application Function

AF\_ID Application Function Identity

AKA Authentication and Key Agreement

A-KID AKMA Key IDentifier

AKMA Authentication and Key Management for Applications

AMF Access and Mobility Management Function

AS Application Server

AUSF Authentication Server Function

BBIFF Bearer Binding Intercept and Forward Function

BSS Business Support System

CAG Closed Access Group

CC Content of Communication

CP Control Plane

CPIM Common Presence and Instant Messaging

CPS Call Placement Service

CSI Cell Supplemental Information

CSP Communication Service Provider

CUPS Control and User Plane Separation

DN Data Network

DNAI Data Network Access Identifier

DoNAS Data over NAS

EAP Extensible Authentication Protocol

EAS Edge Application Server

eCNAM Enhanced Calling Name

ECSP Edge Computing Service Provider

E-CSCF Emergency – Call Session Control Function

EDN Edge Data Network

EEC Edge Enabler Client

EECID Edge Enabler Client IDentifier

EES Edge Enabler Server

GPSI Generic Public Subscription Identifier

HMEE Hardware Mediated Execution Enclave

HR Home Routed

IBCF Interconnection Border Control Functions

ICF Identity Caching Function

IEF Identity Event Function

IMS-AGW IMS Access Gateway

IM-MGW IM Media Gateway

IP Interception Product

IQF Identity Query Function

IRI Intercept Related Information

KAF AKMA Application Key

KAKMA AKMA Anchor Key

KID Key IDentifier

KLI Decryption key(s) for services encrypted by CSP-provided keys

KSF Key Server Function

LALS Lawful Access Location Services

LBO Local Break Out

LEA Law Enforcement Agency

LEMF Law Enforcement Monitoring Facility

LI Lawful Interception

LI CA Lawful Interception Certificate Authority

LICF Lawful Interception Control Function

LI\_HI1 Lawful Interception Handover Interface 1

LI\_HI2 Lawful Interception Handover Interface 2

LI\_HI3 Lawful Interception Handover Interface 3

LI\_HI4 Lawful Interception Handover Interface 4

LI\_HIQR Lawful Interception Handover Interface Query Response

LIID Lawful Interception Identifier

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\_T1 Lawful Interception Internal Triggering Interface 1

LI\_T2 Lawful Interception Internal Triggering Interface 2

LI\_T3 Lawful Interception Internal Triggering Interface 3

LI\_X0 Lawful Interception Internal Interface 0

LI\_X1 Lawful Interception Internal Interface 1

LI\_X2 Lawful Interception Internal Interface 2

LI\_X3 Lawful Interception Internal Interface 3

LI\_X3A Lawful Interception Internal Interface 3 Aggregator

LI\_XEM1 Lawful Interception Internal Interface Event Management Interface 1

LI\_XER Lawful Interception Internal Interface Event Record

LI\_XQR Lawful Interception Internal Interface Query Response

LMF Location Management Function

LMISF LI Mirror IMS State Function

LMISF-CC LMISF for the handling of CC

LMISF-IRI LMISF for the handling of IRI

LTF Location Triggering Function

MA Multi-Access

MANO Management and Orchestration

MDF Mediation and Delivery Function

MDF2 Mediation and Delivery Function 2

MDF3 Mediation and Delivery Function 3

MRFP Multimedia Resource Function Processor

MSRP Message Session Relay Protocol

N3A Non-3GPP Access

N3IWF Non 3GPP Inter Working Function

N9HR N9 Home Routed

NAS Non-Access Stratum

NEF Network Exposure Function

NFV Network Function Virtualisation

NFVI Network Function Virtualisation Infrastructure

NFVO Network Function Virtualisation Orchestrator

NIDD Non-IP Data Delivery

NPLI Network Provided Location Information

NR New Radio

NRF Network Repository Function

NSSF Network Slice Selection Function

OSS Operations Support System

PAG POI Aggregator

PCF Policy Control Function

P-CSCF Proxy - Call Session Control Function

PEI Permanent Equipment Identifier

PGW PDN Gateway

PGW-C PDN Gateway Control Plane

PGW-U PDN Gateway User Plane

POI Point Of Interception

PLMN Public Land Mobile Network

PTC Push to Talk over Cellular

RCD Rich Call Data

RCS Rich Communication Suite

S8HR S8 Home Routed

SCEF Service Capability Exposure Function

SCS Service Capability Server

SGW Serving Gateway

SGW-C Serving Gateway Control Plane

SGW-U Serving Gateway User Plane

SHAKEN Signature-based Handling of Asserted information using toKENs

SIRF System Information Retrieval Function

S-CSCF Serving - Call Session Control Function

SIP Session Initiation Protocol

SMF Session Management Function

SMSF SMS-Function

STF Security Terminating Function

STIR Secure Telephony Identity Revisited

SUCI Subscriber Concealed Identifier

SUPI Subscriber Permanent Identifier

TF Triggering Function

TLS Transport Layer Security

TNGF Trusted Non-3GPP Gateway Function

TrGW Transit Gateway

TWIF Trusted WLAN Interworking Function

UDM Unified Data Management

UDR Unified Data Repository

UDSF Unstructured Data Storage Function

UPF User Plane Function

VNF Virtual Network Function

VNFC Virtual Network Function Component

W-AFG Wireline Access Gateway Function

xCC LI\_X3 Communications Content

xIRI LI\_X2 Intercept Related Information

**\*\*\* End of Second Change \*\*\***

**\*\*\* Start of Third Change \*\*\***

## 7.X LI at EES

### 7.X.1 Background

Edge computing is a concept, described in 3GPP TS 23.501 [2], that enables operator and 3rd party services to be hosted close to the UE's access point of attachment, to achieve an efficient service delivery through the reduced end-to-end latency and load on the transport network. An Edge Computing Service Provider (ECSP) is a mobile network operator or a 3rd party service provider offering edge computing service. Details of edge hosting environment, are outside the scope of 3GPP (see clause 4.1 of TS 23.558 [XZ]).

For edge computing, it is essential that the Application Clients (ACs) are able to locate and connect with the most suitable application server available in the Edge Data Network (EDN), depending on the needs of the application. The edge enabler layer exposes APIs to support such capabilities. The edge computing capabilities supported by 3GPP are illustrated in the figure 7.X-1 and as defined in TS 23.558 [XZ].



Figure 7.X-1: Overview of 3GPP edge computing

The EES (see clause 6.3.2 of TS 23.558 [XZ]) is a component of the edge enabler layer which facilitates communication between the Application Clients running on the UE and the EAS deployed on the EDN. This includes EAS discovery by the UE and application context transfer between EASs for service continuity. The ECS (Edge Configuration Server) is another component of the edge enabler layer providing supporting functions needed for the EEC to connect with an EES. Figure 7.X-2 as defined in TS 23.558 [XZ] shows the general architecture for enabling edge applications using a service-based representation.



Figure 7.X-2: Architecture for enabling edge applications - service-based representation

Figure 7.X-3 shows a edge computing network, where EDN owned/managed by a ECSP (Edge Computing Service Provider) is communicating with the PLMN operator mobile network, and connected via UPF. The EDN contains EAS, EES and ECS. The PLMN operator is responsible for the deployment of NG-RAN, 5GC including AMF, SMF, UPF and NEF. Other models such as where the PLMN operator is the ECSP are possible.

The ECSP can have service agreement with one or more PLMN operators and may request the PLMN operators to connect EAS and EES with 5GC network functions.



Figure 7.X-3: Edge computing network

### 7.X.2 Architecture

The EES shall provide the IRI-POI function. Figure 7.X-4 gives a reference point representation of the LI architecture with EES as a CP NF providing the IRI-POI function for edge computing.



**Figure 7.X-4: LI architecture for Edge Computing showing LI at EES**

### 7.X.3 Target identities

The LIPF present in the ADMF provisions the intercept information associated with the following target identities to the IRI-POI present in the EES:

- GPSI.

- EECID.

### 7.X.4 IRI events

The IRI-POI in the EES shall generate xIRI when it detects the following specific events or information in both roaming and non-roaming situations:

- EEC registration (see clause 8.4.2 of TS 23.558 [XZ]).

- EAS discovery (see clause 8.5.2.2 of TS 23.558 [XZ])

- EAS discovery subscription (see clause 8.5.2.3 of TS 23.558 [XZ]).

- EAS discovery notification (see clause 8.5.2.3 of TS 23.558 [XZ]).

- Application context relocation (see clause 8.8.3.4 of TS 23.558 [XZ]).

- Application context relocation information subscription (see clause 8.8.3.5 of TS 23.558 [XZ]).

- Application context relocation information notification (see clause 8.8.3.5 of TS 23.558 [XZ]).

- EEC context relocation (see clause 8.9 of TS 23.558 [XZ]).

- Start of interception with registered EEC

The EEC registration xIRI is generated when the IRI-POI present in the EES detects that an EEC (Edge Enabler Client) has performed a registration, registration update or deregistration procedure with the EES for a target.

The EAS discovery xIRI is generated when the IRI-POI present in the EES detects that an EEC has performed an EAS discovery request-response procedure with the EES for a target.

The EAS discovery subscription xIRI is generated when the IRI-POI present in the EES detects that an EEC has subscribed, updated its subscription and unsubscribed for EAS discovery reporting for a target.

The EAS discovery notification xIRI is generated when the IRI-POI present in the EES detects that an EES has notified the EEC about EAS discovery information for a target.

The application context relocation xIRI is generated when the IRI-POI present in the EES detects that an EEC has performed an ACR (Application Context Relocation) procedure with the EES with "ACR Action" set to. "ACR initiation request" or "ACR determination request" for a target.

The application context relocation information subscription xIRI is generated when the IRI-POI present in the EES detects that an EEC has subscribed, updated its subscription and unsubscribed for ACR information reporting for a target.

The application context relocation information notification xIRI is generated when the IRI-POI present in the EES detects that an EES has notified the EEC about ACR information for a target.

The EEC context relocation xIRI is generated when the IRI-POI present in the EES detects that an EEC context information has been exchanged between current serving EES (referred to as source EES in TS 23.558 [XZ]) and new serving EES (referred to as target EES in TS 23.558 [XZ].

The start of interception with registered EEC is generated when the IRI-POI present in an EES detects that interception is activated on the target UE which EEC has already registered to the EES.

**\*\*\* End of Third Change \*\*\***

**\*\*\* End of Last Change \*\*\***