**3GPP TSG- RAN WG4 Meeting #111 R4-2409850**

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

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| *CR-Form-v12.3* | | | | | | | | |
| **CHANGE REQUEST** | | | | | | | | |
|  | | | | | | | | |
|  | **38.101-4** | **CR** | **-** | **rev** | **-** | **Current version:** | **18.3.0** |  |
|  | | | | | | | | |
| *For* ***[HELP](http://www.3gpp.org/3G_Specs/CRs.htm" \l "_blank)*** *on using this form: comprehensive instructions can be found at  <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 TS38.101-4: Introduction of TDD 2Rx requirements for advanced receiver for MU-MIMO | | | | | | | | | |
|  |  | | | | | | | | | |
| ***Source to WG:*** | ZTE Corporation,Sanechips | | | | | | | | | |
| ***Source to TSG:*** | R4 | | | | | | | | | |
|  |  | | | | | | | | | |
| ***Work item code:*** | NR\_demod\_enh3-Perf | | | | |  | ***Date:*** | | | 2024-05-20 |
|  |  | | | |  | |  | | |  |
| ***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 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-17 (Release 17) Rel-18 (Release 18) Rel-19 (Release 19)*  *Rel-20 (Release 20)* | |
|  |  | | | | | | | | | |
| ***Reason for change:*** | | TDD 2Rx requirements for advanced receiver for MU-MIMO is missing. | | | | | | | | |
|  | |  | | | | | | | | |
| ***Summary of change:*** | | Introduction of TDD 2Rx requirements for advanced receiver for MU-MIMO. | | | | | | | | |
|  | |  | | | | | | | | |
| ***Consequences if not approved:*** | | RAN4 introduces advanced receiver for MU-MIMO feature in R-18. Otherwise, TDD 2Rx requirements for advanced receiver for MU-MIMO is missing. | | | | | | | | |
|  | |  | | | | | | | | |
| ***Clauses affected:*** | | 5.2.2.2.17 | | | | | | | | |
|  | |  | | | | | | | | |
|  | | **Y** | **N** |  | | | |  | | |
| ***Other specs*** | |  | **X** | Other core specifications | | | | TS/TR ... CR ... | | |
| ***affected:*** | | **X** |  | Test specifications | | | | TS/TR 38.521-4 | | |
| ***(show related CRs)*** | |  | **X** | O&M Specifications | | | | TS/TR ... CR ... | | |
|  | |  | | | | | | | | |
| ***Other comments:*** | |  | | | | | | | | |
|  | |  | | | | | | | | |
| ***This CR's revision history:*** | |  | | | | | | | | |

#### < START OF CHANGE>

##### 5.2.2.2.17 Minimum requirements for PDSCH with intra cell inter user interference

The performance requirements are specified in Table 5.2.2.2.17-3, with the addition of test parameters in Table 5.2.2.2.17-2 and the downlink physical channel setup according to Annex C.3.1.

The performance requirements for UE supporting Enhanced Receiver Type 2 are specified in Table 5.2.2.2.17-5, with the addition of test parameters in Table 5.2.2.2.17-2 and Table 5.2.2.2.17-4 , and the downlink physical channel setup according to Annex C.3.1.

The test purposes are specified in Table 5.2.2.2.17-1.

Table 5.2.2.2.17-1: Tests purpose

|  |  |
| --- | --- |
| Purpose | Test index |
| Verify the PDSCH performance under 2 receive antenna conditions, when transmission from the serving cell is interfered by 1 or 2 interfering cells. | 1-1 |
| Verify PDSCH performance under 2 receive antenna conditions, when the PDSCH transmission of target UE is interfered by co-scheduled UE with Enhanced Receiver Type 2 when modulation order for co-scheduled UE is explicitly signaled by DCI. | 2-1 |
| Verify PDSCH performance under 2 receive antenna conditions, when the PDSCH transmission of target UE is interfered by co-scheduled UE with Enhanced Receiver Type 2 when modulation order for co-scheduled UE is detected. | 2-2 |

Table 5.2.2.2.17-2: Test parameters

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Parameter | | Unit | Target UE | Co-scheduled UE |
| Duplex mode | |  | TDD | |
| Active DL BWP index | |  | 1 | |
| PDSCH configuration | Mapping type |  | Type A | |
| k0 |  | 0 | |
| Starting symbol (S) |  | 2 | |
| Length (L) |  | 12 | |
| PDSCH aggregation factor |  | 1 | |
| PRB bundling type |  | Static | |
| PRB bundling size |  | 2 | |
| Resource allocation type |  | Type 0 | |
| RBG size |  | Config2 | |
| VRB-to-PRB mapping type |  | Non-interleaved | |
| VRB-to-PRB mapping interleaver bundle size |  | N/A | |
| PDSCH DMRS configuration | DMRS Type |  | Type 1 | |
| Number of additional DMRS |  | 1 | |
| Maximum number of OFDM symbols for DL front loaded DMRS |  | 1 | |
| Antenna ports indexes |  | 1000 | 1001 |
| Number of PDSCH DMRS CDM group(s) without data |  | 1 | 1 |
| PDSCH & PDSCH DMRS Precoding configuration | |  | Single Panel Type I, Randomized precoder selection for every PRB bundle and updated per slot, with equal probability of each applicable i1/i2 combination or codebook  Index, chosen from section 5.2.2.2.1 of TS 38.214 [12]. | Single Panel Type I, Randomized precoder selection for every PRB bundle and updated per slot, with equal probability of each applicable i1/i2 combination or codebook  Index, chosen from section 5.2.2.2.1 of TS 38.214 [12].Any column of precoder matrix is not equal to any column of precoder matrix of Target UE for test 1-1.  Select the precoder to ensure any column of precoder is orthogonal to any column of precoder for the target PDSCH for test 2-1 and 2-2. |
| MU-MIMO Beamforming Model | |  | As specified in B.4.2 | |
| Number of HARQ Processes | |  | 8 | N/A |
| The number of slots between PDSCH and corresponding HARQ-ACK information | |  | Specific to each TDD UL-DL pattern and as defined in Annex A.1.2 | N/A |
| Note 1: The DMRS scrambling ID is same for both target UE and Co-scheduled UE. | | | | |

Table 5.2.2.2.17-3: Minimum performance for PDSCH of target UE with intra-cell inter user interference

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Test num. | Reference channel | Bandwidth (MHz) / Subcarrier spacing (kHz) | Modulation format and code rate | | TDD UL-DL pattern | Propagation condition | Correlation matrix and antenna configuration | Reference value | |
| Target UE | Co-scheduled UE | Fraction of  maximum  throughput  (%) | SNR (dB) |
| 1-1 | R.PDSCH.2-2.1 TDD | 40 / 30 | 16QAM, 0.48 | Random 16QAM symbols | FR1.30-1 | TDLC300-100 | 2x2, ULA Low | 70 | 18.9 |

The parameters in Table 5.2.2.2.17-4 are configured for requirements with with enhanced Receiver Type 2.

Table 5.2.2.2.17-4: Assistance Information parameters for requirements with Enhanced Receiver Type 2

|  |  |  |
| --- | --- | --- |
| Parameter | | Value |
| AdvancedReceiver-MU-MIMO-r18 | precodingAndResourceAllocation | True |
| pdsch-TimeDomainAllocation | True |
| mcs-Table | qam256 for test 2-2 |
| advReceiver-MU-MIMO-DCI-1-1 | Enabled |
| Co-scheduled UE information in DCI (Table 7.3.1.2.2-12 of TS38.212[10]) | | 1 for Test 2-1  6 for Test 2-2 |

Table 5.2.2.2.17-5: Minimum performance for target UE with Rank 1 with Enhanced Receiver Type 2

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Test num. | Reference channel | Bandwidth (MHz) / Subcarrier spacing (kHz) | Modulation format and code rate | | TDD UL-DL pattern | Propagation condition | Correlation matrix and antenna configuration | Reference value | |
| Target UE | Co-scheduled UE | Fraction of  maximum  throughput  (%) | SNR (dB) |
| 2-1 | R.PDSCH.2-2.1 TDD | 40 / 30 | 16QAM, 0.48 | Random QPSK symbols | FR1.30-1 | TDLC300-100 | 2x2, ULA Medium | 70 | TBD |
| 2-2 | TDD: R.PDSCH.7-1.3 TDD | 40 / 30 | 64QAM,  0.43 | Random 16QAM symbols | FR1.30-1 | TDLC300-100 | 2x2, ULA Medium | 70 | TBD |

#### < End OF CHANGE>