**SA WG2 Meeting #S2-152e(e-meeting) S2-220xxxx**

**17 - 26 August, 2022, Electronic Meeting (revision of S2-22xxxxx)**

**Source: CATT**

**Title: Way forward proposal for key issues with one solution**

**Document for: Approval**

**Agenda Item: 9.10**

**Work Item / Release: FS\_eLCS\_Ph3**

*Abstract of the contribution: way forward proposal for key issues with one solution.*

# 1. Discussion

In TR 23.700-71 v0.3.0, there are some key issues with only one solution, as shown in Table 1.

Table 1: key issues with one solution in TR 23.700-71 v0.3.0

|  |  |  |  |
| --- | --- | --- | --- |
| Key issue | WT# | Solution | RAN impacted |
| Key Issue#5: Assistance data provisioning for low power high accuracy GNSS positioning | WT#3.1 | Solution #21: Collection of nearby GNSS assistance data | NO |
| Key Issue#6: UE Positioning without UE/User Awareness | WT#3.2 | Solution #14: Unawareness positioning | YES: when UE unawareness indication is received, if target UE is in RRC\_INACTIVE state, RAN does not page UE and rejects the message. |
| Key Issue#8: support of location service continuity in case of UE mobility | WT#6 | Solution #22: Support of LCS mobility when UE moves between NG-RAN nodes | NO |
| Key Issue#11: Enhance the Triggered Location for UE power saving purpose | WT#3.3 | Solution #25: Event Report in an Allowed Area | NO |
| Key Issue#12: support of low power and/or high accuracy positioning | WT#3.1 | Solution #26: LPHAP requirement awareness by LMF | NO |

Based on the pCRs proposed to be discussed in CC for SA2#152E preparation on 26 July, 2022, new solutions for KI#8 and KI#12 are proposed. So evaluation for KI#8 and KI#12 needs to wait for the agreements of the new solutions.

This pCR proposes evaluation and conclusion for KI#5, KI#6 and KI#11.

# 2. Proposal

This paper proposes to add evaluation and conclusion for key issues with one solution.

\* First change \*

# 7 Evaluation

Editor's note: This clause provides an evaluation of the solutions of clause 6.

## 7.x Key Issue #5: Assistance data provisioning for low power high accuracy GNSS positioning

The clause evaluates the solutions for KI#5 as following.

There is one solution, i.e. sol#21, is related to key issue#5. In sol#21, the impacts to 5GC NFs are as follows:

- LMF: obtain GNSS assistance data from trusted AF directly or from untrusted AF via NEF and discover the trusted AF or NEF via NRF.

- AF: notify GNSS assistance data to NEF or LMF.

- NEF: notify GNSS assistance data to LMF.

To support the functions above, the existing service operations event exposure service operations are re-used to support GNSS assistance data subscribe and notify. Furthermore, the solution has no RAN impacts.

## 7.x Key Issue #6: UE Positioning without UE/User Awareness

There is one solution, i.e. sol#14, is related to key issue#6 which aims to support UE is not notified by any means during the LCS session, especially when UE is in CM\_IDLE or RRC\_INACTIVE state.

In sol#14, UE unaware indication and user unaware indication are introduced. To support the indications, the impacts to existing NFs are shown in Table 7.x-1.

Table 7.x-1: Impacts to existing NFs of solution#14

|  |  |  |
| --- | --- | --- |
| Impacts | UE unaware | User unaware |
| GMLC impact | Receive UE unaware indication from LCS Client/NEF and send the indication to AMF. | Receive user unaware indication from LCS Client/NEF and send the indication to AMF. |
| NEF impact | Receive UE unaware indication from AF and send the indication to GMLC. | Receive user unaware indication from AF and send the indication to GMLC. |
| AMF impact | Receive UE unaware indication from GMLC and behave differently based on UE state:   * UE in CM\_CONNECTED: send the UE unaware indication to LMF. * UE in CM\_IDLE: not to page UE and rejects the location request from GMLC or returns the latest UE location. | Receive user unaware indication from GMLC and skip the privacy check which requires interaction with user is skipped. |
| LMF impact | Receive UE unaware indication from AMF, select uplink positioning method (e.g. UL E-CID) based on the indication and send the network positioning message including UE unaware indication to RAN node. | No |
| RAN impact | Receive UE unaware indication from LMF and behave differently based on UE state:   * UE in RRC\_CONNECTED: RAN behaviour is not impacted. * UE in RRC\_INACTIVE: not to page UE and reject the network positioning message. | No |

Based on the analyses in Table 7.x-1, user unaware indication requires the network to page UE when UE is in CM\_IDLE or RRC\_INACTIVE state during the positioning procedure. Thus the indication can only support user unawareness.

UE unaware indication does not require the network to page UE when UE is in CM\_IDLE or RRC\_INACTIVE state during the positioning procedure. Thus the indication can support both UE and user unawareness.

## 7.x Key Issue #11: Enhance the Triggered Location for UE power saving purpose

There is one solution, i.e. sol#25, is related to key issue#11 which aims to support UE location tracking when UE enters a pre-defined area.

In sol#25, the event report allowed area is provided by network to UE. When the UE detects the trigger or periodic event happens, if the UE is in the event report allowed area, then it obtains location measurements, calculates the location estimate and sends the event report. Otherwise, the UE behaviours above are not performed. To save power, the UE can adjust the event report allowed area received from network based on battery status.

To support sol#25, the deferred MT-LR procedure is enhanced to transfer event report allowed area parameter from network to UE. UE can adjust the area via the UE Location Privacy Setting procedure. No new message/procedure is introduced and no RAN impact is introduced.

\* Second change \*

# 8 Conclusions

Editor's note: This clause will capture conclusions from the study.

## 8.X Conclusions for Key Issue #5

It is concluded that solution#21 is used as the baseline for normative work.

## 8.X Conclusions for Key Issue #6

It is concluded that solution#14 (UE unaware indication) is used as the baseline for normative work.

## 8.X Conclusions for Key Issue #11

It is concluded that solution#25 is used as the baseline for normative work.

\* End of changes \*