**3GPP TSG-RAN WG2 Meeting #121bis-e *R2-2304053***

**Elbonia, 17– 26 April 2023**

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| *CR-Form-v12.2* |
| **CHANGE REQUEST** |
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|  | **38.305** | **CR** | **0126** | **rev** | **1** | **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 | **X** | Radio Access Network | **X** | Core Network | **X** |

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| ***Title:***  | Measurements and Assistance Data Transfer |
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| ***Source to WG:*** | Nokia, Nokia Shanghai Bell |
| ***Source to TSG:*** | R2 |
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| ***Work item code:*** | NR\_pos\_enh-Core |  | ***Date:*** | 2023-04-20 |
|  |  |  |  |  |
| ***Category:*** | **F** |  | ***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-16 (Release 16)Rel-17 (Release 17)Rel-18 (Release 18)Rel-19 (Release 19)* |
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| ***Reason for change:*** | **Measurements related:**1. For UL-AoA positioning, the measurements listed in Section 4.3.15 and Section 8.14.1 are not aligned. Also, in 4.3.15, it indicates that both A-AoA and Z-AoA must be used while in Table 8.14.2.2-1, azimuth and zenith (aka, elevation) angle of arrival is mentioned as an either or both possibilities.
2. For DL-AoD positioning, in step 2 of the LMF-initiated Location Information Transfer procedure in 8.11.3.1.3.1, only the DL-PRS-RSRP measurement is mentioned. DL-PRS-RSRPP measurement is also possible as shown in Table 8.11.2.2-1, but it is not mentioned. For ease of specification maintenance it is better to generalize the measurement used in the procedure section (and keep the list of measurements in the information transfer tables), as it is done for multi-RTT Location Information Transfer procedure.
3. For DL-TDOA positioning, in step 2 of the LMF-initiated Location Information Transfer procedure in 8.12.3.1.3.1, only DL RSTD and DL-PRS-RSRP measurements are mentioned but DL-PRS-RSRPP measurement is also possible as shown in Table 8.12.2.2-1, but it is not mentioned. For ease of specification maintenance it is better to generalize the measurement used in the procedure section (and keep the list of measurements in the information transfer tables), as it is done for multi-RTT Location Information Transfer procedure.

**Assistance Data Transfer for Multi-RTT, DL-AoD, DL-TDOA:**1. In the Assistance Data Transfer procedure for Multi-RTT, DL-AoD and DL-TDOA positioning, UE behaviour is unclear when it receives assistance data for a TRP for which the UE has no stored assistance data.
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| ***Summary of change:*** | 1. Section 4.3.15: Clarified that either A-AoA or Z-AoA or both can be used for UL-AoA positoning. Added UL-SRS-RSRP to align with Section 8.14.1.
2. Section 8.11.3.1.3.1: Updated step 2 to generalize the measurements as DL-AoD measurements (since Table 8.11.2.2-1 has the specific measurements listed in it).
3. Section 8.12.3.1.3.1: Updated step 2 to generalize the measurements as DL-TDOA measurements (since Table 8.12.2.2-1 has the specific measurements listed in it).
4. In Sections 8.10.3.1.2.1, 8.11.3.1.2 and 8.12.3.1.2 clarified that the UE stores the assistance data for the TRP for which it does not have stored information but continues to maintain the stored assistance data for other TRPs for which it already has information stored in the UE.

**Impact analysis**Impacted functionality: 1. Measurements used for UL-AoA, DL-AoD and DL-TDOA positioning
2. Assistance Data Transfer procedure for Multi-RTT, DL-AoD, DL-TDOA

Inter-operability: No inter-operability issues seen as the corrections are just ensuring the alignment of information in different parts of the specification and no functional changes have been made. |
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| ***Consequences if not approved:*** | 1. Contradicting information remains in the specification about the angle measurement usage for UL-AoA positioning
2. Incomplete and contradicting information remains in the specification about the measurements to be used for DL-AoD positioning
3. Incomplete and contradicting information remains in the specification about the measurements to be used for DL-TDOA positioning
4. UE behaviour when it receives assistance data for a TRP for which the UE has no stored assistance data will remain ambiguous in the specification
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| ***Clauses affected:*** | 4.3.15, 8.10.3.1.2.1, 8.11.3.1.2, 8.11.3.1.3.1, 8.12.3.1.2, 8.12.3.1.3.1 |
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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:*** |  |
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| ***This CR's revision history:*** | **Rev 1**:* Revised the text in clauses 8.10.3.1.2.1, 8.11.3.1.2 and 8.12.3.1.2 to “and maintains the already stored assistance data for other TRPs”
* Removed the text, “also called elevation angle” from clause 4.3.15
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*First Modified Subclause*

### 4.3.15 UL-AoA

The UL-AoA positioning method makes use of the measured azimuth angle of arrival (A-AoA) and/or zenith angle of arrival (Z-AoA) at multiple RPs of uplink signals transmitted from the UE. The RPs measure A-AoA and Z-AoA (and optionally UL-SRS-RSRP and/or UL-SRS-RSRPP) of the received signals using assistance data received from the positioning server, and the resulting measurements are used along with other configuration information to estimate the location of the UE.

The operation of the UL-AoA positioning method is described in clause 8.14.

*Next Modified Subclause*

### 8.10.3 Multi-RTT Positioning Procedures

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###### 8.10.3.1.2.1 Assistance Data Transfer between LMF and UE

The purpose of this procedure is to enable the LMF to provide assistance data to the UE (e.g., as part of a positioning procedure) and the UE to request assistance data from the LMF (e.g., as part of a positioning procedure). The LMF may provide the pre-configured DL-PRS assistance data (with associated validity criteria) to the UE (before or during an ongoing LPP positioning session), to be utilized for potential positioning measurements at a future time. Pre-configured DL-PRS assistance data may consist of multiple instances, where each instance is applicable to a different area within the network. One or more assistance data instances may be provided. Each instance is provided in one LPP Assistance Data messages.

If a UE receives assistance data for a TRP for which it has already stored assistance data, it overwrites the stored assistance data, whereas if a UE receives assistance data for a TRP for which it has not stored assistance data, it stores the assistance data for the TRP and maintains the already stored assistance data for other TRPs. The TRPs are uniquely identified using a combination of PRS-ID and Cell-ID. The number TRPs for which the UE can store Assistance Data is a UE capability and is indicated by the number of areas a UE can support.

*Next Modified Subclause*

### 8.11.3 DL-AoD Positioning Procedures

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##### 8.11.3.1.2 Assistance Data Transfer Procedure

The purpose of this procedure is to enable the LMF to provide assistance data to the UE (e.g., as part of a positioning procedure) and the UE to request assistance data from the LMF (e.g., as part of a positioning procedure). The LMF may provide the pre-configured DL-PRS assistance data (with associated validity criteria) to the UE (before or during an ongoing LPP positioning session), to be utilized for potential positioning measurements at a future time. Pre-configured DL-PRS assistance data may consist of multiple instances, where each instance is applicable to a different area within the network. One or more assistance data instances may be provided. Each instance is provided in one LPP Assistance Data messages.

If a UE receives assistance data for a TRP for which it has already stored assistance data, it overwrites the stored assistance data, whereas if a UE receives assistance data for a TRP for which it has not stored assistance data, it stores the assistance data for the TRP and maintains the already stored assistance data for other TRPs. The TRPs are uniquely identified using a combination of PRS-ID and Cell-ID. The number TRPs for which the UE can store Assistance Data is a UE capability and is indicated by the number of areas a UE can support.

*Next Modified Subclause*

###### 8.11.3.1.3.1 LMF-initiated Location Information Transfer Procedure

Figure 8.11.3.1.3.1-1 shows the Location Information Transfer operations for the DL-AoD positioning method when the procedure is initiated by the LMF.



Figure 8.11.3.1.3.1-1: LMF-initiated Location Information Transfer Procedure

(1) The LMF sends an LPP Request Location Information message to the UE. This request includes indication of DL-AoD measurements requested, including any needed measurement configuration information, and required response time.

(2) The UE obtains DL-AoD measurements as requested in step 1. The UE then sends an LPP Provide Location Information message to the LMF, before the Response Time provided in step (1) elapsed, and includes the obtained DL-AoD measurements. If the UE is unable to perform the requested measurements, or the Response Time elapsed before any of the requested measurements were obtained, the UE returns any information that can be provided in an LPP message of type Provide Location Information which includes a cause indication for the not provided location information.

*Next Modified Subclause*

### 8.12.3 DL-TDOA Positioning Procedures

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##### 8.12.3.1.2 Assistance Data Transfer Procedure

The purpose of this procedure is to enable the LMF to provide assistance data to the UE (e.g., as part of a positioning procedure) and the UE to request assistance data from the LMF (e.g., as part of a positioning procedure). The LMF may provide the pre-configured DL-PRS assistance data (with associated validity criteria) to the UE (before or during an ongoing LPP positioning session), to be utilized for potential positioning measurements at a future time. Pre-configured DL-PRS assistance data may consist of multiple instances, where each instance is applicable to a different area within the network. One or more assistance data instances may be provided. Each instance is provided in one LPP Assistance Data messages.

If a UE receives assistance data for a TRP for which it has already stored assistance data, it overwrites the stored assistance data, whereas if a UE receives assistance data for a TRP for which it has not stored assistance data, it stores the assistance data for the TRP and maintains the already stored assistance data for other TRPs. The TRPs are uniquely identified using a combination of PRS-ID and Cell-ID. The number TRPs for which the UE can store Assistance Data is a UE capability and is indicated by the number of areas a UE can support.

*Next Modified Subclause*

###### 8.12.3.1.3.1 LMF-initiated Location Information Transfer Procedure

Figure 8.12.3.1.3.1-1 shows the Location Information Transfer operations for the DL-TDOA positioning method when the procedure is initiated by the LMF.



Figure 8.12.3.1.3.1-1: LMF-initiated Location Information Transfer Procedure

(1) The LMF sends an LPP Request Location Information message to the UE. This request includes indication of DL-TDOA measurements requested, including any needed measurement configuration information, and required response time.

(2) The UE obtains DL-TDOA measurements as requested in step 1. The UE then sends an LPP Provide Location Information message to the LMF, before the Response Time provided in step (1) elapsed, and includes the obtained DL-TDOA measurements. If the UE is unable to perform the requested measurements, or the Response Time elapsed before any of the requested measurements were obtained, the UE returns any information that can be provided in an LPP message of type Provide Location Information which includes a cause indication for the not provided location information.

*End of Changes*