**3GPP TSG-RAN4 Meeting #102-e*****R4-22XXXX***

**Electronic meeting, Feb. 21 – Mar. 3, 2022**

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| *CR-Form-v12.2* |
| **CHANGE REQUEST** |
|  |
|  | **38.133** | **CR** | **Draft** | **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 |  | Core Network |  |

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| ***Title:***  | Draft CR on PRS-RSRPP measurement requirements in RRC\_INACTIVE state |
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| ***Source to WG:*** | CATT |
| ***Source to TSG:*** | R4 |
|  |  |
| ***Work item code:*** | NR\_pos\_enh-Core |  | ***Date:*** | 2022-02-10 |
|  |  |  |  |  |
| ***Category:*** | B |  | ***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-15 (Release 15)Rel-16 (Release 16)Rel-17 (Release 17)Rel-18 (Release 18)* |
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| ***Reason for change:*** | PRS-RSRPP measurement in RRC\_INACTIVE state is introduced in R17 positioning enhancement WI and the corresponding PRS-RSRPP measurement requirements need to be specified in TS 38.133.  |
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| ***Summary of change:*** | **This draft CR is based on the skeleton of new sections in the endorsed draft big CR R4-2202683 in RAN4#101bis-e meeting.** 1. Introduce the measurement period requirements for the PRS-RSRPP measurement in RRC\_INACTIVE state in TS 38.133.
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| ***Consequences if not approved:*** | The measurement period requirements for the PRS-RSRPP measurement in RRC\_INACTIVE state are missing.  |
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| ***Clauses affected:*** | (new) 5.5.5 |
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|  | **Y** | **N** |  |  |
| ***Other specs*** |  |  |  Other core specifications  | TS/TR ... CR ...  |
| ***affected:*** |  |  |  Test specifications | TS/TR ... CR ...  |
| ***(show related CRs)*** |  |  |  O&M Specifications | TS/TR ... CR ...  |
|  |  |
| ***Other comments:*** |  |
|  |  |
| ***This CR's revision history:*** |  |

# <Start of Change 1>

5.5.5 PRS-RSRPP measurements

#### 5.5.5.1 Introduction

The requirements in clause 5.5.5.5 shall apply provided the UE has received a message from LMF via LPP requesting the UE to measure and report PRS-RSRPP measurements defined in TS 38.215 [4]. And the UE is capable of supporting the PRS-RSRPP measurement in RRC INACTIVE state.

#### 5.5.5.2 Requirements applicability

The requirements in clause 5.5.5 apply for periodic and triggered PRS-RSRPP measurements, provided:

- PRS-RSRPP related side conditions given in clause 10.1.x are met for a corresponding Band.

##### 5.5.5.3 Measurement capability

TBD

#### 5.5.5.4 Measurement reporting requirements

This measurement reporting delay requirements should exclude the transmission time needed by SDT or the transmission time to connected state to report positioning measurements.

The reported PRS-RSRPP measurement values contained in measurement reports shall be based on the measurement report mapping requirements specified in clauses 10.1.x.

The PRS-RSRPP measurement accuracy for all measured PRS resources shall be fulfilled according to the accuracy requriements specified in the clauses 10.1.x.

#### 5.5.5.5 Measurement period requirements

When the physical layer receives *NR-DL-AoD-ProvideAssistanceData* message and *NR-DL-AoD-RequestLocationInformation* message in RRC\_INACTIVE state, the UE shall be able to measure multiple (up to the UE capability specified in Clause 9.9.6.y) PRS-RSRPP measurements as defined in TS 38.215 [4] on configured positioning frequency layers, within ms.

where

*i* is the index of positioning frequency layer,

L is the total number of positioning frequency layers,

 is the periodicity of the PRS-RSRPP measurement in positioning frequency layer *i*.

where

 Kcarrier\_PRS is the carrier specific scaling factor for PRS-RSRPP measurements. For the UE that supports parallel PRS measurement, Kcarrier\_PRS = 1. For the UE that not supports parallel PRS measurement, Kcarrier\_PRS equals to Kcarrier as defined in section 4.2.2.4 if Srxlev ≤ SnonIntraSearchP or Squal ≤ SnonIntraSearchQ, or equals to Nlayer in 4.2.2.7 if Srxlev > SnonIntraSearchP and Squal > SnonIntraSearchQ.

 is the scaling factor for Rx beam sweeping, and =1 if positioning frequency layer *i* is in FR1. If positioning frequency layer *i* is in FR2, = [8].

 is the time duration of available PRS to be measured in the positioning frequency layer i to be measured during , and is calculated in the same way as PRS duration K defined in clause 5.1.6.5 of TS 38.214 [26]. For calculation of , only the PRS resources unmuted are considered.

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

 is UE capability combination per band where N is a duration of DL PRS symbols in ms corresponding to *[high layer signaling]* in TS 37.355 [34] processed every T ms corresponding to *[high layer signaling]* 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 *[high layer signaling]* in TS 37.355 [34],

* Note: the signaling is under discussion in RAN1/2.

 is the number of PRS-RSRPP measurement samples and = 4 for the UE not supporting reduced number of samples. For the UE supporting reduced number of samples, = FFS.

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

 is the periodicity of PRS-RSRPP measurement in positioning frequency layer *i*,

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

 is the least common multiple between and DRX cycle,

 is the maximum PRS resource periodicity among all PRS resources in positioning frequency layer i,

If positioning frequency layer *i* has more than one DL PRS resource set with different PRS periodicities with muting, , the least common multiple of among the DL PRS resource sets is used to derive , where:

 is the periodicity of PRS resource sets given by the higher-layer parameter *DL-PRS-Periodicity*.

 is the scaling factor considering PRS resource muting. If bitmap for higher-layer parameter *DL-* is the scaling factor considering PRS resource muting. , where is the muting repetition factor given by the higher-layer parameter *DL-PRS-MutingBitRepetitionFactor*, and is the size of the bitmap .

When PRS-RSRPP measurements are configured for DL-AoD, the time starts from the first DRX cycle including the DL PRS resources in the assistance data after both the *NR-DL-AoD-RequestLocationInformation* message and *NR-DL-AoD-ProvideAssistanceData* message are delivered to the physical layer of UE.

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

If changes during the measurement period, the measurement period could be longer.

The measurement requirements do not apply for a PRS resource:

* if the PRS resource is across two sampling duration of N within duration or
* 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.

The PRS-RSRPP measurement requirements in this section apply for first path.

The requirements in this section apply, provided no PRS symbols are dropped during the measurement period due to collisions with other DL signals; otherwise, a longer measurement period is expected.

The requirements in clause 5.5.5 do not apply if the PRS configuration given by higher layer paramters *NR-DL-PRS-AssistanceData* exceeds any of the UE measurement capabilities given by *NR-DL-PRS-ResourcesCapability* in *NR-DL-AoD-ProvideCapabilities*, and it is up to UE implementation which PRS resources are measured, subject to UE measurement capabilities*.*When the cell reselection occurs during the PRS measurement period, the UE shall continue the PRS-RSRPP measurement after the cell reselection.

If the DRX cycle is reconfigured during the PRS measurement period, the PRS measurement period can be longer.

If cell reselection occurs while PRS-RSRPP measurement is being performed, then the UE shall continue and complete the on-going PRS-RSRPP measurements after a new cell is selected. The PRS-RSRPP measurement period can be longer.

If the RRC state transition occurs from RRC\_INACTIVE to RRC\_CONNECTED state during the PRS-RSRPP measurement period then the UE shall continue the PRS-RSRPP measurement. The PRS-RSRPP measurement period can be longer.

Note: Section 5.5.5 will be revisited to capture the agreement from stage 2 running CR in RAN2.

# <End of Change 1>