**3GPP TSG-WG2 Meeting #164 *S2-2408891***

**19th – 23rd August 2024, Maastricht, Netherlands**

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| *CR-Form-v12.2* | | | | | | | | |
| **CHANGE REQUEST** | | | | | | | | |
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|  | **23.273** | **CR** | **0532** | **rev** | **1** | **Current version:** | **18.6.0** |  |
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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:*** | KI#1 - LMF enhancements for UE positioning using a ML model | | | | | | | | | |
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| ***Source to WG:*** | Ericsson | | | | | | | | | |
| ***Source to TSG:*** | SA2 | | | | | | | | | |
|  |  | | | | | | | | | |
| ***Work item code:*** | AIML\_CN | | | | |  | ***Date:*** | | | 2024-08-07 |
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| ***Category:*** | **B** |  | | | | | ***Release:*** | | | Rel-19 |
|  | *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-17 (Release 17) Rel-18 (Release 18) Rel-19 (Release 19)  Rel-20 (Release 20)* | |
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| ***Reason for change:*** | | This CR proposes to specify the conclusions in the TR 23.700-84 for KI#1 for the option when LMF performs both training of the ML Model and inference, as such principle #2 and #5 are the main ones listed below for reference, although other principles are also applicable to this option.  **Principle #2:** LMF is enhanced to perform model training for AI/ML based Positioning, the trigger for data collection and for model training in LMF is up to implementation.  **Principle #5:**  Data used for model training, inference and model performance monitoring for AI/ML based positioning will be decided by RAN WGs, and SA WG2 will align with RAN WGs. The related procedures for data collection will be coordinated with RAN WGs in the normative phase.  NOTE 3: The user's authorization/consent of collecting UE related training data is needed as specified in TS 23.288 [5] and TS 23.273 [7]. | | | | | | | | |
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| ***Summary of change:*** | | The LMF collects input data for ML Model training from the UE using either control plane or user plane procedures. When the control plane solution is used a N1 container is sent transparently via AMF. The N1 container transfer a LCS Periodic-Triggered Invoke Request/Response to request channel measurements and location estimates. When the user plane solution is used the LMF sends the LCS Periodic-Triggered Invoke Request/Response over user plane. The LMF may also request UE Positioning using any of the methods listed in 6.11.  The procedure for data collection is applicable for training an ML Model in LMF, however any differences with the procedure for data collection when the training of the ML Model is not in LMF should be minimized. | | | | | | | | |
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| ***Consequences if not approved:*** | | Conclusion in the TR 23.700-84 are not specified. | | | | | | | | |
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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 ... | | |
|  | |  | | | | | | | | |
| ***Other comments:*** | |  | | | | | | | | |
|  | |  | | | | | | | | |
| ***This CR's revision history:*** | |  | | | | | | | | |

**\*\*\*\*\*\*\*\*\*\* First Change \*\*\*\*\*\*\*\*\*\***

##### 6.X.1 Data collection at LMF to train the AI/ML-based positioning model to perform positioning based on UE measurements

The LMF needs to obtain input data for AI/ML based positioning model training and may also request the UE to provide the UE location. The ML Model is trained to perform UE positioning for UEs located in an area of interest that may expand over multiple TA or cover multiple NG-RAN nodes.

Editor´s Note: The input data and its source for AI/ML based positioning model training will be defined by RAN WGs, and SA WG2 will align with RAN WGs.



Figure 6.x.1-1: Data collection by LMF to train the LMF-side AI/ML model using UE measurements.

1. The LMF starts data collection for the purpose to train a LMF-side ML Model for UE Positioning. The LMF subacribes to AMF to retrieve the list of SUPIs located in an area of interest using Namf\_EventExposure\_Subscriber\_Request (Target of Event Reporting = ”any UE”, Event ID = “UEs in/out area of interest”.
2. The AMF send Namf\_EventExposure\_Subscriber\_Response (list of SUPIs in the area of interest”).
3. The LMF checks the user consent for model training using Nudm\_SDM\_Get (SUPI, User consent (purpose is set to ML model training)), if user consent is granted, the LMF subscribes to UDM to change on user consent using Nudm\_SDM\_Subscribe (SUPI, User consent (purpose is set to ML model training) and the procedure continues in step 4 for this SUPI, otherwise the SUPI in the area of interest is skipped no data is collected for this SUPI.

Editor´s Note: If and how LMF is informed about the UE capability to report input data for ML Model training is FFS.

For each SUPI that provided consent to data collection for model training and for a UE that can generate input data for the model training, steps 4 to 9 are performed:

1. The LMF obtains input data generated from UE for the LMF-side AIML-based positioning model training.

Editor´s Note: How the LMF obtains the input data is FFS depending on the RAN2 decision.

At the time the LMF decides that the input data for a UE are not needed, e.g. the user consent for data collection for model training is revoked, the LMF stops to collect the input data.

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