**3GPP TSG-RAN4 Meeting #112 *R4-24XXXX***

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

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| *CR-Form-v12.3* | | | | | | | | |
| **CHANGE REQUEST** | | | | | | | | |
|  | | | | | | | | |
|  | **38.101-4** | **CR** | **0633** | **rev** | **1** | **Current version:** | **17.13.0** |  |
|  | | | | | | | | |
| *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:*** | (TEI17) Correct FRC for PMI Reporting Requirements | | | | | | | | | |
|  |  | | | | | | | | | |
| ***Source to WG:*** | Qualcomm Incorporated | | | | | | | | | |
| ***Source to TSG:*** | RAN4 | | | | | | | | | |
|  |  | | | | | | | | | |
| ***Work item code:*** | TEI17 | | | | |  | ***Date:*** | | | 2024-08-09 |
|  |  | | | |  | |  | | |  |
| ***Category:*** | **F** |  | | | | | ***Release:*** | | | Rel-17 |
|  | *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:*** | | Reference measurement channels for PDSCH performance requirements do not reflect the test setup in 38.101-4 | | | | | | | | |
|  | |  | | | | | | | | |
| ***Summary of change:*** | | Align Reference measurement channels for PDSCH performance requirements | | | | | | | | |
|  | |  | | | | | | | | |
| ***Consequences if not approved:*** | | Reference measurement channels for PDSCH performance requirements are not correct | | | | | | | | |
|  | |  | | | | | | | | |
| ***Clauses affected:*** | | A.3.2.1.1  A.3.2.2.2  A.3.2.2.5  A.3.2.3.1 | | | | | | | | |
|  | |  | | | | | | | | |
|  | | **Y** | **N** |  | | | |  | | |
| ***Other specs*** | |  | **X** | Other core specifications | | | | TS/TR ... CR ... | | |
| ***affected:*** | | **X** |  | Test specifications | | | | **TR 38.521-4** | | |
| ***(show related CRs)*** | |  | **X** | O&M Specifications | | | | TS/TR ... CR ... | | |
|  | |  | | | | | | | | |
| ***Other comments:*** | |  | | | | | | | | |
|  | |  | | | | | | | | |
| ***This CR's revision history:*** | |  | | | | | | | | |

*~~~Start of Change*

Table A.3.2.1.1-6: PDSCH Reference Channel for FDD PMI reporting requirements

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Parameter** | **Unit** | **Value** | | | | |
| Reference channel |  | R.PDSCH.1-6.1 FDD | R.PDSCH.1-6.2 FDD | R.PDSCH.1-6.3 FDD | R.PDSCH.1-6.4 FDD |  |
| Channel bandwidth | MHz | 10 | 10 | 10 | 10 |  |
| Subcarrier spacing | kHz | 15 | 15 | 15 | 15 |  |
| Number of allocated resource blocks | PRBs | 52 | 52 | 52 | 52 |  |
| Number of consecutive PDSCH symbols |  | 12 | 12 | 12 | 12 |  |
| Allocated slots per 2 frames | Slots | 14 | 14 | 14 | 14 |  |
| MCS table |  | 64QAM | 64QAM | 64QAM | 64QAM |  |
| MCS index |  | 13 | 13 | 20 | 13 |  |
| Modulation |  | 16QAM | 16QAM | 64QAM | 16QAM |  |
| Target Coding Rate |  | 0.48 | 0.48 | 0.55 | 0.48 |  |
| Number of MIMO layer |  | 1 | 2 | 2 | 2 |  |
| Number of DMRS REs (Note 3) |  | 24 | 24 | 24 | 24 |  |
| Overhead for TBS determination |  | 0 | 0 | 0 | 0 |  |
| Information Bit Payload per Slot |  |  |  |  |  |  |
| For Slot i = 0 | Bits | N/A | N/A | N/A | N/A |  |
| For CSI Slots i=10 and i, if mod (i,5) =1, i={0,…,19} |  | N/A | N/A | N/A | N/A |  |
| For Non CSI-RS Slot i, if mod (i,5) ={0,2,3,4}, i={1,.. 9,11,…,19} | Bits | 12040 | 24072 | 40976 | 24072 |  |
| Transport block CRC per Slot |  |  |  |  |  |  |
| For Slot i = 0 | Bits | N/A | N/A | N/A | N/A |  |
| For CSI Slots i, if mod (i,5) =1, i={0,…,19} |  | N/A | N/A | N/A | N/A |  |
| For Non CSI-RS Slot i, if mod (i,5) ={0,2,3,4}, i={1,.. 9,11,…,19} | Bits | 24 | 24 | 24 | 24 |  |
| Number of Code Blocks per Slot |  |  |  |  |  |  |
| For Slot i = 0 | CBs | N/A | N/A | N/A | N/A |  |
| For CSI Slots i=10 and i, if mod (i,5) =1, i={0,…,19} |  | N/A | N/A | N/A | N/A |  |
| For Non CSI-RS Slot i, if mod (i,5) ={0,2,3,4}, i={1,..,9,11,…,19} | CBs | 2 | 3 | 5 | 3 |  |
| Binary Channel Bits Per Slot |  |  |  |  |  |  |
| For Slot i = 0 | Bits | N/A | N/A | N/A | N/A |  |
| For CSI Slots i=10 and i, if mod (i,5) =1, i={0,…,19} |  | N/A | N/A | N/A | N/A |  |
|  |  |  |  |  |  |  |
| For Non CSI-RS Slot i, if mod (i,5) ={0,2,3,4}, i={1,..9,11,…,19} | Bits | 24960 | 49920 | 74880 | 49920 |  |
| Max. Throughput averaged over 2 frames | Mbps | 8.428 | 16.850 | 28.683 | 16.850 |  |
| Note 1: SS/PBCH block is transmitted in slot #0 with periodicity 20 ms  Note 2: Slot i is slot index per 2 frames  Note 3: Number of DMRS REs includes the overhead of the DM-RS CDM groups without data | | | | | | |

*End of Change~~~*

*~~~Start of Change*

Table A.3.2.2.2-8: PDSCH Reference Channel for TDD PMI reporting requirements with UL-DL pattern FR1.30-1

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Parameter** | **Unit** | **Value** | | | | |
| Reference channel |  | R.PDSCH.2-8.1 TDD | R.PDSCH.2-8.2 TDD | R.PDSCH.2-8.3 TDD | R.PDSCH.2-8.4 TDD | R.PDSCH.2-8.5 TDD |
| Channel bandwidth | MHz | 40 | 40 | 40 | 20 | 40 |
| Subcarrier spacing | kHz | 30 | 30 | 30 | 30 | 30 |
| Allocated resource blocks | PRBs | 106 | 106 | 106 | 51 | 106 |
| Number of consecutive PDSCH symbols |  | 12 | 12 | 12 | 12 | 12 |
| Allocated slots per 2 frames |  | 22 | 22 | 22 | 22 | 22 |
| MCS table |  | 64QAM | 64QAM | 64QAM | 64QAM | 64QAM |
| MCS index |  | 13 | 13 | 20 | 13 | 13 |
| Modulation |  | 16QAM | 16QAM | 64QAM | 16QAM | 16QAM |
| Target Coding Rate |  | 0.48 | 0.48 | 0.55 | 0.48 | 0.48 |
| Number of MIMO layers |  | 1 | 2 | 2 | 1 | 2 |
| Number of DMRS REs (Note 3) |  | 24 | 24 | 24 | 24 | 24 |
| Overhead for TBS determination |  | 0 | 0 | 0 | 0 | 0 |
| Information Bit Payload per Slot |  |  |  |  |  |  |
| For Slots 0 and Slot i, if mod(i, 10) = {7,8,9} for i from {0,…,39} | Bits | N/A | N/A | N/A | N/A | N/A |
| For CSI-RS Slot i=20 and i, if mod(i,10) =1 for i from {0,…,39} | Bits | N/A | N/A | N/A | N/A | N/A |
|  |  |  |  |  |  |  |
| For Slot i, if mod(i, 10) = {0,2,3,4,5,6} for i from {1,…,19,22,…,39} | Bits | 24576 | 49176 | 83976 | 11784 | 49176 |
| Transport block CRC per Slot |  |  |  |  |  |  |
| For Slots 0 and Slot i, if mod(i, 10) = {7,8,9} for i from {0,…,39} | Bits | N/A | N/A | N/A | N/A | N/A |
| For CSI-RS Slot i=20 and i, if mod(i,10) =1 for i from {0,…,39} | Bits | N/A | N/A | N/A | N/A | N/A |
|  |  |  |  |  |  |  |
| For Slot i, if mod(i, 10) = {0,2,3,4,5,6} for i from {1,…,19,22,…,39} | Bits | 24 | 24 | 24 | 24 | 24 |
| Number of Code Blocks per Slot |  |  |  |  |  |  |
| For Slots 0 and Slot i, if mod(i, 10) = {7,8,9} for i from {0,…,39} | CBs | N/A | N/A | N/A | N/A | N/A |
| For CSI-RS Slot i=20 and i, if mod(i,10) =1 for i from {0,…,39} | CBs | N/A | N/A | N/A | N/A | N/A |
|  |  |  |  |  |  |  |
| For Slot i, if mod(i, 10) = {0,2,3,4,5,6} for i from {1,…,19,22,…,39} | CBs | 3 | 6 | 10 | 2 | 6 |
| Binary Channel Bits Per Slot |  |  |  |  |  |  |
| For Slots 0 and Slot i, if mod(i, 10) = {7,8,9} for i from {0,…,39} | Bits | N/A | N/A | N/A | N/A | N/A |
| For CSI-RS Slot i=20 and i, if mod(i,10) =1 for i from {0,…,39} | Bits | N/A | N/A | N/A | N/A | N/A |
|  |  |  |  |  |  |  |
| For Slot i, if mod(i, 10) = {0,2,3,4,5,6} for i from {1,…,19,22,…,39} | Bits | 50880 | 101760 | 152640 | 24480 | 101760 |
| Max. Throughput averaged over 2 frames | Mbps | 27.0336 | 54.0936 | 92.3736 | 12.9624 | 54.0936 |
| Note 1: SS/PBCH block is transmitted in slot #0 with periodicity 20 ms  Note 2: Slot i is slot index per 2 frames  Note 3: Number of DMRS REs includes the overhead of the DM-RS CDM groups without data | | | | | | |

*End of Change~~~*

*~~~Start of Change*

Table A.3.2.2.5-7: PDSCH Reference Channel for TDD PMI reporting requirements with UL-DL pattern FR2.120-1 (16QAM)

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Parameter | Unit | Value | | | | |
| Reference channel |  | R.PDSCH.5-7.1 TDD |  |  |  |  |
| Channel bandwidth | MHz | 100 |  |  |  |  |
| Subcarrier spacing | kHz | 120 |  |  |  |  |
| Allocated resource blocks | PRBs | 66 |  |  |  |  |
| Number of consecutive PDSCH symbols |  | 12 |  |  |  |  |
| Allocated slots per 2 frames |  | 62 |  |  |  |  |
| MCS table |  | 64QAM |  |  |  |  |
| MCS index |  | 13 |  |  |  |  |
| Modulation |  | 16QAM |  |  |  |  |
| Target Coding Rate |  | 0.48 |  |  |  |  |
| Number of MIMO layers |  | 1 |  |  |  |  |
| Number of DMRS REs (Note 3) |  | 24 |  |  |  |  |
| Overhead for TBS determination |  | 6 |  |  |  |  |
| Information Bit Payload per Slot |  |  |  |  |  |  |
| For Slots 0 and Slot i, if mod(i, 5) = {3,4} for i from {0,…,159} | Bits | N/A |  |  |  |  |
| For CSI-RS Slot i=80 and i, if mod(i,5) =1 for i from {0,…,159} | Bits | N/A |  |  |  |  |
|  |  |  |  |  |  |  |
| For Slot i, if mod(i, 5) = {0,2} for i from {1,…,79,82,…,159} | Bits | 14344 |  |  |  |  |
| Transport block CRC per Slot |  |  |  |  |  |  |
| For Slots 0 and Slot i, if mod(i, 5) = {3,4} for i from {0,…,159} | Bits | N/A |  |  |  |  |
| For CSI-RS Slot i=80 and i, if mod(i,5) =1 for i from {0,…,159} | Bits | N/A |  |  |  |  |
|  |  |  |  |  |  |  |
| For Slot i, if mod(i, 5) = {0,2} for i from {1,…,79,82,…,159} | Bits | 24 |  |  |  |  |
| Number of Code Blocks per Slot |  |  |  |  |  |  |
| For Slots 0 and Slot i, if mod(i, 5) = {3,4} for i from {0,…,159} | CBs | N/A |  |  |  |  |
| For CSI-RS Slot i=80 and i, if mod(i,5) =1 for i from {0,…,159} | CBs | N/A |  |  |  |  |
|  |  |  |  |  |  |  |
| For Slot i, if mod(i, 5) = {0,2} for i from {1,…,79,82,…,159} | CBs | 2 |  |  |  |  |
| Binary Channel Bits Per Slot |  |  |  |  |  |  |
| For Slots 0 and Slot i, if mod(i, 5) = {3,4} for i from {0,…,159} | Bits | N/A |  |  |  |  |
| For CSI-RS Slot i=80 and i, if mod(i,5) =1 for i from {0,…,159} | Bits | N/A |  |  |  |  |
|  |  |  |  |  |  |  |
| For Slot i, if mod(i, 5) = {0,2} for i from {1,…,79,82,…,159} | Bits | 30360 |  |  |  |  |
| Max. Throughput averaged over 2 frames | Mbps | 44.4664 |  |  |  |  |
| Note 1: SS/PBCH block is transmitted in slot #0 with periodicity 20 ms  Note 2: Slot i is slot index per 2 frames  Note 3: Number of DMRS REs includes the overhead of the DM-RS CDM groups without data | | | | | | |

*End of Change~~~*

*~~~Start of Change*

Table A.3.2.2.5-8: PDSCH Reference Channel for TDD PMI reporting requirements with UL-DL pattern FR2.120-2 (16QAM)

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Parameter** | **Unit** | **Value** | | | | |
| Reference channel |  | R.PDSCH.5-8.1 TDD |  |  |  |  |
| Channel bandwidth | MHz | 100 |  |  |  |  |
| Subcarrier spacing | kHz | 120 |  |  |  |  |
| Allocated resource blocks | PRBs | 66 |  |  |  |  |
| Number of consecutive PDSCH symbols |  | 12 |  |  |  |  |
| Allocated slots per 2 frames |  | 58 |  |  |  |  |
| MCS table |  | 64QAM |  |  |  |  |
| MCS index |  | 13 |  |  |  |  |
| Modulation |  | 16QAM |  |  |  |  |
| Target Coding Rate |  | 0.48 |  |  |  |  |
| Number of MIMO layers |  | 1 |  |  |  |  |
| Number of DMRS REs (Note 3) |  | 24 |  |  |  |  |
| Overhead for TBS determination |  | 6 |  |  |  |  |
| Information Bit Payload per Slot |  |  |  |  |  |  |
| For Slots 0 and Slot i, if mod(i, 4) = {2,3} for i from {0,…,159} | Bits | N/A |  |  |  |  |
| For CSI-RS Slot i = 80 and i, if mod(i,8) =1 for i from {0,…,159} | Bits | N/A |  |  |  |  |
|  |  |  |  |  |  |  |
| For Slot i, if mod(i, 8) = {0,4,5} for i from {1,…,79,82,…,159} | Bits | 14344 |  |  |  |  |
| Transport block CRC per Slot |  |  |  |  |  |  |
| For Slots 0 and Slot i, if mod(i, 4) = {2,3} for i from {0,…,159} | Bits | N/A |  |  |  |  |
| For CSI-RS Slot i = 80 and i, if mod(i,8) =1 for i from {0,…,159} | Bits | N/A |  |  |  |  |
|  |  |  |  |  |  |  |
| For Slot i, if mod(i, 8) = {0,4,5} for i from {1,…,79,82,…,159} | Bits | 24 |  |  |  |  |
| Number of Code Blocks per Slot |  |  |  |  |  |  |
| For Slots 0 and Slot i, if mod(i, 4) = {2,3} for i from {0,…,159} | CBs | N/A |  |  |  |  |
| For CSI-RS Slot i = 80 and i, if mod(i,8) =1 for i from {0,…,159} | CBs | N/A |  |  |  |  |
|  |  |  |  |  |  |  |
| For Slot i, if mod(i, 8) = {0,4,5} for i from {1,…,79,82,…,159} | CBs | 2 |  |  |  |  |
| Binary Channel Bits Per Slot |  |  |  |  |  |  |
| For Slots 0 and Slot i, if mod(i, 4) = {2,3} for i from {0,…,159} | Bits | N/A |  |  |  |  |
| For CSI-RS Slot i = 80 and i, if mod(i,8) =1 for i from {0,…,159} | Bits | N/A |  |  |  |  |
|  |  |  |  |  |  |  |
| For Slot i, if mod(i, 8) = {0,4,5} for i from {1,…,79,82,…,159} | Bits | 30360 |  |  |  |  |
| Max. Throughput averaged over 2 frames | Mbps | 41.5976 |  |  |  |  |
| Note 1: SS/PBCH block is transmitted in slot #0 with periodicity 20 ms  Note 2: Slot i is slot index per 2 frames  Note 3: Number of DMRS REs includes the overhead of the DM-RS CDM groups without data | | | | | | |

*End of Change~~~*

*~~~Start of Change*

Table A.3.2.3.1-3: PDSCH Reference Channel for HD-FDD PMI reporting requirements

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Parameter** | **Unit** | **Value** | | | | |
| Reference channel |  | R.PDSCH.1-3.1 HD-FDD |  |  |  |  |
| Channel bandwidth | MHz | 10 |  |  |  |  |
| Subcarrier spacing | kHz | 15 |  |  |  |  |
| Number of allocated resource blocks | PRBs | 52 |  |  |  |  |
| Number of consecutive PDSCH symbols |  |  |  |  |  |  |
| For Slot i, if mod(i, 5) = 3 for i from {0,…,19} |  | 8 |  |  |  |  |
| For Slot i, if mod(i, 5) = {0,2} for i from {1, ..9,11,…,19} |  | 12 |  |  |  |  |
| Allocated slots per 2 frames | Slots | 10 |  |  |  |  |
| MCS table |  | 64QAM |  |  |  |  |
| MCS index |  | 13 |  |  |  |  |
| Modulation |  | 16QAM |  |  |  |  |
| Target Coding Rate |  | 0.48 |  |  |  |  |
| Number of MIMO layer |  | 1 |  |  |  |  |
| Number of DMRS REs (Note 3) |  | 24 |  |  |  |  |
| Overhead for TBS determination |  | 0 |  |  |  |  |
| Information Bit Payload per Slot |  |  |  |  |  |  |
| For Slot i = 0 | Bits | N/A |  |  |  |  |
| For CSI Slots i = 10 and i, if mod (i,5) =1, i={0,…,19} |  | N/A |  |  |  |  |
| For Non CSI-RS Slot i, if mod (i,5) =3, i={0,..19} | Bits | 7168 |  |  |  |  |
| For Non CSI-RS Slot i, if mod (i,5) ={0,2}, i={1, ..9,11,..19} | Bits | 12040 |  |  |  |  |
| Transport block CRC per Slot |  |  |  |  |  |  |
| For Slot i = 0 | Bits | N/A |  |  |  |  |
| For CSI Slots i = 10 and i, if mod (i,5) =1, i={0,…,19} |  | N/A |  |  |  |  |
| For Non CSI-RS Slot i, if mod (i,5) =3, i={0,..19} | Bits | 24 |  |  |  |  |
| For Non CSI-RS Slot i, if mod (i,5) ={0,2}, i={1, ..9,11,..19} | Bits | 24 |  |  |  |  |
| Number of Code Blocks per Slot |  |  |  |  |  |  |
| For Slot i = 0 | CBs | N/A |  |  |  |  |
| For CSI Slots i = 10 and i, if mod (i,5) =1, i={0,…,19} |  | N/A |  |  |  |  |
| For Non CSI-RS Slot i, if mod (i,5) =3, i={0,..,19} | CBs | 1 |  |  |  |  |
| For Non CSI-RS Slot i, if mod (i,5) ={0,2}, i={1, ..9,11,..,19} | CBs | 2 |  |  |  |  |
| Binary Channel Bits Per Slot |  |  |  |  |  |  |
| For Slot i = 0 | Bits | N/A |  |  |  |  |
| For CSI Slots i = 10 and i, if mod (i,5) =1, i={0,…,19} |  | N/A |  |  |  |  |
|  |  |  |  |  |  |  |
| For Non CSI-RS Slot i, if mod (i,5) =3, i={0,..,19} | Bits | 14976 |  |  |  |  |
| For Non CSI-RS Slot i, if mod (i,5) ={0,2}, i={1,..9,11,…,19} | Bits | 24960 |  |  |  |  |
| Max. Throughput averaged over 2 frames | Mbps | 5.0460 |  |  |  |  |
| Note 1: SS/PBCH block is transmitted in slot #0 with periodicity 20 ms  Note 2: Slot i is slot index per 2 frames  Note 3: Number of DMRS REs includes the overhead of the DM-RS CDM groups without data | | | | | | |

*End of Change~~~*