**3GPP TSG-WG SA2 Meeting #155 *S2-23xxxx***

**Athens, Greece, Feb 20 – 24, 2023 (revision of S2-23xxxx)**

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| *CR-Form-v12.2* |
| **CHANGE REQUEST** |
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|  | **23.273** | **CR** | **-** | **rev** | **0** | **Current version:** | **18.0.0** |  |
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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 |  | Radio Access Network |  | Core Network | **X** |

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| ***Title:***  | NWDAF support on LMF |
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| ***Source to WG:*** | vivo, Nokia?, Nokia Shanghai Bell? Lenovo? |
| ***Source to TSG:*** | SA2 |
|  |  |
| ***Work item code:*** | eLCS\_Ph3 |  | ***Date:*** | 2023-02-10 |
|  |  |  |  |  |
| ***Category:*** | **B** |  | ***Release:*** | Rel-18 |
|  | *Use one of the following categories:****F*** *(correction)****A*** *(mirror corresponding to a change in an earlier release)****B*** *(addition of feature),* ***C*** *(functional modification of feature)****D*** *(editorial modification)*Detailed explanations of the above categories canbe found in 3GPP [TR 21.900](http://www.3gpp.org/ftp/Specs/html-info/21900.htm). | *Use one of the following releases:Rel-8 (Release 8)Rel-9 (Release 9)Rel-10 (Release 10)Rel-11 (Release 11)…Rel-16 (Release 16)Rel-17 (Release 17)Rel-18 (Release 18)Rel-19 (Release 19)* |
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| ***Reason for change:*** | FS\_eNA\_Ph3 KI#9 has conclusion as:

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| To benefit LCS system, the NWDAF provides a new analytic ID with location accuracy estimates as required by the conclusions of the eLCS-Ph3 study.NOTE 6: The FS\_eLCS\_ph3 in TR 23.700-71 [30] contains a conclusion for Key Issue 4 to use this analytics. |

FS\_eLCS\_Ph3 KI#4 has conclusion as:

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| The interim conclusion for aspect#1 is as follows:NOTE 1: In this aspect, as the beneficiary is LCS system, LCS will do the conclusion and inform FS\_eNA\_Ph3 about the requirements to NWDAF (eNA\_Ph3 Key Issue#9) for the enhancement of LCS system.- NWDAF provides new analytics for Location Estimation Accuracy. The location accuracy analytics include horizontal or vertical accuracy, indoor/outdoor indication.- Solutions 11 and 20 will be used as a basis to derive location estimation accuracy analytics. Further details on input data for the new location accuracy analytics will be determined during the normative phase in coordination with eNA\_Ph3.- LMF as a NWDAF consumer of such analytics uses Location Estimation Accuracy analytics to determine Position Method in the area where a UE is located.- Location client as a consumer of such analytics uses Location Estimation Accuracy to determine a requested LCS QoS class or adjust application specific parameters (out of scope of 3GPP). |

In SA2#154ad, S2-2302005 (CR0612 rev-1) is approved regarding how the NWDAF provides such analytics ID. But how to utilize such analytics needs to be captured in eLCS. In current specification, LCS client/AF can request LCS QoS (LCS accuracy, delay time, LCS class). GMLC receives such request and location estimate from LMF (via AMF). If the LCS class is satisfied regarding multiple QoS class and assured class, GMLC will return the location estimate to LCS client/AF, otherwise, GMLC will discard the location estimate and reply with an cause.With NWDAF’s new analytics, LMF can determine whether the location estimate can satisfy the requested LCS class, if not, LMF can rerun the UE positioning procedure to obtain better reqult. This will significantly reduce the failure of offering satisfactory locaiton estimate.  |
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| ***Summary of change:*** | Include corresponding procedures in eLCS\_Ph3 to complete TR conclusions in both FS\_eNA\_Ph3 KI#9 and FS\_eLCS\_Ph3 KI#4. |
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| ***Consequences if not approved:*** |  It is now clear about how LMF utilizes such new analytics ID. |
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| ***Clauses affected:*** | 6.x.1 (new) |
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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 ...  |
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| ***Other comments:*** |  |
|  |  |
| ***This CR's revision history:*** |  |

\* \* \* \* First change \* \* \* \*

## 4.1b LCS Quality of Service

LCS Quality of Service is used to characterise the location request. It can either be determined by the operator or determined based on the negotiation with the LCS client or the AF. It is optional for LCS client or the AF to provide the LCS Quality of Service in the location request.

LCS Quality of Service information is characterised by 3 key attributes:

- LCS QoS Class as defined below.

- Accuracy: i.e. Horizontal Accuracy (see clause 4.3.1 of TS 22.071 [2]) and Vertical Accuracy (see clause 4.3.2 of TS 22.071 [2].

- Response Time (e.g. no delay, low delay or delay tolerant as described in clause 4.3.3 of TS 22.071 [2]).

NOTE 1: One or two QoS values for Horizontal Accuracy, Vertical Accuracy can be provided in the location request in addition to a preferred accuracy when LCS QoS Class is set to Multiple QoS Class.

The LCS QoS Class defines the degree of adherence by the Location Service to another quality of service parameter (Accuracy), if requested. The 5G system shall attempt to satisfy the other quality of service parameter regardless of the use of QoS Class. There are 3 LCS QoS Classes:

- Best Effort Class: This class defines the least stringent requirement on the QoS achieved for a location request. If a location estimate obtained does not fulfil the other QoS requirements, it should still be returned but with an appropriate indication that the requested QoS was not met. If no location estimate is obtained, an appropriate error cause is sent.

- Multiple QoS Class: This class defines intermediate stringent requirements on the QoS achieved for a location request. If the obtained location estimate does not fulfil the most stringent (i.e. primary) other QoS requirements affected by the degree of adherence of the QoS class, then another location estimation may be triggered at LMF attempting less stringent other QoS requirements. The process may be iterated until the least stringent (i.e. minimum) other QoS requirements are attempted. If the least stringent other QoS requirements cannot be fulfilled by a location estimate, then the location estimate shall be discarded, and an appropriate error cause shall be sent.

NOTE 2: An AF may provide a location request with Multiple QoS Class via NEF. For an LCS client to provide a location request with Multiple QoS Class an Le interface implementation supporting Multiple QoS Class may be required.

NOTE 3: Multiple QoS Class can only be applied for Deferred 5GC-MT-LR Procedure in this release of the specification.

- Assured Class: This class defines the most stringent requirement on the accuracy achieved for a location request. If a location estimate obtained does not fulfil the other QoS requirements, then it shall be discarded, and an appropriate error cause shall be sent. LMF will also check with NWDAF about whether the location estimate can satisfy the requested LCS QoS accuracy. If not, LMF may adjust the positioning method to acquire location estimate with better accuracy.

NOTE 4: How the LMF decides the positioning method is an implementation aspect not pre-determined by QoS criteria.

For LCS client, it may indicate accuracy defined in TS 29.572 [12], tables 6.1.6.3.2-1 and 6.1.6.3.5-1. For AF, it may either indicate the accuracy defined in TS 29.572 [12], table 6.1.6.3.2-1, or indicate a particular value e.g. PLMN ID defined in TS 29.122 [35], table 5.3.2.4.7-1.

\* \* \* \* Second change \* \* \* \*

Editor’s Note: For how to assist LCS client in requesting LCS service with this analytics is FFS.

### 6.x.1 LMF determination of positioning method



Figure 6.11.4-1: positioning method determination based on NWDAF analytics

1. AMF invokes Nlmf\_Locaiton\_DeterminationLocation service operation to LMF, where LCS QoS is included, if requested by LCS client, or AF (via NEF).

2. The LMF initiates the LCS session and derives the UE location estimate, used positioning method, achieved Location QoS accuracy and etc as described in clause 8.3.2.2.

3. Before sends back to the AMF/GMLC, the LMF queries the NWDAF with analytics ID, location estimate and optionally LCS assistance data such as UE ID, used positioning method, achieved location QoS accuracy or requested LCS QoS accuracy, TA/cell ID that UE resides.

4. The NWDAF determines the location estimate related analytics as specified in TS 23.288 and returns the location accuracy analytics specified in clause 6.x in TS 23.288 [x].

5. LMF compares the location accuracy received in step 4 with the required location accuracy received in step 1.

6. If the required location accuracy is not met, the LMF takes subsequent actions like re-executing the LCS procedure with more stringent parameters.

7. The LMF returns the location estimate with the required accuracy.

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