**3GPP TSG-RAN WG1 Meeting #110 *R1-2208020***

**Toulouse, France, August 22 – 26, 2022**

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| *CR-Form-v12.2* |
| **CHANGE REQUEST** |
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|  | **TS 38.214** | **CR** | 304 | **rev** | **-** | **Current version:** | **17.2.0** |  |
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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 |  |

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| ***Title:***  | CR on the positioning frequency layer within a PPW and UE capability for the PPW |
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| ***Source to WG:*** | Moderator (Huawei), ZTE |
| ***Source to TSG:*** | RAN1 |
|  |  |
| ***Work item code:*** | NR\_pos\_enh-Core |  | ***Date:*** | 2022-08-25 |
|  |  |  |  |  |
| ***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-15 (Release 15)Rel-16 (Release 16)Rel-17 (Release 17)Rel-18 (Release 18)Rel-19 (Release 19)* |
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| ***Reason for change:*** | (1) In RAN1#109e meeting, it is agreed that only single frequency layer can be processed inside one PPW across all instances. Hence, TS 38.214 should be updated accordingly.

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| AgreementReply to the RAN4’s question in LS R1-2203026 with* RAN1 already agreed in RAN1#108-e that inside each single instance of a PRS processing window, a single PFL can be measured. This is applicable to all Types of MG-less PRS processing.
* In addition, it is RAN1 understanding that the applicable number of positioning frequency layers for the gapless PRS measurement within a PRS processing window is **one across all instances of the PRS processing window**.
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(2) In UE capability FG 27-3-3, PRS processing capability singaling (N, T) and (N2, T2) are introduced for PRS in PPW. Hence, the paragraph in TS 38.214 should be extended to both measurement gap and PPW based postioning. |
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| ***Summary of change:*** | Clarify that only single frequency layer can be processed inside one PPW across all instances;Update the description according the UE capability for PPW. |
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| ***Consequences if not approved:*** | The specification 38.214 is not aligned with the agreement |
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| ***Clauses affected:*** | 5.1.6.5 |
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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:*** | **Isolated Impact Analysis:**No inter-operability issue is identified. |
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| ***This CR's revision history:*** |  |

5.1.6.5 PRS reception procedure

<Unrelated part omitted>

The UE is expected to measure the DL PRS outside the measurement gap, subject to UE capability, if the DL PRS is inside the active DL BWP and has the same numerology as the active DL BWP and is within the DL PRS processing window indicated by higher layer parameter [*PRSProcessingWindow*]. The UE is not expected to measure the DL PRS outside the measurement gap if the expected received timing difference between the DL PRS from the non-serving cell and that from the serving cell, determined by the higher layer parameters *nr-DL-PRS-ExpectedRSTD* and *nr-DL-PRS-ExpectedRSTD-Uncertainty,* is larger than maximum Rx timing difference provided by [UE capability]*.* For receiving the DL PRS outside the measurement gap and within the DL PRS processing window, if the UE determines the DL PRS priority is higher than other DL signals or channels except SSB as indicated by higher layer parameter [*PRS-priority-indicator*] or as implied by UE capability, the UE is expected to measure the DL PRS; otherwise, the UE is not expected to measure the DL PRS and expected to receive other DL signals and channels, subject to UE capabilities. Inside one [*PRSProcessingWindow*] the UE is only expected to measure a single DL PRS positioning frequency layer.

When the UE is expected to measure the DL PRS outside the measurement gap in a configured PRS processing window with type1A and if the DL PRS is determined to be higher priority than the DL signals and channels inside the PRS processing window, those DL signals and channels are not expected to be measured by the UE. When the UE is expected to measure the DL PRS outside the measurement gap in a configured PRS processing window with type1B and if the DL PRS is determined to be higher priority than the DL signals and channels inside the PRS processing window, those DL signals and channels in the same band as the DL PRS are not expected to be measured by the UE. When the UE is expected to measure the DL PRS outside the measurement gap in a configured PRS processing window with [Type-2] if the DL PRS is determined to be higher priority than the DL signals and channels inside the PRS processing window, those DL signals and channels from the impacted serving cells are not expected to be measured by the UE on the overlapped symbols with the DL PRS, where impacted serving cells refer to the serving cell on which the *DL-PPW-PreConfig* is configured for a frequency range 1 band, and all the serving cells in the same band as the DL PRS for a frequency range 2 band.

When the UE has an activated PRS processing window with type1A or type1B and the UE determines the presence of other DL signals and channels, except SSB, of higher priority than the DL PRS in the PRS processing window no later than [N symbol(s)/T ms] before the first symbol of the PRS processing window, the UE is expected to receive the other DL signals and channels and drop all PRS within the PRS processing window. When the UE has an activated PRS processing window with type2 and the UE determines the presence of other DL signals and channels, except SSB, of higher priority than the DL PRS on a symbol configured with the DL PRS no later than [N symbols/T ms] before the DL PRS symbol, the UE is expected to receive the other DL signals and channels and drop the DL PRS symbol.

When the UE has an activated PRS processing window with type1A or type1B and the UE determines the presence of other DL signals and channels, except SSB, of higher priority than the DL PRS in the PRS processing window later than [N symbol(s)/T ms] before the first symbol of the PRS processing window, the UE is not required to receive the other DL signals and channels and may receive the DL PRS and consider the DL PRS as higher priority in the PRS processing window. When the UE has an activated PRS processing window with type2 and the UE determines the presence of other DL signals and channels, except SSB, of higher priority than the DL PRS on a symbol configured with the DL PRS later than [N symbol(s)/T ms] before the DL PRS symbols, the UE is not required to receive the other DL signals and channels and may receive the DL PRS symbol and consider the DL PRS as higher priority in that symbol.

Within a positioning frequency layer, the DL PRS resources are sorted in the decreasing order of priority for measurement to be performed by the UE, with the reference indicated by *nr-DL-PRS-ReferenceInfo* being the highest priority for measurement, and the following priority is assumed:

- Up to 64 *NR-SelectedDL-PRS-IndexPerTRP* of the frequency layer are sorted according to priority if *nr-SelectedDL-PRS-IndexListPerFreq* is provided, or up to 64 *NR-DL-PRS-AssistanceDataPerTRP* of the frequency layer are sorted according to priority otherwise;

- Up to 2 *DL-SelectedPRS-ResourceSetIndex* per *dl-PRS-ID* of the frequency layer are sorted according to priority if *dl-SelectedPRS-ResourceSetIndexList* is provided, or up to 2 *NR-DL-PRS-ResourceSet* per *dl-PRS-ID* of the frequency layer are sorted according to priority otherwise.

The UE DL PRS processing capability is defined in [TS 37.355]. For the purpose of DL PRS processing capability, the duration *K* msec of DL PRS symbols within *P* msec window, is calculated by

*-* Type 1 duration calculation with UE symbol level buffering capability

*-* Type 2 duration calculation with UE slot level buffering capability

*- S* is the set of slots based on the numerology of the DL PRS of a serving cell within the *P* msec window in the positioning frequency layer that contains potential DL PRS resources considering the actual *nr-DL-PRS-ExpectedRSTD*, *nr-DL-PRS-ExpectedRSTD-Uncertainty* provided for each pair of DL PRS Resource Sets.

*-* For Type 1, is the smallest interval in msec within slot corresponding to an integer number of OFDM symbols based on the numerology of the DL PRS of a serving cell that covers the union of the potential PRS symbols and determines the PRS symbol occupancy within slot , where the interval considers the actual *nr-DL-PRS-ExpectedRSTD*, *nr-DL-PRS-ExpectedRSTD-Uncertainty* provided for each pair of DL PRS resource sets (target and reference).

*-* For Type 2, is the numerology of the DL PRS, and is the cardinality of the set .

The UE may be configured to report one or more measurement instances, each with its own timestamp, on DL RSTD, DL PRS-RSRP, and/or UE Rx-Tx time difference measurements, in a single measurement report.

<Unrelated part omitted>