**3GPP TSG-RAN WG1 Meeting 102eR1-20xxxxx**

**Elbonia, August 17 – 28, 2020**

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| *CR-Form-v12.0* | | | | | | | | |
| **DRAFT CHANGE REQUEST** | | | | | | | | |
|  | | | | | | | | |
|  | **38.211** | **CR** |  | **rev** |  | **Current version:** | **16.2.0** |  |
|  | | | | | | | | |
| *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:*** | Corrections to positioning | | | | | | | | | |
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| ***Source to WG:*** | Ericsson | | | | | | | | | |
| ***Source to TSG:*** |  | | | | | | | | | |
|  |  | | | | | | | | | |
| ***Work item code:*** | NR\_pos-Core | | | | |  | ***Date:*** | | | 2020-08-31 |
|  |  | | | |  | |  | | |  |
| ***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 can be 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-12 (Release 12)* *Rel-13 (Release 13) Rel-14 (Release 14) Rel-15 (Release 15) Rel-16 (Release 16)* | |
|  |  | | | | | | | | | |
| ***Reason for change:*** | | 1. Ambigous specification when the UE may assume SSBs colliding with SRS. 2. Misaligned parameter names between 38.211 and 38.331 | | | | | | | | |
|  | |  | | | | | | | | |
| ***Summary of change:*** | | 1. Clarifying when the UE may assume SSB and PRS collisions (R1-2007125) 2. Updating parameter names to match 38.331 | | | | | | | | |
|  | |  | | | | | | | | |
| ***Consequences if not approved:*** | | 1. Ambigous specification of positioning 2. Misaligned parameter names | | | | | | | | |
|  | |  | | | | | | | | |
| ***Clauses affected:*** | | 7.4.1.7.2, 7.4.1.7.3, 7.4.1.7.4 | | | | | | | | |
|  | |  | | | | | | | | |
|  | | **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 ... | | |
|  | |  | | | | | | | | |
| ***Other comments:*** | |  | | | | | | | | |
|  | |  | | | | | | | | |
| ***This CR's revision history:*** | |  | | | | | | | | |

##### 7.4.1.7.2 Sequence generation

The UE shall assume the reference-signal sequence is defined by

where the pseudo-random sequence is defined in clause 5.2.1. The pseudo-random sequence generator shall be initialised with

where is the slot number, the downlink PRS sequence ID is given by the higher-layer parameter *dl-PRS-SequenceID-r16*, and is the OFDM symbol within the slot to which the sequence is mapped.

##### 7.4.1.7.3 Mapping to physical resources in a downlink PRS resource

For each downlink PRS resource configured, the UE shall assume the sequence  is scaled with a factor and mapped to resources elements according to

when the following conditions are fulfilled:

- the resource element is within the resource blocks occupied by the downlink PRS resource for which the UE is configured;

- the symbol is not used by any SS/PBCH block used by a serving cell for downlink PRS transmitted from the same serving cell or any SS/PBCH block from a non-serving cell whose time frequency location is provided to the UE by higher layers for downlink PRS transmitted from the same non-serving cell;

- the slot number satisfies the conditions in clause 7.4.1.7.4.

and where

- the antenna port

- is the first symbol of the downlink PRS within a slot and given by the higher-layer parameter *dl-PRS-ResourceSymbolOffset-r16*;

- the size of the downlink PRS resource in the time domain is given by the higher-layer parameter *dl-PRS-NumSymbols-r16*;

- the comb size is given by the higher-layer parameter *dl-PRS-CombSizeN-r16* such that the combination is one of {2, 2},{4, 2}, {6, 2}, {12, 2}, {4, 4}, {12, 4}, {6, 6}, {12, 6} and {12, 12}*;*

- the resource-element offset is given by the higher-layer parameter *dl-PRS-ReOffset-r16*;

- the quantity is given by Table 7.4.1.7.3-1.

The reference point for is the location of the point A of the positioning frequency layer, in which the downlink PRS resource is configured where point A is given by the higher-layer parameter *dl-PRS-PointA-r16*.

Table 7.4.1.7.3-1: The frequency offset as a function of .

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | Symbol number within the downlink PRS resource | | | | | | | | | | | |
| 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 |
| 2 | 0 | 1 | 0 | 1 | 0 | 1 | 0 | 1 | 0 | 1 | 0 | 1 |
| 4 | 0 | 2 | 1 | 3 | 0 | 2 | 1 | 3 | 0 | 2 | 1 | 3 |
| 6 | 0 | 3 | 1 | 4 | 2 | 5 | 0 | 3 | 1 | 4 | 2 | 5 |
| 12 | 0 | 6 | 3 | 9 | 1 | 7 | 4 | 10 | 2 | 8 | 5 | 11 |

##### 7.4.1.7.4 Mapping to slots in a downlink PRS resource set

For a downlink PRS resource in a downlink PRS resource set, the UE shall assume the downlink PRS resource being transmitted when the slot and frame numbers fulfil

and one of the following conditions are fulfilled:

- the higher-layer parameters *dl-PRS-MutingOption1-r16* and *dl-PRS-MutingOption2-r16* are not provided;

- the higher-layer parameter *dl-PRS-MutingOption1-r16* is provided with bitmap but *dl-PRS-MutingOption2-r16* with bitmap is not provided, and bit is set;

- the higher-layer parameter *dl-PRS-MutingOption2-r16* is provided with bitmap but *dl-PRS-MutingOption1-r16* with bitmap is not provided, and bit is set;

- the higher-layer parameters *dl-PRS-MutingOption1-r16* with bitmap and *dl-PRS-MutingOption2-r16* with are both provided, and both bit and are set.

where

- is bit in the bitmap given by the higher-layer parameter *dl-PRS-MutingOption1-r16* where is the size of the bitmap;

- is bit in the bitmap given by the higher-layer parameter *dl-PRS-MutingOption2-r16;*

- the periodicity and the slot offset are given by the higher-layer parameter *dl-PRS-Periodicity-and-ResourceSetSlotOffset-r16;*

- the downlink PRS resource slot offset is given by the higher-layer parameter *dl-PRS-ResourceSlotOffset-r16*;

- the repetition factor is given by the higher-layer parameter *dl-PRS-ResourceRepetitionFactor*;

- the muting repetition factor is given by the higher-layer parameter *dl-PRS-MutingBitRepetitionFactor-r16*;

- the time gap is given by the higher-layer parameter *dl-PRS-ResourceTimeGap-r16*;

For a downlink PRS resource in a downlink PRS resource set configured, the UE shall assume the downlink PRS resource being transmitted as described in clause 5.1.6.4 of [6, TS 38.214].