**3GPP TSG- Meeting #**

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| *CR-Form-v12.3* | | | | | | | | |
| **CHANGE REQUEST** | | | | | | | | |
|  | | | | | | | | |
|  |  | **CR** |  | **rev** |  | **Current version:** |  |  |
|  | | | | | | | | |
| *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:*** |  | | | | | | | | | |
|  |  | | | | | | | | | |
| ***Source to WG:*** |  | | | | | | | | | |
| ***Source to TSG:*** | R4 | | | | | | | | | |
|  |  | | | | | | | | | |
| ***Work item code:*** |  | | | | |  | ***Date:*** | | |  |
|  |  | | | |  | |  | | |  |
| ***Category:*** |  |  | | | | | ***Release:*** | | |  |
|  | *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:*** | | 5.2.3.1.16, 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:*** | | Revision of R4-2411662 | | | | | | | | |

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

##### 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 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 |

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  {1000, 1001} for test 2-1 | {1001} for test 1-1  {1002, 1003} for test 2-1 |
| Number of PDSCH DMRS CDM group(s) without data |  | 1 for test 1-1  2 for test 2-1 | 1 for test 1-1  2 for test 2-1 |
| 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 |
| 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 |

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

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

##### 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 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 |

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 test 1-1  {1000, 1001} for test 2-1 | {1001} for test 1-1  {1002, 1003} for test 2-1 |
| Number of PDSCH DMRS CDM group(s) without data |  | 1 for test 1-1  2 for test 2-1 | 1 for test 1-1  2 for test 2-1 |
| 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 |
| 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 |

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

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

#### 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 |  |  |  |
| Channel bandwidth | MHz |  | 10 |  |  |  |
| Subcarrier spacing | kHz |  | 15 |  |  |  |
| Number of allocated resource blocks | PRBs |  | 52 |  |  |  |
| Number of consecutive PDSCH symbols |  |  | 12 |  |  |  |
| Allocated slots per 2 frames | Slots |  | 19 |  |  |  |
| MCS table |  |  | 64QAM |  |  |  |
| MCS index |  |  | 13 |  |  |  |
| Modulation |  |  | 16QAM |  |  |  |
| Target Coding Rate |  |  | 0.48 |  |  |  |
| Number of MIMO layers |  |  | 2 |  |  |  |
| Number of DMRS REs |  |  | 24 |  |  |  |
| Overhead for TBS determination |  |  | 0 |  |  |  |
| Information Bit Payload per Slot |  |  |  |  |  |  |
| For Slot i = 0 | Bits |  | N/A |  |  |  |
| For Slots i = 1,…, 19 | Bits |  | 24072 |  |  |  |
| Transport block CRC per Slot |  |  |  |  |  |  |
| For Slot i = 0 | Bits |  | N/A |  |  |  |
| For Slots i = 1,…, 19 | Bits |  | 24 |  |  |  |
| Number of Code Blocks per Slot |  |  |  |  |  |  |
| For Slot i = 0 | CBs |  | N/A |  |  |  |
| For Slots i = 1,…, 19 | CBs |  | 3 |  |  |  |
| Binary Channel Bits Per Slot |  |  |  |  |  |  |
| For Slot i = 0 | Bits |  | N/A |  |  |  |
| For Slots i = 10, 11 | Bits |  | 47424 |  |  |  |
| For Slots i = 1,…, 9, 12, …, 19 | Bits |  | 49920 |  |  |  |
| Max. Throughput averaged over 2 frames | Mbps |  | 22.868 |  |  |  |
| 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 3>***

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

#### 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 |  |  |  |
| Channel bandwidth | MHz |  | 40 |  |  |  |
| Subcarrier spacing | kHz |  | 30 |  |  |  |
| Allocated resource blocks | PRBs |  | 106 |  |  |  |
| Number of consecutive PDSCH symbols |  |  |  |  |  |  |
| For Slot i, if mod(i, 10) = 7 for i from {0,…,39} |  |  | 4 |  |  |  |
| For Slot i, if mod(i, 10) = {0,1,2,3,4,5,6} for i from {1,…,39} |  |  | 12 |  |  |  |
| Allocated slots per 2 frames |  |  | 31 |  |  |  |
| MCS table |  |  | 64QAM |  |  |  |
| MCS index |  |  | 13 |  |  |  |
| Modulation |  |  | 16QAM |  |  |  |
| Target Coding Rate |  |  | 0.48 |  |  |  |
| Number of MIMO layers |  |  | 2 |  |  |  |
| Number of DMRS REs |  |  |  |  |  |  |
| For Slot i, if mod(i, 10) = 7 for i from {0,…,39} |  |  | 12 |  |  |  |
| For Slot i, if mod(i, 10) = {0,1,2,3,4,5,6} for i from {1,…,39} |  |  | 24 |  |  |  |
| Overhead for TBS determination |  |  | 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 |  |  |  |
| For Slot i, if mod(i, 10) = 7 for i from {0,…,39} | Bits |  | 14600 |  |  |  |
| For Slot i, if mod(i, 10) = {0,1,2,3,4,5,6} for i from {1,…,39} | Bits |  | 49176 |  |  |  |
| 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 |  |  |  |
| For Slot i, if mod(i, 10) = 7 for i from {0,…,39} | Bits |  | 24 |  |  |  |
| For Slot i, if mod(i, 10) = {0,1,2,3,4,5,6}for i from {1,…,39} | Bits |  | 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 |  |  |  |
| For Slot i, if mod(i, 10) = 7 for i from {0,…,39} | CBs |  | 2 |  |  |  |
| For Slot i, if mod(i, 10) = {0,1,2,3,4,5,6} for i from {1,…,39} | CBs |  | 6 |  |  |  |
| 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 |  |  |  |
| For Slots i = 20, 21 | Bits |  | 96672 |  |  |  |
| For Slot i, if mod(i, 10) = 7 for i from {0,…,39} | Bits |  | 30528 |  |  |  |
| For Slot i, if mod(i, 10) = {0,1,2,3,4,5,6} for i from {1,…,19,22,…,39} | Bits |  | 101760 |  |  |  |
| Max. Throughput averaged over 2 frames | Mbps |  | 69.308 |  |  |  |
| 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 4>***