**3GPP TSG-RAN4 Meeting #112 *R4-2411663***

**Maastricht, Netherlands, 19th Aug 2024 - 23rd Aug 2024**

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| *CR-Form-v12.3* | | | | | | | | |
| **CHANGE REQUEST** | | | | | | | | |
|  | | | | | | | | |
|  | **38.101-4** | **CR** | **0583** | **rev** | **-** | **Current version:** | **18.4.0** |  |
|  | | | | | | | | |
| *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 |  | Core Network |  |

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| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | | | | | | | | | | |
| ***Title:*** | (NR\_demod\_enh2) CR for 38.101-4 on corrections of RMC references | | | | | | | | | |
|  |  | | | | | | | | | |
| ***Source to WG:*** | Nokia | | | | | | | | | |
| ***Source to TSG:*** | R4 | | | | | | | | | |
|  |  | | | | | | | | | |
| ***Work item code:*** | NR\_demod\_enh2-Perf | | | | |  | ***Date:*** | | | 2024-08-08 |
|  |  | | | |  | |  | | |  |
| ***Category:*** | **F** |  | | | | | ***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:*** | | R.PDSCH.5-1.1 FDD is a duplicate of R.PDSCH.1-2.1 FDD  R.PDSCH.7-1.1 TDD is a duplicate of R.PDSCH.2-2.1 TDD  Change will remove (void) duplicated RMCs and correct current references to the remaning RMCs. | | | | | | | | |
|  | |  | | | | | | | | |
| ***Summary of change:*** | | Removed (set to void) duplicated RMCs: R.PDSCH.5-1.1 FDD, R.PDSCH.7-1.1 TDD.  Corrected RMC references to use R.PDSCH.1-2.1 FDD and R.PDSCH.2-2.1 TDD respectively | | | | | | | | |
|  | |  | | | | | | | | |
| ***Consequences if not approved:*** | | Duplicated RMCs still exist. | | | | | | | | |
|  | |  | | | | | | | | |
| ***Clauses affected:*** | | 5.2.2.1.16, 5.2.3.1.16, 5.2.2.17, 5.2.3.2.17, A.3.2.1.5, A.3.2.2.7 | | | | | | | | |
|  | |  | | | | | | | | |
|  | | **Y** | **N** |  | | | |  | | |
| ***Other specs*** | |  | **X** | Other core specifications | | | |  | | |
| ***affected:*** | | **X** |  | Test specifications | | | | TS 38.521-4 | | |
| ***(show related CRs)*** | |  | **X** | O&M Specifications | | | |  | | |
|  | |  | | | | | | | | |
| ***Other comments:*** | |  | | | | | | | | |
|  | |  | | | | | | | | |
| ***This CR's revision history:*** | |  | | | | | | | | |

***<Start of change 1>***

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

The performance requirements are specified in Table 5.2.2.1.16-3, with the addition of test parameters in Table 5.2.2.1.16-2 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 5.2.2.1.16-5, with the addition of test parameters in Tables 5.2.2.1.16-2, 5.2.2.1.16-4 and the downlink physical channel setup according to Annex C.3.1.

The test purposes are specified in Table 5.2.2.1.16-1.

Table 5.2.2.1.16-1: Tests purpose

|  |  |
| --- | --- |
| Purpose | Test index |
| Verify the PDSCH performance under 2 receive antenna conditions when the PDSCH transmission of target UE is interfered by co-scheduled UE | 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 5.2.2.1.16-2: Test parameters

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Parameter | | Unit | Target UE | Co-scheduled UE |
| Duplex mode | |  | FDD | |
| 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 | |  | 4 | N/A |
| The number of slots between PDSCH and corresponding HARQ-ACK information | |  | 2 | N/A |
| Note 1: The DMRS scrambling ID is same for both target UE and Co-scheduled UE. | | | | |

Table 5.2.2.1.16-3: Minimum performance for target UE with Rank 1

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Test num | Reference channel | Bandwidth (MHz) / Subcarrier spacing (kHz) | Modulation format and code rate | | Propagation condition | Correlation matrix and antenna configuration | Reference value | |
| Target UE | Co-scheduled UE | Fraction of maximum throughput (%) | SNR (dB) |
| 1-1 | R.PDSCH.1-2.1 FDD | 10 / 15 | 16QAM, 0.48 | Random 16QAM symbols | TDLC300-100 | 2x2, ULA Low | 70 | 18.0 |

The parameters in Table 5.2.2.1.16-4 are configured for requirements with Enhanced Receiver Type 2

Table 5.2.3.1.16-4: Assitance Information parameters for requirements with Enhanced Receiver Type 2

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

Table 5.2.2.1.16-5: 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 | | Propagation condition | Correlation matrix and antenna configuration | Reference value | |
| Target UE | Co-scheduled UE | Fraction of  maximum  throughput  (%) | SNR (dB) |
| 2-1 | R.PDSCH.1-2.1 FDD | 10 / 15 | 16QAM, 0.48 | Random QPSK symbols | TDLC300-100 | 2x2, ULA Medium | 70 | [16.3] |
| 2-2 | R.PDSCH.5-1.3 FDD | 10 / 15 | 64QAM,  0.43 | Random 16QAM symbols | TDLC300-100 | 2x2, ULA Medium | 70 | [24.4] |

***<End of change 1>***

***<Start of change 2>***

##### 5.2.3.1.16 Minimum requirements for PDSCH with intra-cell inter-user interference

The performance requirements are specified in Table 5.2.3.1.16-3 and Table 5.2.3.1.16-4, with the addition of test parameters in Table 5.2.3.1.16-2 and the downlink physical channel setup according to Annex C.3.1.

The performance requirements for UE supporting Enhanced receiver Type 2 for intra-cell inter-user interference are specified in Table 5.2.3.1.16-6 and Table 5.2.3.1.16-7, with the addition of test parameters in Tables 5.2.3.1.16-2, 5.2.3.1.16-5 and the downlink physical channel setup according to Annex C.3.1.

The test purposes are specified in Table 5.2.3.1.16-1.

Table 5.2.3.1.16-1: Tests purpose

|  |  |
| --- | --- |
| Purpose | Test index |
| Verify PDSCH performance under 4 receive antenna conditions, when the PDSCH transmission of target UE is interfered by co-scheduled UE. | 1-1, 2-1 |
| Verify PDSCH performance under 4 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. | 3-1, 4-1 |
| Verify PDSCH performance under 4 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. | 3-2, 4.2 |

Table 5.2.3.1.16-2: Test parameters

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Parameter | | Unit | Target UE | Co-scheduled UE |
| Duplex mode | |  | FDD | |
| 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 (Note 1) | DMRS Type |  | Type 1 | |
| Number of additional DMRS |  | 1 | |
| Maximum number of OFDM symbols for DL front loaded DMRS |  | 1 | |
| Antenna ports indexes |  | {1000} for test 1-1, 3-1, 3-2  {1000, 1001} for test 2-1, 4-1, 4-2 | {1001} for test 1-1, 3-1, 3-2  {1002, 1003} for test 2-1, 4-1, 4-2 |
| Number of PDSCH DMRS CDM group(s) without data |  | 1 for test 1-1, 3-1, 3-2  2 for test 2-1, 4-1, 4-2 | 1 for test 1-1, 3-1, 3-2  2 for test 2-1, 4-1, 4-2 |
| 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, 3-1, 3-2, 4-1, 4-2 |
| MU-MIMO Beamforming Model | |  | As specified in B.4.2 | |
| Number of HARQ Processes | |  | 4 | N/A |
| The number of slots between PDSCH and corresponding HARQ-ACK information | |  | 2 | N/A |
| Note 1: DMRS scrambling ID is the same for both target and co-scheduled UEs. | | | | |

Table5.2.3.1.16-3: Minimum performance for target UE with Rank 1

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Test num. | Reference channel | Bandwidth (MHz) / Subcarrier spacing (kHz) | Modulation format and code rate | | Propagation condition | Correlation matrix and antenna configuration | Reference value | |
| Target UE | Co-scheduled UE | Fraction of  maximum  throughput  (%) | SNR (dB) |
| 1-1 | R.PDSCH.1-2.1 FDD | 10 / 15 | 16QAM, 0.48 | Random 16QAM symbols | TDLC300-100 | 2x4, ULA Low | 70 | 11.5 |

Table5.2.3.1.16-4: Minimum performance for target UE with Rank 2

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Test num. | Reference channel | Bandwidth (MHz) / Subcarrier spacing (kHz) | Modulation format and code rate | | Propagation condition | Correlation matrix and antenna configuration | Reference value | |
| Target UE | Co-scheduled UE | Fraction of  maximum  throughput  (%) | SNR (dB) |
| 2-1 | R.PDSCH.5-1.2 FDD | 10 / 15 | 16QAM, 0.48 | Random 16QAM symbols | TDLA30-10 | 4x4, ULA Low | 70 | 15.3 |

The parameters in Table 5.2.3.1.16-5 are configured for requirements with Enhanced receiver Type 2 for intra-cell inter-user interference.

Table 5.2.3.1.16-5: Assitance Information parameters for requirements with Enhanced receiver Type 2

|  |  |  |
| --- | --- | --- |
| Parameter | | Value |
| AdvancedReceiver-MU-MIMO-r18 | precodingAndResourceAllocation | True |
| pdsch-TimeDomainAllocation | True |
| mcs-Table | qam256 |
| advReceiver-MU-MIMO-DCI-1-1 | Enabled |
| Co-scheduled UE information in DCI (Table 7.3.1.2.2-12 of TS38.212) | | 1 for Test 3-1  2 for Test 4-1  6 for Test 3-2, 4-2 |

Table 5.2.3.1.16-6: 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 | | Propagation condition | Correlation matrix and antenna configuration | Reference value | |
| Target UE | Co-scheduled UE | Fraction of  maximum  throughput  (%) | SNR (dB) |
| 3-1 | R.PDSCH.1-2.1 FDD | 10 / 15 | 16QAM, 0.48 | Random QPSK symbols | TDLC300-100 | 2x4, ULA Medium | 70 | [15.2] |
| 3-2 | R.PDSCH.5-1.3 FDD | 10 / 15 | 64QAM, 0.43 | Random 16QAM symbols | TDLC300-100 | 2x4, ULA Medium | 70 | [24.2] |

Table5.2.3.1.16-7: Minimum performance for target UE with Rank 2 with Enhanced receiver

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Test num. | Reference channel | Bandwidth (MHz) / Subcarrier spacing (kHz) | Modulation format and code rate | | Propagation condition | Correlation matrix and antenna configuration | Reference value | |
| Target UE | Co-scheduled UE | Fraction of  maximum  throughput  (%) | SNR (dB) |
| 4-1 | R.PDSCH.5-1.4 FDD | 10 / 15 | 64QAM, 0.43 | Random 16QAM symbols | TDLA30-10 | 4x4, ULA Low | 70 | [19.3] |
| 4-2 | R.PDSCH.5-1.2 FDD | 10 / 15 | 16QAM, 0.48 | Random QPSK symbols | TDLA30-10 | 4x4, ULA Low | 70 | [14.4] |

***<End of change 2>***

***<Start of change 3>***

##### 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 the PDSCH transmission of target UE is interfered by co-scheduled UE | 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 target UE with Rank 1

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 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 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 |
| 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 | [16.6] |
| 2-2 | R.PDSCH.7-1.3 TDD | 40 / 30 | 64QAM,  0.43 | Random 16QAM symbols | FR1.30-1 | TDLC300-100 | 2x2, ULA Medium | 70 | [26.0] |

***<End of change 3>***

***<Start of change 4>***

##### 5.2.3.2.17 Minimum requirements for PDSCH with intra-cell inter-user interference

The performance requirements are specified in Table 5.2.3.2.17-3 and and Table 5.2.3.2.17-4, with the addition of test parameters in Table 5.2.3.2.17-2 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 5.2.3.2.17-6 and Table 5.2.3.2.17-7, with the addition of test parameters in Tables 5.2.3.2.17-2, 5.2.3.2.17-5 and the downlink physical channel setup according to Annex C.3.1.

The test purposes are specified in Table 5.2.3.2.17-1.

Table 5.2.3.2.17-1: Tests purpose

|  |  |
| --- | --- |
| Purpose | Test index |
| Verify PDSCH performance under 4 receive antenna conditions, when the PDSCH transmission of target UE is interfered by co-scheduled UE. | 1-1, 2-1 |
| Verify PDSCH performance under 4 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. | 3-1, 4-1 |
| Verify PDSCH performance under 4 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. | 3-2, 4-2 |

Table 5.2.3.2.17-2: 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 (Note 1) | DMRS Type |  | Type 1 | |
| Number of additional DMRS |  | 1 | |
| Maximum number of OFDM symbols for DL front loaded DMRS |  | 1 | |
| Antenna ports indexes |  | {1000} for tests 1-1, 3-1, 3-2  {1000, 1001} for tests 2-1, 4-1, 4-2 | {1001} for tests 1-1, 3-1, 3-2  {1002, 1003} for tests 2-1, 4-1, 4-2 |
| Number of PDSCH DMRS CDM group(s) without data |  | 1 for tests 1-1, 3-1, 3-2  2 for tests 2-1, 4-1, 4-2 | 1 for tests 1-1, 3-1, 3-2  2 for tests 2-1, 4-1, 4-2 |
| 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, 3-1, 3-2, 4-1, 4-2 |
| 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: DMRS scrambling ID is the same for both target and co-shceduled UEs. | | | | |

Table5.2.3.1.17-3: Minimum performance for target UE with Rank 1

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 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 | 2x4, ULA Low | 70 | 11.8 |

Table 5.2.3.2.17-4: Minimum performance for target UE with Rank 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.7-1.2 TDD | 40 / 30 | 16QAM, 0.48 | Random 16QAM symbols | FR1.30-1 | TDLA30-10 | 4x4, ULA Low | 70 | 15.5 |

The parameters in Table 5.2.3.2.17-5 are configured for requirements with Enhanced Receiver Type 2.

Table 5.2.3.2.17-5: Assistance Information parameters for requirements with Enhanced Receiver Type 2

|  |  |  |
| --- | --- | --- |
| Parameter | | Value |
| AdvancedReceiver-MU-MIMO-r18 | precodingAndResourceAllocation | True |
| pdsch-TimeDomainAllocation | True |
| mcs-Table | qam256 |
| advReceiver-MU-MIMO-DCI-1-1 | Enabled |
| Co-scheduled UE information in DCI (Table 7.3.1.2.2-12 of TS38.212) | | 1 for Test 3-1  2 for Test 4-1  6 for Test 3-2, 4-2 |

Table 5.2.3.2.17-6: 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) |
| 3-1 | R.PDSCH.2-2.1 TDD | 40 / 30 | 16QAM, 0.48 | Random QPSK symbols | FR1.30-1 | TDLC300-100 | 2x4, ULA Medium | 70 | [15.5] |
| 3-2 | R.PDSCH.7-1.3 TDD | 40 / 30 | 64QAM, 0.43 | Random 16-QAM symbols | FR1.30-1 | TDLC300-100 | 2x4, ULA Medium | 70 | [25.3] |

Table 5.2.3.2.17-7: Minimum performance for target UE with Rank 2 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) |
| 4-1 | R.PDSCH.7-1.4 TDD | 40 / 30 | 64QAM, 0.43 | Random 16QAM symbols | FR1.30-1 | TDLA30-10 | 4x4, ULA Low | 70 | [19.5] |
| 4-2 | R.PDSCH.7-1.2 TDD | 40 / 30 | 16QAM, 0.48 | Random QPSK symbols | FR1.30-1 | TDLA30-10 | 4x4, ULA Low | 70 | [14.9] |

***<End of change 4>***

***<Start of change 5>***

#### A.3.2.1.5 Reference measurement channels for Intra-cell Inter-UE interference scenario

Table A.3.2.1.5-1: PDSCH Reference Channel for FDD Intra-cell Inter-UE interference scenario

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Parameter | Unit | Value | | | | |
| Reference channel |  | (Void) | R.PDSCH.5-1.2 FDD | R.PDSCH.5-1.3 FDD | R.PDSCH.5-1.4 FDD |  |
| Channel bandwidth | MHz |  | 10 | 10 | 10 |  |
| Subcarrier spacing | kHz |  | 15 | 15 | 15 |  |
| Number of allocated resource blocks | PRBs |  | 52 | 52 | 52 |  |
| Number of consecutive PDSCH symbols |  |  | 12 | 12 | 12 |  |
| Allocated slots per 2 frames | Slots |  | 19 | 19 | 19 |  |
| MCS table |  |  | 64QAM | 64QAM | 64QAM |  |
| MCS index |  |  | 13 | 17 | 17 |  |
| Modulation |  |  | 16QAM | 64QAM | 64QAM |  |
| Target Coding Rate |  |  | 0.48 | 0.43 | 0.43 |  |
| Number of MIMO layers |  |  | 2 | 1 | 2 |  |
| Number of DMRS REs |  |  | 24 | 12 | 24 |  |
| Overhead for TBS determination |  |  | 0 | 0 | 0 |  |
| Information Bit Payload per Slot |  |  |  |  |  |  |
| For Slot i = 0 | Bits |  | N/A | N/A | N/A |  |
| For Slots i = 1,…, 19 | Bits |  | 24072 | 17928 | 32264 |  |
| Transport block CRC per Slot |  |  |  |  |  |  |
| For Slot i = 0 | Bits |  | N/A | N/A | N/A |  |
| For Slots i = 1,…, 19 | Bits |  | 24 | 24 | 24 |  |
| Number of Code Blocks per Slot |  |  |  |  |  |  |
| For Slot i = 0 | CBs |  | N/A | N/A | N/A |  |
| For Slots i = 1,…, 19 | CBs |  | 3 | 3 | 4 |  |
| Binary Channel Bits Per Slot |  |  |  |  |  |  |
| For Slot i = 0 | Bits |  | N/A | N/A | N/A |  |
| For Slots i = 10, 11 | Bits |  | 47424 | 39312 | 71136 |  |
| For Slots i = 1,…, 9, 12, …, 19 | Bits |  | 49920 | 41184 | 74880 |  |
| Max. Throughput averaged over 2 frames | Mbps |  | 22.868 | 34.960 | 62.915 |  |
| Note 1: SS/PBCH block is transmitted in slot #0 with periodicity 20 ms  Note 2: Slot i is slot index per 2 frames | | | | | | |

***<End of change 5>***

***<Start of change 6>***

#### A.3.2.2.7 Reference measurement channels for Intra-cell Inter-UE interference scenario

Table A.3.2.2.7-1: PDSCH Reference Channel for TDD Intra-cell Inter-UE interference scenario

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Parameter | Unit | Value | | | | |
| Reference channel |  | (Void) | R.PDSCH.7-1.2 TDD | R.PDSCH.7-1.3 TDD | R.PDSCH.7-1.4 TDD |  |
| Channel bandwidth | MHz |  | 40 | 40 | 40 |  |
| Subcarrier spacing | kHz |  | 30 | 30 | 30 |  |
| Allocated resource blocks | PRBs |  | 106 | 106 | 106 |  |
| Number of consecutive PDSCH symbols |  |  |  |  |  |  |
| For Slot i, if mod(i, 10) = 7 for i from {0,…,39} |  |  | 4 | 4 | 4 |  |
| For Slot i, if mod(i, 10) = {0,1,2,3,4,5,6} for i from {1,…,39} |  |  | 12 | 12 | 12 |  |
| Allocated slots per 2 frames |  |  | 31 | 31 | 31 |  |
| MCS table |  |  | 64QAM | 64QAM | 64QAM |  |
| MCS index |  |  | 13 | 17 | 17 |  |
| Modulation |  |  | 16QAM | 64QAM | 64QAM |  |
| Target Coding Rate |  |  | 0.48 | 0.43 | 0.43 |  |
| Number of MIMO layers |  |  | 2 | 1 | 2 |  |
| Number of DMRS REs |  |  |  |  |  |  |
| For Slot i, if mod(i, 10) = 7 for i from {0,…,39} |  |  | 12 | 6 | 12 |  |
| For Slot i, if mod(i, 10) = {0,1,2,3,4,5,6} for i from {1,…,39} |  |  | 24 | 12 | 24 |  |
| Overhead for TBS determination |  |  | 0 | 0 | 0 |  |
| Information Bit Payload per Slot |  |  |  |  |  |  |
| For Slots 0 and Slot i, if mod(i, 10) = {8,9} for i from {0,…,39} | Bits |  | N/A | N/A | N/A |  |
| For Slot i, if mod(i, 10) = 7 for i from {0,…,39} | Bits |  | 14600 | 11528 | 19464 |  |
| For Slot i, if mod(i, 10) = {0,1,2,3,4,5,6} for i from {1,…,39} | Bits |  | 49176 | 35856 | 65576 |  |
| Transport block CRC per Slot |  |  |  |  |  |  |
| For Slots 0 and Slot i, if mod(i, 10) = {8,9} for i from {0,…,39} | Bits |  | N/A | N/A | N/A |  |
| For Slot i, if mod(i, 10) = 7 for i from {0,…,39} | Bits |  | 24 | 24 | 24 |  |
| For Slot i, if mod(i, 10) = {0,1,2,3,4,5,6}for i from {1,…,39} | Bits |  | 24 | 24 | 24 |  |
| Number of Code Blocks per Slot |  |  |  |  |  |  |
| For Slots 0 and Slot i, if mod(i, 10) = {8,9} for i from {0,…,39} | CBs |  | N/A | N/A | N/A |  |
| For Slot i, if mod(i, 10) = 7 for i from {0,…,39} | CBs |  | 2 | 2 | 3 |  |
| For Slot i, if mod(i, 10) = {0,1,2,3,4,5,6} for i from {1,…,39} | CBs |  | 6 | 5 | 8 |  |
| Binary Channel Bits Per Slot |  |  |  |  |  |  |
| For Slots 0 and Slot i, if mod(i, 10) = {8,9} for i from {0,…,39} | Bits |  | N/A | N/A | N/A |  |
| For Slots i = 20, 21 | Bits |  | 96672 | 80136 | 160272 |  |
| For Slot i, if mod(i, 10) = 7 for i from {0,…,39} | Bits |  | 30528 | 26712 | 53424 |  |
| For Slot i, if mod(i, 10) = {0,1,2,3,4,5,6} for i from {1,…,19,22,…,39} | Bits |  | 101760 | 83952 | 167904 |  |
| Max. Throughput averaged over 2 frames | Mbps |  | 69.308 | 57.755 | 104.817 |  |
| Note 1: SS/PBCH block is transmitted in slot #0 with periodicity 20 ms  Note 2: Slot i is slot index per 2 frames | | | | | | |

***<End of change 6>***