**3GPP TSG-CT WG1 Meeting #136-eC1-22xxxx**

**E-meeting, 12th - 20th May 2022 *(was\_3843)***

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| *CR-Form-v12.1* |
| **CHANGE REQUEST** |
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|  | **24.571** | **CR** | **0012** | **rev** |  | **Current version:** | **17.1.0** |  |
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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 | **x** | Radio Access Network |  | Core Network | **x** |

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| ***Title:***  | Additional of Scheduled Location Time  |
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| ***Source to WG:*** | vivo, Huawei, HiSilicon |
| ***Source to TSG:*** | C1 |
|  |  |
| ***Work item code:*** | 5G\_eLCS\_ph2 |  | ***Date:*** | 2022-04-23 |
|  |  |  |  |  |
| ***Category:*** | **B** |  | ***Release:*** | Rel-17 |
|  | *Use one of the following categories:****F*** *(correction)****A*** *(mirror corresponding to a change in an earlier release)****B*** *(addition of feature),* ***C*** *(functional modification of feature)****D*** *(editorial modification)*Detailed explanations of the above categories canbe found in 3GPP [TR 21.900](http://www.3gpp.org/ftp/Specs/html-info/21900.htm). | *Use one of the following releases:Rel-8 (Release 8)Rel-9 (Release 9)Rel-10 (Release 10)Rel-11 (Release 11)...Rel-15 (Release 15)Rel-16 (Release 16)Rel-17 (Release 17)Rel-18 (Release 18)* |
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| ***Reason for change:*** | The Scheduled Location Time feature has been introduced from SA2#148e(S2-2109106). As stated in the current TS 23.273, scheduled location time allows an external LCS Client, AF or the UE to specify a time in the future at which a current location of the UE is to be obtained.Excerpted from subclause 6.2 and 6.3.1 in TS23.273:“*2) The UE sends an MO-LR Request message included in a UL NAS TRANSPORT message. The MO-LR Request may optionally include up to three LPP positioning message(s). Different types of location services can be requested: location estimate of the UE, location estimate of the UE to be sent to an LCS client or AF, or location assistance data. If the UE is requesting its own location or that its own location be sent to an LCS client or AF, this message carries LCS requested QoS information (e.g. accuracy, response time, LCS QoS Class), the requested maximum age of location, the requested type of location (e.g. "current location", "current or last known location") and, optionally for a current location, a scheduled location time. If the UE is requesting that its location be sent to an LCS client, the message shall include the identity of the LCS client or the AF, and may include the address of the GMLC through which the LCS client or AF (via NEF) should be accessed. In addition, a Service Type indicates which MO-LR service of the LCS Client is requested by the UE may be included. The message also may include a pseudonym indicator to indicate a pseudonym should be assigned by the network and transferred to the LCS Client as the UE's identity. If the UE is instead requesting location assistance data, the embedded LPP message specifies the type of assistance data and the positioning method for which the assistance data applies.*”“*1. The external location services client or the AF (via NEF) sends a request to the (H)GMLC for location reporting for periodic, triggered or UE available location events. The request is sent as described for step 1 in clause 6.1.2 with the differences described here. The LCS Service Request provides the type of periodic or triggered location reporting being requested and associated parameters. For periodic location, the LCS Service Request includes the time interval between successive location reports, the total number of reports and may include location QoS. For periodic location reporting, the LCS Service Request may include a scheduled location time for the first periodic location report. For area event reporting, the LCS Service Request includes details of the target geographical area, whether the event to be reported is the UE being inside, entering into or leaving the target area, the duration of event reporting, the minimum and maximum time intervals between successive event reports, the maximum event sampling interval, whether location estimates shall be included in event reports (and associated location QoS), and whether only one location report is required or more than one. If the target area is expressed by a local coordinate system or a geopolitical name, the (H)GMLC shall convert the target area to a geographical area expressed by a shape as defined in TS 23.032 [8]. For motion event reporting, the LCS Service Request includes the threshold linear distance, the duration of event reporting, the minimum and maximum time intervals between successive event reports, the maximum event sampling interval, whether location estimates shall be included in event reports (and associated location QoS), and whether only one location report is required or more than one.*”The scheduled location time has been captured as “scheduledLocTime” in TS 24.080.This feature needs to be reflected in LCS PeriodicTriggered Invoke and LCS MO-LR operations in CT1 specification. |
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| ***Summary of change:*** | The schedules location time feature is introduced into TS 24.571 with aligning to stage 2 requirement. |
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| ***Consequences if not approved:*** | Missing statements for scheduled location time of the specification. |
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| ***Clauses affected:*** | 5.2.1.3.2, 5.2.2.1.2 |
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|  | **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 \*\*\*\*\*

##### 5.2.1.3.2 Normal operation

The LMF sends a REGISTER message to the UE containing the supplementary services LCS PeriodicTriggered Invoke component as defined in 3GPP TS 24.080 [5]. The REGISTER message is transported to the UE via the serving AMF as described in figure 5.2.1.3.1.1.

If the UE can support the periodic or triggered location, the UE returns a RELEASE COMPLETE message to the LMF containing an LCS PeriodicTriggered return result. The RELEASE COMPLETE message is transported to the LMF via the serving AMF as described in figure 5.2.1.3.1.1.

If the UE is unable to process or support the request received from the network, it shall return an error indication by sending a RELEASE COMPLETE message containing a return error component or reject component. Error values are specified in 3GPP TS 24.080 [5].

Figure 5.2.1.3.2.1 illustrates the signalling for normal operation between the UE and the network.

**UE Network**

REGISTER

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Facility (Invoke = LCS-PeriodicTriggered (referenceNumber, qos, periodicLocation, areaEventReporting, motionEventReporting, referenceNumberExt, h-gmlc-callBackUri, supportedGADShapes, deferredRoutingIdentifier, reportingAccessTypes, multiplePositioningProtocolPDUs, controlPlane-CIoT-5GS-Optimisation, scheduledLocTime))

RELEASE COMPLETE

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Facility (Return result = LCS-PeriodicTriggered)

RELEASE COMPLETE

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Facility (Return error (Error))

RELEASE COMPLETE

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Facility (Reject (Invoke\_problem))

RELEASE COMPLETE

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Figure 5.2.1.3.2.1: Periodic or Triggered Location Invocation

\*\*\*\*\* Next change \*\*\*\*\*

##### 5.2.2.1.2 Normal operation

The UE invokes a MO-LR by sending a REGISTER message to the network containing a LCS-MOLR invoke component. SS Version Indicator value 1 or above shall be used.

The receiving network entity shall initiate the handling of location request in the network. The network shall pass the result of the location procedure to the UE by sending a FACILITY message to the UE containing a LCS-MOLR return result component. When location estimate is kept in the network entity and this information satisfies the requested accuracy and the requested maximum age of location, then the network may reuse this information and the positioning measurement procedure may be skipped.

The network shall pass the result of the location procedure to the UE only if the location estimate is given in a format that the UE supports, as indicated by either the presence (and content) or the absence of the parameter supportedGADShapes, which may be sent by the UE in the LCS-MOLR operation.

The UE may terminate the dialogue by sending a RELEASE COMPLETE message in the case of single location request (see figure 5.2.2.1.1-1). The UE may also initiate another location request operation by sending a FACILITY message to the network containing a LCS-MOLR invoke component (see figure 5.2.2.1.1-2). After the last location request operation the UE shall terminate the dialogue by sending a RELEASE COMPLETE message.

If the network is unable to successfully fulfil the request received from the UE (e.g. to provide a location estimate or location assistance information), it shall clear the transaction by sending a RELEASE COMPLETE message containing a return error component. Error values are specified in 3GPP TS 24.080 [5]. If the network is unable to provide a location estimate due to lack of support in the UE for the type of shape of the location estimate, then it shall use the error Facility Not Supported.

If the network has returned a result to the UE in a FACILITY message but, after some PLMN administered time period has elapsed, has not received either a new location request operation in a FACILITY message or a RELEASE COMPLETE message from the UE, the network may clear the transaction by sending a RELEASE COMPLETE message.

During the MO-LR operation the UE shall run a timer T(LCSL). This timer is started when the operation is sent, and stopped when a response is received from the network. If this timer expires the UE shall assume that the operation has failed, and may terminate the dialogue by sending a RELEASE COMPLETE message, and shall inform the user of the failure.

**UE Network**

REGISTER

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Facility (Invoke = LCS-MOLR (molr-Type, lcs-QoS, lcsClientExternalID, mlc-Number, supportedGADShapes, lcsServiceTypeID, ageOfLocationInfo, locationType, pseudonymIndicator, h-gmlc-address,multiplePositioningProtocolPDUs, scheduledLocTime))

FACILITY

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Facility (Return result = LCS-MOLR (locationEstimate, velocityEstimate, add-LocationEstimate, decipheringKeys))

RELEASE COMPLETE

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Facility (Return error (Error))

RELEASE COMPLETE

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Facility (Reject (Invoke\_problem))

RELEASE COMPLETE

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Figure 5.2.2.1.1-1: Single mobile originated location request

**UE Network**

REGISTER

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Facility (Invoke = LCS-MOLR Request (molr-Type, lcs-QoS, lcsClientExternalID, mlc-Number, supportedGADShapes, lcsServiceTypeID, ageOfLocationInfo, locationType, pseudonymIndicator, h-gmlc-address, multiplePositioningProtocolPDUs, scheduledLocTime))

FACILITY

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(Return result = LCS-MOLR (locationEstimate, velocityEstimate, add-LocationEstimate, decipheringKeys))

RELEASE COMPLETE

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Facility (Return error (Error))

RELEASE COMPLETE

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Facility (Reject (Invoke\_problem))

FACILITY

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Facility (Invoke = LCS-MOLR (molr-Type, lcs-QoS, lcsClientExternalID, mlc-Number, supportedGADShapes, lcsServiceTypeID, ageOfLocationInfo, locationType, pseudonymIndicator, h-gmlc-address, multiplePositioningProtocolPDUs))

FACILITY

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(Return result = LCS-MOLR (locationEstimate, velocityEstimate, add-LocationEstimate, decipheringKeys))

RELEASE COMPLETE

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Facility (Return error (Error))

RELEASE COMPLETE

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Facility (Reject (Invoke\_problem))

RELEASE COMPLETE

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Figure 5.2.2.1.1-2: Multiple mobile originated location requests

NOTE 1: Only the following IEs defined in MO-LR operations in 3GPP TS 24.080 [5] are used for NG-RAN LCS:

- molr-Type

- lcs-QoS

- lcsServiceTypeID

- ageOfLocationInformation

- locationType

- mlc-Number

- lcsClientExternalID

- pseudonymIndicator

- supportedGADShapes

- multiplePositioningProtocolPDUs

- locationEstimate

- h-gmlc-address

- decipheringKeys

- scheduledLocTime

NOTE 2: multiplePositioningProtocolPDUs IE is added to the MO-LR Request to allow for passing multiple UE positioning information LPP messages (e.g. UE location measurements or UE capabilities) to the LMF for NG-RAN LCS. Its ASN.1 description is given in 3GPP TS 24.080 [5], where the maximum number of LPP messages is specified. There is one or more types of multiple LPP messages can be encapsulated in one multiplePositioningProtocolPDUs IE.

\*\*\*\*\* End of change \*\*\*\*\*