**3GPP TSG-RAN WG3 Meeting #120R3-232834**

**Incheon, Republic of Korea, May 22nd – 26th 2023**

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| *CR-Form-v12.2* |
| **CHANGE REQUEST** |
|  |
|  | **38.305** | **CR** | **-** | **rev** | **-** | **Current version:** | **17.4.0** |  |
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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 | **x** | Core Network | **x** |

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| ***Title:***  | Introduction of Mobile TRP |
|  |  |
| ***Source to WG:*** | Ericsson, Xiaomi, Qualcomm Inc., CATT, Nokia, Nokia Shanghai Bell, ZTE |
| ***Source to TSG:*** | R3 |
|  |  |
| ***Work item code:*** |  |  | ***Date:*** | 2023-05-12 |
|  |  |  |  |  |
| ***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:*** | SA2 introduced the support of mobile TRP Positioning in TS 23.273, where it is specified that the LMF can obtain the Mobile TRP location information via two different methods. Since a TRP can be mobile, it is proposed to update the definition section in section 3.1 and to clarify that MO-LR procedure is used for the Mobile TRP case. |
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| ***Summary of change:*** | 1. Added a definition of Mobile TRP in section 3.1, which follows TS 23.273 definition and which can include RP, TP, or TRP.
2. Described that MO-LR function is used for transfer of the Mobile TRP's location to the LMF, as specified in TS 23.273.
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| ***Consequences if not approved:*** | Missing support of Mobile TRP positioning, as specified in TS 23.273. |
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| ***Clauses affected:*** | 3.1, 7.3.3 |
|  |  |
|  | **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:*** |  |

-------------------------------------------Start of changes-------------------------------------------

3 Definitions, symbols and abbreviations

3.1 Definitions

For the purposes of the present document, the terms and definitions given in TR 21.905 [1] and the following apply. A term defined in the present document takes precedence over the definition of the same term, if any, in TR 21.905 [1].

As used in this document, the suffixes "-based" and "-assisted" refer respectively to the node that is responsible for making the positioning calculation (and which may also provide measurements) and a node that provides measurements (but which does not make the positioning calculation). Thus, an operation in which measurements are provided by the UE to the LMF to be used in the computation of a position estimate is described as "UE-assisted" (and could also be called "LMF-based"), while one in which the UE computes its own position is described as "UE-based".

**Positioning integrity**: A measure of the trust in the accuracy of the position-related data and the ability to provide associated alerts.

**Pre-configured assistance data**: Refers to the DL-PRS assistance data (with associated validity criteria) that can be provided to the UE (before or during an ongoing LPP positioning session), to be then utilized for potential positioning measurements at a future time (e.g. for deferred MT-LR). Pre-configured DL-PRS assistance data may consist of multiple instances, where each instance is applicable to a different area within the network.

**Protection Level (PL):** A statistical upper-bound of the Positioning Error (PE) that ensures that, the probability per unit of time of the true error being greater than the AL and the PL being less than or equal to the AL, for longer than the TTA, is less than the required TIR, i.e., the PL satisfies the following inequality:
 *Prob per unit of time* [((*PE>AL*) & (*PL<=AL*)) *for longer than TTA*] *< required TIR*
When the PL bounds the positioning error in the horizontal plane or on the vertical axis then it is called Horizontal Protection Level (HPL) or Vertical Protection Level (VPL) respectively.
A specific equation for the PL is not specified as this is implementation-defined. For the PL to be considered valid, it must simply satisfy the inequality above.

NOTE: the PL inequality is valid for all values of the AL.

**PRS-only TP**: A TP which only transmits PRS, DL-PRS signals and is not associated with a cell.

**PRS Processing Window (PPW):** The PRS Processing Window is configured by the network to a UE for NR DL-PRS measurements without measurement gap.

**Reception Point (RP)**: A set of geographically co-located receive antennas (e.g. antenna array (with one or more antenna elements)) for one cell, part of one cell or one UL-SRS-only RP. Reception Points can include base station (ng-eNB or gNB) antennas, remote radio heads, a remote antenna of a base station, an antenna of a UL-SRS-only RP, etc. One cell can include one or multiple reception points. For a homogeneous deployment, each reception point may correspond to one cell.

**Rx Time Delay:** From a signal reception perspective, there will be a time delay from the time when the RF signal arrives at the Rx antenna to the time when the signal is digitized and time-stamped at the baseband.

**Rx Timing Error:** Result of Rx time delay involved in the reception of a signal before reporting measurements that are obtained from the signal. It is the uncalibrated Rx time delay, or the remaining delay after the UE/TRP internal calibration/compensation of the Rx time delay, involved in the reception of the DL-PRS/UL SRS signals. The calibration/compensation may also include the calibration/compensation of the relative time delay between different RF chains in the same UE/TRP and may also possibly consider the offset of the Rx antenna phase centre to the physical antenna centre.

**SRS-only RP**: An RP which only receives UL-SRS signals and is not associated with a cell.

**Transmission Point (TP)**: A set of geographically co-located transmit antennas (e.g. antenna array (with one or more antenna elements)) for one cell, part of one cell or one DL-PRS-only TP. Transmission Points can include base station (ng-eNB or gNB) antennas, remote radio heads, a remote antenna of a base station, an antenna of a DL-PRS-only TP, etc. One cell can include one or multiple transmission points. For a homogeneous deployment, each transmission point may correspond to one cell.

**Transmission-Reception Point (TRP)**: A set of geographically co-located antennas (e.g. antenna array (with one or more antenna elements)) supporting TP and/or RP functionality.

**TRP Rx 'Timing Error Group' (TRP Rx TEG):** Rx timing errors, associated with TRP reporting of one or more UL measurements, that are within a certain margin.

**TRP RxTx 'Timing Error Group' (TRP RxTx TEG):** Rx timing errors and Tx timing errors, associated with TRP reporting of one or more gNB Rx-Tx time difference measurements, which have the 'Rx timing errors+Tx timing errors' differences within a certain margin.

**TRP Tx 'Timing Error Troup' (TRP Tx TEG):** Tx timing errors, associated with TRP transmissions on one or more DL-PRS resources, that are within a certain margin.

**Tx Time Delay:** From a signal transmission perspective, the time delay from the time when the digital signal is generated at baseband to the time when the RF signal is transmitted from the Tx antenna.

**Tx Timing Error:** Result of Tx time delay involved in the transmission of a signal. It is the uncalibrated Tx time delay, or the remaining delay after the TRP/UE internal calibration/compensation of the Tx time delay, involved in the transmission of the DL-PRS/UL SRS signals. The calibration/compensation may also include the calibration/compensation of the relative time delay between different RF chains in the same TRP/UE and may also possibly consider the offset of the Tx antenna phase centre to the physical antenna centre.

**UE Rx 'Timing Error Group' (UE Rx TEG):** Rx timing errors, associated with UE reporting of one or more DL measurements (RSTD), that are within a certain margin.

**UE RxTx 'Timing Error Group' (UE RxTx TEG):** Rx timing errors and Tx timing errors, associated with UE reporting of one or more UE Rx-Tx time difference measurements, which have the 'Rx timing errors+Tx timing errors' differences within a certain margin.

**UE Tx 'Timing Error Group' (UE Tx TEG):** Tx timing errors, associated with UE transmissions on one or more UL SRS resources for positioning purpose, that are within a certain margin.

**Mobile TRP:** a TRP belonging to a mobile IAB-node.

-------------------------------------------Next change-------------------------------------------

7.3.3 MO-LR Service Support

Figure 7.3.3-1 shows the sequence of operations for an MO-LR service, starting at the point where an LCS Client in the UE or the user has requested some location service (e.g., retrieval of the UE's location or transfer of the UE's location to a third party or transfer of the Mobile TRP's location to LMF as specified in TS 23.273 [35]).

-------------------------------------------End of changes-------------------------------------------