**3GPP TSG-SA WG6 Meeting #52-bis-e S6-22xxxx**

***Location,* 16th – 20th January 2023 (revision of S6-22xxxx)**

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| *CR-Form-v12.2* | | | | | | | | |
| **CHANGE REQUEST** | | | | | | | | |
|  | | | | | | | | |
|  | **23.434** | **CR** |  | **rev** | **-** | **Current version:** |  |  |
|  | | | | | | | | |
| *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 | **X** | Radio Access Network |  | Core Network | **X** |

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| ***Title:*** | Update the on-network functional model and reference point for location management | | | | | | | | | |
|  |  | | | | | | | | | |
| ***Source to WG:*** | CATT | | | | | | | | | |
| ***Source to TSG:*** | SA6 | | | | | | | | | |
|  |  | | | | | | | | | |
| ***Work item code:*** | 5GFLS | | | | |  | ***Date:*** | | | 2022-12-02 |
|  |  | | | |  | |  | | |  |
| ***Category:*** | B |  | | | | | ***Release:*** | | |  |
|  | *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:*** | | Based on the conclusion of KI#1 in TR 23.700-96, Architecture enhancements from solution#8 will be used for updating the baseline location management server specified in 3GPP TS 23.434. And according to the sol#8, the SEAL LMS is enhanced with FLF(Fused Location Function) and supports the enhanced LM-UU interface over non-3GPP access, and LM-3P interface respectively. | | | | | | | | |
|  | |  | | | | | | | | |
| ***Summary of change:*** | | To update the on-network functional model and reference point for location management to align with the conclusion of KI#1 in TR 23.700-96. | | | | | | | | |
|  | |  | | | | | | | | |
| ***Consequences if not approved:*** | | The 5G-enabled fused location service capability will not be conducted for SEAL location management. | | | | | | | | |
|  | |  | | | | | | | | |
| ***Clauses affected:*** | | 2,9.2.2, 9.2.4.2, 9.2.4.3,9.2.5.2,9.2.5.x | | | | | | | | |
|  | |  | | | | | | | | |
|  | | **Y** | **N** |  | | | |  | | |
| ***Other specs*** | |  | **X** | Other core specifications | | | | TS/TR ... CR ... | | |
| ***affected:*** | |  | **X** | Test specifications | | | | TS/TR ... CR ... | | |
| ***(show related CRs)*** | |  | **X** | O&M Specifications | | | | TS/TR ... CR ... | | |
|  | |  | | | | | | | | |
| ***Other comments:*** | |  | | | | | | | | |
|  | |  | | | | | | | | |
| ***This CR'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 22.104: "Service requirements for cyber-physical control applications in vertical domains".

[3] 3GPP TS 23.379: "Functional architecture and information flows to support Mission Critical Push To Talk (MCPTT); Stage 2".

[4] 3GPP TS 23.280: "Common functional architecture to support mission critical services; Stage 2".

[5] 3GPP TS 23.281: "Functional architecture and information flows to support Mission Critical Video (MCVideo); Stage 2".

[6] 3GPP TS 23.282: "Functional architecture and information flows to support Mission Critical Data (MCData); Stage 2".

[7] 3GPP TS 23.286: "Application layer support for V2X services; Functional architecture and information flows".

[8] 3GPP TS 23.222: "Functional architecture and information flows to support Common API Framework for 3GPP Northbound APIs; Stage 2".

[9] 3GPP TS 23.401: "General Packet Radio Service (GPRS) enhancements for Evolved Universal Terrestrial Radio Access Network (E-UTRAN) access".

[10] 3GPP TS 23.501: "System Architecture for the 5G System; Stage 2".

[11] 3GPP TS 23.502: "Procedures for the 5G System; Stage 2".

[12] 3GPP TS 23.303: "Proximity-based services (ProSe); Stage 2".

[13] 3GPP TS 23.682: "Architecture enhancements to facilitate communications with packet data networks and applications".

[14] 3GPP TS 23.002: "Network Architecture".

[15] 3GPP TS 23.228: "IP Multimedia Subsystem (IMS); Stage 2".

[16] 3GPP TS 23.468: "Group Communication System Enablers for LTE (GCSE\_LTE); Stage 2".

[17] 3GPP TS 23.246: "Multimedia Broadcast/Multicast Service (MBMS); Architecture and functional description".

[18] 3GPP TS 23.203: "Policy and charging control architecture".

[19] 3GPP TS 23.503: "Policy and Charging Control Framework for the 5G System; Stage 2".

[20] 3GPP TS 26.348: "Northbound Application Programming Interface (API) for Multimedia Broadcast/Multicast Service (MBMS) at the xMB reference point".

[21] 3GPP TS 29.214: "Policy and charging control over Rx reference point".

[22] 3GPP TS 29.468: "Group Communication System Enablers for LTE (GCSE\_LTE); MB2 Reference Point; Stage 3".

[23] 3GPP TS 36.300: "Evolved Universal Terrestrial Radio Access (E-UTRA) and Evolved Universal Terrestrial Radio Access Network (E-UTRAN); Overall description; Stage 2".

[24] IETF RFC 6733 (October 2012): "Diameter Base Protocol".

[25] ETSI TS 102 894-2 (V1.2.1): "Intelligent Transport Systems (ITS); Users and applications requirements; Part 2: Applications and facilities layer common data dictionaryMultimedia Broadcast/Multicast Service (MBMS); Protocols and codecs".

[26] ETSI TS 102 965 (V1.4.1): "Intelligent Transport Systems (ITS); Application Object Identifier (ITS-AID); Registration".

[27] ISO TS 17419: "Intelligent Transport Systems - Cooperative systems - Classification and management of ITS applications in a global context".

[28] 3GPP TS 26.346: "Multimedia Broadcast/Multicast Service (MBMS); Protocols and codecs".

[29] 3GPP TS 33.434: "Service Enabler Architecture Layer (SEAL); Security aspects for Verticals".

[30] 3GPP TS 29.549: "Service Enabler Architecture Layer for Verticals (SEAL); Application Programming Interface (API) specification; Stage3".

[31] 3GPP TS 23.285: "Architecture enhancements for V2X services".

[32] IETF RFC 7252: "The Constrained Application Protocol (CoAP)".

[33] IETF RFC 8323: "CoAP (Constrained Application Protocol) over TCP, TLS, and WebSockets".

[34] 3GPP TS 23.288: "Architecture enhancements for 5G System (5GS) to support network data analytics services".

[35] IEEE Std 802.1Qcc-2018: "Standard for Local and metropolitan area networks - Bridges and Bridged Networks - Amendment: Stream Reservation Protocol (SRP) Enhancements and Performance Improvements".

[36] IEEE 802.1Q-2018: "IEEE Standard for Local and Metropolitan Area Networks—Bridges and Bridged Networks".

[37] IEEE Std 802.1CB-2017: "Frame Replication and Elimination for Reliability".

[38] 3GPP TS 23.003: "Numbering, Addressing and Identification".

[39] 3GPP TS 23.247: "Architectural enhancements for 5G multicast-broadcast services; Stage 2".

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

\* \* \* 2nd Change \* \* \* \*

## 9.2 Functional model for location management

### 9.2.1 General

The functional model for the location management is based on the generic functional model specified in clause 6. It is organized into functional entities to describe a functional architecture which addresses the support for location management aspects for vertical applications. The on-network and off-network functional model is specified in this clause.

### 9.2.2 On-network functional model description

### 9.2.2.1 Generic On-network functional model description

Figure 9.2.2.1-1 illustrates the generic on-network functional model for location management.



Figure 9.2.2.1-1: Generic On-network functional model for location management

The location management client communicates with the location management server over the LM-UU reference point. The location management client provides the support for location management functions to the VAL client(s) over LM‑C reference point. The VAL server(s) communicate with the location management server over the LM-S reference point.

The location management server communicates with the SCEF via T8 reference point to obtain location information from the underlying 3GPP network system. The location management server obtains location information from the NEF via N33 reference point by mechanism defined in clause 5.2.6.2 of 3GPP TS 23.502 [11].

NOTE: Location information from LCS of 4G system is not exposed by SCEF.

Editor's note: Use of Le interface for acquiring location information provided by PLMN is FFS.

### 9.2.2.2 Fused On-network functional model description

Figure 9.2.2.2-1 illustrates the fused on-network functional model for location management.

Figure 9.2.2.2-1: Fused On-network functional model for location management

The location management client communicates with the location management server over the LM-UU reference point through 3GPP and/or non-3GPP network system. The location management client provides the support for location management functions to the VAL client(s) over LM‑C reference point. The VAL server(s) communicate with the location management server over the LM-S reference point. And location management server also communicates with the 3rd party location server via LM-3P reference point.

The location management server communicates with the SCEF via T8 reference point to obtain location information from the underlying 3GPP network system. The location management server obtains location information from the NEF via N33 reference point by mechanism defined in clause 5.2.6.2 of 3GPP TS 23.502 [11]. The location management server obtains location information from the GMLC via Le reference point by mechanism defined in clause 4.4.1 of 3GPP TS 23.273[x]. The location management server also obtains location information from the 3rd party location server via LM-3P reference point.

The fused location function, which is part of the location management server, could fuse kinds of location information from multiple sources to determine a more accurate UE location. The fused location function also could select one or more location sources and location methods based on the requested location QoS which obtained from the location management server.

The location management server communicates with the VAL-server via LM-S reference point to report the location information of the target UE or receive the location information request for the specific UE.

\* \* \* 3rd Change \* \* \* \*

### 9.2.4 Functional entities description

#### 9.2.4.1 General

The functional entities for location management SEAL service are described in the following subclauses.

#### 9.2.4.2 Location management client

The location management client functional entity acts as the application client for location management functions. It interacts with the location management server to provide the UE-based positioning and location-related information, etc. The location management client also supports interactions with the corresponding location management client between the two UEs in one PLMN or different PLMNs.

#### 9.2.4.3 Location management server

The location management server is a functional entity that receives and stores user location information and provides user location information to the vertical application server. The location management server may also acquire location information provided by PLMN operator via T8, N33 or Le reference point or obtain location information provided by 3rd party location server via LM-3P reference point*.* The location management server is enhanced with fused location function which could fuse/combind location information from multiple sources and provides a better location report. The location management server acts as CAPIF's API exposing function as specified in 3GPP TS 23.222 [8]. The location management server also supports interactions with the corresponding location management server in distributed SEAL deployments.

NOTE: The accuracy of location information acquired from 4G system via T8 reference point is not higher than at cell level (ECGI) for E-UTRAN.

\* \* \* 4th Change \* \* \* \*

### 9.2.5 Reference points description

#### 9.2.5.1 General

The reference points for the functional model for location management are described in the following subclauses.

#### 9.2.5.2 LM-UU

The interactions related to location management functions between the location management client and the location management server are supported by LM-UU reference point. This reference point utilizes Uu reference point as described in 3GPP TS 23.401 [9] and 3GPP TS 23.501 [10].

LM-UU reference point provides a means for the location management server to receive location information report from the location management client. The reference point supports location reporting, location determination, location management, and exchange of location contextual information (e.g. UE ID, location capabilities of the target UE, the available positioning methods supported by the target UE, such as the WiFi SSID list for WiFi SSID fingerprint based UE positioning) between the location management server and the location management client of the target UE. The LM-UU reference point shall use SIP-1 and SIP-2 reference points for subscription/notification related signalling. And for transport and routing of location management related signalling LM-UU reference point uses the HTTP-1 and HTTP-2 signalling control plane reference points.

#### 9.2.5.3 LM-PC5

The interactions related to location management functions between the location management clients located in different VAL UEs are supported by LM-PC5 reference point. This reference point utilizes PC5 reference point as described in 3GPP TS 23.303 [12].

#### 9.2.5.4 LM-C

The interactions related to location management functions between the VAL client(s) and the location management client within a VAL UE are supported by LM-C reference point.

#### 9.2.5.5 LM-S

The interactions related to location management functions between the VAL server(s) and the location management server are supported by LM-S reference point. This reference point is an instance of CAPIF-2 reference point as specified in 3GPP TS 23.222 [8].

LM-S reference point is used by the VAL server to request and receive location information from location management server. The LM-S reference point shall use SIP-1 and SIP-2 reference points for subscription/notification related signalling. And for transport and routing of location management related signalling LM-S reference point uses the HTTP-1 and HTTP-2 signalling control plane reference points.

#### 9.2.5.6 LM-E

The interactions related to location management functions between the location management servers in a distributed deployment are supported by LM-E reference point.

Editor's Note: The functions enabled over LM-E reference point is FFS.

#### 9.2.5.7 T8

The reference point T8 supports the interactions between the location management server and the SCEF and is specified in 3GPP TS 23.682 [13]. The functions related to location management of T8 are supported by the location management server.

#### 9.2.5.x N33

The reference point N33 supports the interactions between the location management server and the NEF and is specified in 3GPP TS 23.502 [11]. The functions related to location management of N33 are supported by the fused location management server.

#### 9.2.5.x Le

The reference point Le supports the interactions between the location management server and the GMLC and is specified in 3GPP TS 23.273 [x]. The functions related to location management of Le are supported by the fused location management server.

#### 9.2.5.x LM-3P

The reference point is used for location retrieval of the target UE from that 3rd party location server. The LM-3P can be a service-based interface that may support HTTP or WebSocket.

NOTE 1: The definition of LM-3P is out of scope of this specification.

\* \* \* End of Changes \* \* \* \*