**3GPP TSG-WG4 Meeting #111R4-2408889**

**Fukuoka City, Fukuoka , Japan, 20th – 24th May, 2024**

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| *CR-Form-v12.3* |
| **CHANGE REQUEST** |
|  |
|  | **38.133** | **CR** | **draft** | **rev** |  | **Current version:** | **18.5.0** |  |
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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 to 38.133 on test case for SSB based L1-RSRP for FR2 PC6 UE with multi-Rx |
|  |  |
| ***Source to WG:*** | Samsung |
| ***Source to TSG:*** |  R4 |
|  |  |
| ***Work item code:*** | NR\_HST\_FR2\_enh-Perf |  | ***Date:*** | 2024-5-6 |
|  |  |  |  |  |
| ***Category:*** | B |  | ***Release:*** | Rel-18 |
|  | *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-17 (Release 17)Rel-18 (Release 18)Rel-19 (Release 19) Rel-20 (Release 20)* |
|  |  |
| ***Reason for change:*** | 1. In Rel-18 RAN4-led WI on enhanced NR support for high speed train scenario in FR2, the new measurement requirement for SSB based L1-RSRP is defined.
2. In RAN4 #109 meeting, the necessity of test cases for the enhanced SSB based L1-RSRP requirement was verified. It is agreed to define a new test case for SSB based L1-RSRP measurement when DRX is used for FR2-1 PC6 UEs supporting SimultaneousReceptionFR2HST-r18.
3. On top of R4-2406409
4. The Io should be reduced to increase the dB range for the AoA from Spherical Coverage directions
5. The L1-RSRP reporting period [560 ms] in test requirements is incorrect
6. The range of Rx antenna gain Gmin/Gmax should be aligned with the value defined in Annex B, Table B.2.1.5.1-1
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|  |  |
| ***Summary of change:*** | 1. Test case for SSB based L1-RSRP measurement requirement when DRX is used for FR2-1 PC6 UEs supporting SimultaneousReceptionFR2HST-r18 is introduced.
2. The test case is drafted according to WF captured in R4-2321349.
3. On top of R4-2406409
4. Io is re-calculated
5. The L1-RSRP reporting period in test requirements is re-defined
6. The range of Rx antenna gain Gmin and Gmax are updated to align with the values defined in Annex B, Table B.2.1.5.1-1
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| ***Consequences if not approved:*** | No test case to guarantee the new requirement of SSB based L1-RSRP measurement dedicated for FR2 PC6 UE with multi-Rx is applicable; UE will fail the test requirements with incorrect parameters. |
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| ***Clauses affected:*** | A.7.6.3.X (new) |
|  |  |
|  | **Y** | **N** |  |  |
| ***Other specs*** |  | **x** |  Other core specifications  | TS/TR ... CR ...  |
| ***affected:*** | **x** |  |  Test specifications | TS/TR 38.533  |
| ***(show related CRs)*** |  | **x** |  O&M Specifications | TS/TR ... CR ...  |
|  |  |
| ***Other comments:*** |  |
|  |  |
| ***This CR's revision history:*** |  |

**< Start of Change-1 >**

#### A.7.6.3.X SSB based L1-RSRP measurement when DRX is used for power class 6 UE supporting SimultaneousReceptionFR2HST-r18

##### A.7.6.3.X.1 Test Purpose and Environment

The purpose of this test is to verify that the power class 6 UE supporting *SimultaneousReceptionFR2HST-r18* makes correct reporting of L1-RSRP measurement when *highSpeedMeasFlagFR2-r17* is configured, and when *highSpeedDeploymentTypeFR2-r17* is configured as bidirectional. This test will partly verify the L1-RSRP measurement requirements for power class 6 UE configured with *highSpeedMeasFlagFR2-r17* for FR2 in clause 9.5.4.1 with the testing configurations for NR cells in Table A.7.6.3.X.1-1.

 [The AoA setup for this test is Setup X as defined in clause A.3.15.4]

Table A.7.6.3.X.1-1: Applicable NR configurations for FR2 SSB based L1-RSRP test for power class 6 UE supporting SimultaneousReceptionFR2HST-r18

|  |  |
| --- | --- |
| Config | Description |
| 1 | NR 120 kHz SSB SCS, 100 MHz bandwidth, TDD duplex mode |
| 2 | NR 240 kHz SSB SCS, 100 MHz bandwidth, TDD duplex mode |
| Note: The UE is only required to be tested in one of the supported test configurations |

##### A.7.6.3.X.2 Test parameters

There is one cell in the test, the FR2 PCell (Cell 1). The test parameters for the Cell 1 are given in Table A.7.6.3.X.2-1 and Table A.7.6.3.X.2-2 below.

There are two SSBs configured in Cell 1. In CSI measurement configuration, UE is indicated to perform L1-RSRP measurement on two different QCL Type D SSBs simultaneously and report periodically. The test consists of two successive time periods, with time duration of T1 and T2 respectively. The test has higher layer parameter *timeRestrictionForChannelMeasurements* configured*.*

There is no measurement gap configured in the test. Before the test, UE is configured to perform RLM, BFD and L1-RSRP measurement based on the SSBs.

Table A.7.6.3.X.2-1: General test parameters

|  |  |  |  |
| --- | --- | --- | --- |
| Parameter | Config | Unit | Value |
| highSpeedMeasFlagFR2-r17 | 1~2 |  | Set 2 |
| highSpeedDeploymentTypeFR2-r17 | 1~2 |  | bidirectional |
| SSB GSCN | 1~2 |  | freq1 |
| Duplex mode | 1~2 |  | TDD |
| TDD Configuration | 1~2 |  | TDDConf.3.1 |
| BWchannel | 1~2 | MHz | 100: NRB,c = 66 |
| Data RBs allocated | 1~2 |  | 24 |
| PDSCH Reference measurement channel | 1 |  | SR.3.2 TDD |
| 2 | SR.3.3 TDD |
| RMSI CORESET Reference Channel | 1 |  | CR.3.1 TDD |
| 2 | CR.3.2 TDD |
| Dedicated CORESET Reference Channel | 1 |  | CCR.3.1 TDD |
| 2 | CCR.3.7 TDD |
| SSB configuration | 1 |  | SSB.1 FR2 |
|  | 2 |  | SSB.2 FR2 |
| OCNG Patterns | 1~2 |  | OP.5 |
| Initial BWP Configuration | 1~2 |  | DLBWP.0.1ULBWP.0.1 |
| Dedicated BWP configuration | 1~2 |  | DLBWP.1.3ULBWP.1.3 |
| SMTC configuration | 1~2 |  | SMTC.1 |
| TRS Configuration | 1~2 |  | TRS.2.1 TDD |
| PDCCH/PDSCH TCI Configuration | 1~2 |  | TCI.State.2 |
| DRX configuration | 1~2 |  | DRX.3 |
| reportConfigType | 1~2 |  | periodic |
| reportQuantity | 1~2 |  | ssb-Index-RSRP |
| Number of reported RS | 1~2 |  | 2 |
| L1-RSRP reporting period | 1~2 | slot | 320 |
| T1 | 1~2 | s | 5 |
| T2 | 1~2 | s | 3 |
| EPRE ratio of PSS to SSS | 1~2 | dB | 0 |
| EPRE ratio of PBCH DMRS to SSS |  |  |  |
| EPRE ratio of PBCH to PBCH DMRS |  |  |  |
| EPRE ratio of PDCCH DMRS to SSS |  |  |  |
| EPRE ratio of PDCCH to PDCCH DMRS |  |  |  |
| EPRE ratio of PDSCH DMRS to SSS |  |  |  |
| EPRE ratio of PDSCH to PDSCH DMRS |  |  |  |
| EPRE ratio of OCNG DMRS to SSSNote 1 |  |  |  |
| EPRE ratio of OCNG to OCNG DMRS Note 1 |  |  |  |
| Propagation condition | 1~2 |  | AWGN 19444Hz |
| Note 1: OCNG shall be used such that both cells are fully allocated and a constant total transmitted power spectral density is achieved for all OFDM symbols. |

Table A.7.6.3.X.2-2: SSB specific test parameters

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Parameter | Config | Unit | SSB#0 | SSB#1 |
|  |  |  | T1 | T2 | T1 | T2 |
| Angle of arrival configuration |  |  | [Setup X according to A.3.15.X] |
| Beam AssumptionNote 4 | 1-2 |  | Rough |
| Note2 | 1~2 | dBm/15kHz | -105 |
| Note2 | 1 | dBm/SSB SCS | -96 |
|  | 2 |  | -93 |
|  | 1~2 | dB | 0 | 0 | -Infinity | 9 |
| SSB\_RP Note3 | 1 | dBm/SSB SCS | -96 | -96 | -Infinity | -87 |
|  | 2 |  | -93 | -93 | -Infinity | -84 |
| Io Note3 | 1 | dBm/95.04MHz | -68.37 |  -68.37 |  -71.38 |  -61.86 |
|  | 2 |  | -68.37 | -68.37 | -71.38 | -61.86 |
|  | 1~2 | dB | 0 | 0 | -Infinity | 9 |
| Note 1: The resources for uplink transmission are assigned to the UE prior to the start of time period T2.Note 2: Interference from other cells and noise sources not specified in the test is assumed to be constant over subcarriers and time and shall be modelled as AWGN of appropriate power for  to be fulfilled.Note 3: SSB\_RP and Io levels have been derived from other parameters for information purposes. They are not settable parameters themselves.Note 4: Information about types of UE beam is given in B.2.1.3, and does not limit UE implementation or test system implementation |

##### A.7.6.3.X.3 Test Requirements

The UE shall send L1-RSRP report every 320 slots. No later than [1040ms] plus 320 slots from the beginning of time period T2, UE shall send L1-RSRP report including the results for both SSB#0, SSB#1 while meeting the accuracy requirements defined in clause 10.1.20.1.

[For each receive Rx chain, the reported L1-RSRP value shall include the Rx antenna gain of in the range of -10 to +20 dB.]

The rate of correct events observed during repeated tests shall be at least 90%.