**3GPP TSG-RAN4 Meeting #99-e *R4-2108414***

**Electronic meeting, May 19 – 27, 2021**

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| *CR-Form-v12.1* |
| **CHANGE REQUEST** |
|  |
|  | **38.133** | **CR** | **1870** | **rev** | **1** | **Current version:** | **16.7.0** |  |
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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 |  |

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| ***Title:***  | CR on RSTD measurement requirements |
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| ***Source to WG:*** | CATT |
| ***Source to TSG:*** | R4 |
|  |  |
| ***Work item code:*** | NR\_pos-Core |  | ***Date:*** | 2021-04-30 |
|  |  |  |  |  |
| ***Category:*** | F |  | ***Release:*** | Rel-16 |
|  | *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-15 (Release 15)Rel-16 (Release 16)Rel-17 (Release 17)Rel-18 (Release 18)* |
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| ***Reason for change:*** | 1. Some parameters (Lavailable\_PRS,i, multiple periodicity, multiple layers, muting factor) for RSTD measurement are not defined completely.
2. The terminology is not aligned in the specification.
3. The requirements applicability is not defined completely.
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| ***Summary of change:*** | 1. Introduce the RSTD measurement requirement for multiple layers and multiple PRS periodicities in 38.133.
2. Introduce definition of Lavailable\_PRS,i
3. Align the terminology in specification.
4. Introduce the measurement requirements applicability regarding to UE capability and MG.
5. Some wording corrections.
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| ***Consequences if not approved:*** | RSTD measurement requirements are incomplete.  |
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| ***Clauses affected:*** | 9.9.2.5 |
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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 is the revision of R4-2109089.  |
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| ***This CR's revision history:*** |  |

<Start of Change 1>

#### 9.9.2.5 Measurements Period Requirements

When physical layer receives last of *NR-TDOA-ProvideAssistanceData* message and *NR-TDOA-RequestLocationInformation* message from LMF via LPP [34]*,* the UE shall be able to measure and report multiple (up to the UE capability specified in Clause 9.9.2.3) DL RSTD measurements, defined in TS 38.215 [4], during the measurement period defined as:

Where ,

 is the index of positioning frequency layer,

 is total number of positioning frequency layers, and

 is the periodicity of the PRS RSTD measurement in positioning frequency layer i

 is the measurement period for PRS RSTD measurement in positioning frequency layer *i* as specified below:

 ,

where:

 is the UE Rx beam sweeping factor. In FR1, = 1; and in FR2, = 8.

 is the carrier-specific scaling factor for NR PRS-based positioning measurements in positioning frequency layer *i* as defined in clause 9.1.5.2.

 is the maximum number of DL PRS resources in positioning frequency layer *i* configured in a slot.

 is the time duration of available PRS to be measured in the positioning frequency layer i, and is calculated in the same way as PRS duration K defined in clause 5.1.6.5 of TS 38.214 [26].

 is the number of PRS RSTD samples and = 4.

 is the measurement duration for the last PRS RSTD sample, including the sampling time and processing time, = + ,

 is the periodicity of the PRS RSTD measurement in positioning frequency layer i defined as:

 *=*

Where,

 corresponds to *durationOfPRS-ProcessingSymbolsInEveryTms* in TS 37.355 [34],

 *,* the least common multiple between and .

 is the repetition periodicity of the measurement gap applicable for measurement in the PRS frequency layer i.

 is the periodicity of DL PRS resource on positioning frequency layer *i*.

* If more than one PRS periodicities are configured in positioning frequency layer *i*, the least common multiple of PRS periodicities among all DL PRS resource sets in the positioning frequency layer is used to derive the measurement period of that positioning frequency layer *i*. Note: For the purpose of calculating TPRS,i, only the PRS resources fully or partially covered by the MG are considered.

If muting option 1 is applied, the periodicity of a PRS resource is scaled by Nmuting defined as below:

* If TPRS,i \* dl-PRS-MutingBitRepetitionFactor-r16 > 10240 ms
	+ - * Nmuting = 1 (effectively no type1 muting)
* else
	+ - * Nmuting = X \* dl-PRS-MutingBitRepetitionFactor-r16, where
			* X = min( L, 10240/( Tprs \* dl-PRS-MutingBitRepetitionFactor-r16 ) ) and
			* L is the size of NR-MutingPattern-r16 for mutingOption1-r16.

 is UE capability combination per band where N is a duration of DL PRS symbols in ms corresponding to *durationOfPRS-ProcessingSysmbols* in TS 37.355 [34] processed every T ms corresponding to *durationOfPRS-ProcessingSymbolsInEveryTms* in TS 37.355 [34] for a given maximum bandwidth supported by UE corresponding to *supportedBandwidthPRS* in TS 37.355 [34].

 is UE capability for number of DL PRS resources that it can process in a slot as indicated by *maxNumOfDL-PRS-ResProcessedPerSlot* specified in TS 37.355 [34].

The time *s*tarts from the first MG instance aligned with a DL PRS resource(s) of positioning frequency layer *i* closest in time after both the *NR-TDOA-ProvideAssistanceData* message and *NR-TDOA-RequestLocationInformation* message are delivered from LMF to the physical layer of UE via LPP [34].

* Note: No per-positioning frequency layer requirement is applied in scenarios when multiple positioning frequency layers are configured.

*Editor’s note: FFS: RSTD measurement period when PRS-RSRP is configured for other positioning method.*

*Editor’s note: FFS: RSTD measurement period when MG pattern is reconfigured during measurement period.*

When PRS-RSRP is configured for DL-TDOA, RSTD and RSRP are performed over the same measurement period.

The measurement requirements do not apply for a PRS resource, if the PRS resource is across two sampling duration of N within duration LPRS.

The measurement requirements do not apply for a PRS resource, if time span of the PRS resource instance (including at least the minimum number of repetitions specified in the accuracy requirements) is greater than UE reported capability N.If the time span of a DL PRS resource instance (including at least the minimum number of repetitions specified in the accuracy requirements) is greater than the configured measurement gap length excluding RF switching time, then the measurement requirements do not apply for the PRS resource instance.

If handover occurs while RSTD measurements are being performed, then the UE shall continue and complete the on-going RSTD measurements. The UE shall also meet the RSTD measurement requirements in this clause and measurement accuracy requirements in clause 10.1.23. However, in this case the RSTD measurement period shall be as follows:

Where,

- is the number of times handover occurs during ;

- is the largest among all positioning frequency layers;

- is the time during which the RSTD measurement may not be possible due to handover; it can be up to Tinterrupt as defined in clause 6.1.

- is the time during which the RSTD measurement may not be possible due to handover; it can be up to Tinterrupt as defined in clause 6.1.

<End of Change 1>