3GPP TSG-RAN WG4 Meeting # 103-e R4-2210649

Electronic Meeting, May 09 – May 20, 2022

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| *CR-Form-v12.2* |
| **CHANGE REQUEST** |
|  |
|  | **38.141-2** | **CR** |  | **rev** |  | **Current version:** | **16.11.0** |  |
|  |
| *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 |  | Radio Access Network | **x** | Core Network |  |

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| ***Title:***  | Draft CR to TS 38.141-2: 64QAM BS demodulation FRC description correction, Rel-16 |
|  |  |
| ***Source to WG:*** | Huawei, HiSilicon |
| ***Source to TSG:*** | R4 |
|  |  |
| ***Work item code:*** | NR\_unlic-Perf  |  | ***Date:*** | 2022-05-17 |
|  |  |  |  |  |
| ***Category:*** | **F** |  | ***Release:*** | Rel-16 |
|  | *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-16 (Release 16)Rel-17 (Release 17)Rel-18 (Release 18)Rel-19 (Release 19)* |
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| ***Reason for change:*** | It was observed that the description of the Annex A.5 is not consistent and is missing the description of the recently added table A.5-5. For consistency purposes, this is completed in this CR. With the introduction of additional FR1 FRCs for the interlaced PUSCH (Table A.5-5), the annex A.5 description text was not updated. |
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| ***Summary of change:*** | * Adding missing description of the FRC parameters in table A.5-5
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| ***Consequences if not approved:*** | Description of Annex A.5 would remain incomplete and inconsistent.  |
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| ***Clauses affected:*** | A.5 |
|  |  |
|  | **Y** | **N** |  |  |
| ***Other specs*** |  | **x** |  Other core specifications  |  |
| ***affected:*** |  | **x** |  Test specifications |  |
| ***(show related CRs)*** |  | **x** |  O&M Specifications |  |
|  |  |
| ***Other comments:*** |  |
|  |  |
| ***This CR's revision history:*** |  |

*------------------------------ Modified sections ------------------------------*

# A.5 Fixed Reference Channels for performance requirements (64QAM, R=567/1024)

The parameters for the reference measurement channels are specified in table A.5-2 and table A.5-5 for FR1 PUSCH performance requirements with transform precoding disabled, additional DM-RS position = pos1 and 1 transmission layer.

- FRC parameters are specified in table A.5-2 for FR1 PUSCH with transform precoding disabled, *Additional DM-RS position = pos1* and 1 transmission layer.

- FRC parameters are specified in table A.5-5 for FR1 interlaced PUSCH with transform precoding disabled, *Additional DM-RS position = pos1* and 1 transmission layer.

The parameters for the reference measurement channels are specified in table A.5-3 to table A.5-4 for FR2 PUSCH performance requirements:

- FRC parameters are specified in table A.5-3 for FR2 PUSCH with transform precoding disabled, additional DM-RS position = pos0 and 1 transmission layer.

- FRC parameters are specified in table A.5-4 for FR2 PUSCH with transform precoding disabled, additional DM-RS position = pos1 and 1 transmission layer.

Table A.5-1: Void

Table A.5-2: FRC parameters for FR1 PUSCH performance requirements, transform precoding disabled, additional DM-RS position = pos1 and 1 transmission layer (64QAM, R=567/1024)

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Reference channel | G-FR1-A5-8 | G-FR1-A5-9 | G-FR1-A5-10 | G-FR1-A5-11 | G-FR1-A5-12 | G-FR1-A5-13 | G-FR1-A5-14 |
| Subcarrier spacing (kHz) | 15 | 15 | 15 | 30 | 30 | 30 | 30 |
| Allocated resource blocks | 25 | 52 | 106 | 24 | 51 | 106 | 273 |
| CP-OFDM Symbols per slot (Note 1) | 12 | 12 | 12 | 12 | 12 | 12 | 12 |
| Modulation | 64QAM | 64QAM | 64QAM | 64QAM | 64QAM | 64QAM | 64QAM |
| Code rate (Note 2) | 567/1024 | 567/1024 | 567/1024 | 567/1024 | 567/1024 | 567/1024 | 567/1024 |
| Payload size (bits) | 12040 | 25104 | 50184 | 11528 | 24576 | 50184 | 131176 |
| Transport block CRC (bits) | 24 | 24 | 24 | 24 | 24 | 24 | 24 |
| Code block CRC size (bits) | 24 | 24 | 24 | 24 | 24 | 24 | 24 |
| Number of code blocks - C | 2 | 3 | 6 | 2 | 3 | 6 | 16 |
| Code block size including CRC (bits) (Note 2) | 6056 | 8400 | 8392 | 5800 | 8224 | 8392 | 8224 |
| Total number of bits per slot | 21600 | 44928 | 91584 | 20736 | 44064 | 91584 | 235872 |
| Total symbols per slot | 3600 | 7488 | 15264 | 3456 | 7344 | 15264 | 39312 |
| NOTE 1: DM-RS configuration type = 1 with DM-RS duration = single-symbol DM-RS and the number of DM-RS CDM groups without data is 2, additional DM-RS position = pos1, *l0* = 2 and *l* = 11 for PUSCH mapping type A, *l0* = 0 and *l* = 10 for PUSCH mapping type B as per table 6.4.1.1.3-3 of TS 38.211 [20].NOTE 2: Code block size including CRC (bits) equals to *K'* in clause 5.2.2 of TS 38.212 [19]. |

Table A.5-3: FRC parameters for FR2 PUSCH performance requirements, transform precoding disabled, additional DM-RS position = pos0 and 1 transmission layer (64QAM, R=567/1024)

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Reference channel | G-FR2-A5-1 | G-FR2-A5-2 | G-FR2-A5-3 | G-FR2-A5-4 | G-FR2-A5-5 |
| Subcarrier spacing (kHz) | 60 | 60 | 120 | 120 | 120 |
| Allocated resource blocks | 66 | 132 | 32 | 66 | 132 |
| CP-OFDM Symbols per slot (Note 1) | 9 | 9 | 9 | 9 | 9 |
| Modulation | 64QAM | 64QAM | 64QAM | 64QAM | 64QAM |
| Code rate (Note 2) | 567/1024 | 567/1024 | 567/1024 | 567/1024 | 567/1024 |
| Payload size (bits) | 23568 | 47112 | 11528 | 23568 | 47112 |
| Transport block CRC (bits) | 24 | 24 | 24 | 24 | 24 |
| Code block CRC size (bits) | 24 | 24 | 24 | 24 | 24 |
| Number of code blocks - C | 3 | 6 | 2 | 3 | 6 |
| Code block size including CRC (bits) (Note 2) | 7888 | 7880 | 5800 | 7888 | 7880 |
| Total number of bits per slot without PT-RS | 42768 | 85536 | 20736 | 42768 | 85536 |
| Total number of bits per slot with PT-RS (Note 3) | 40986 | 81972 | 19872 | 40986 | 81972 |
| Total symbols per slot without PT-RS | 7128 | 14256 | 3456 | 7128 | 14256 |
| Total symbols per slot with PT-RS (Note 3) | 6831 | 13662 | 3312 | 6831 | 13662 |
| NOTE 1: DM-RS configuration type = 1 with DM-RS duration = single-symbol DM-RS and the number of DM-RS CDM groups without data is 2, additional DM-RS position = pos0 with *l0*= 0 as per table 6.4.1.1.3-3 of TS 38.211 [20].NOTE 2: Code block size including CRC (bits) equals to *K'* in clause 5.2.2 of TS 38.212 [19].NOTE 3: PT-RS configuration *KPT-RS =2, LPT-RS =1*. |

Table A.5-4: FRC parameters for FR2 PUSCH performance requirements, transform precoding disabled, additional DM-RS position = pos1 and 1 transmission layer (64QAM, R=567/1024)

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Reference channel | G-FR2-A5-6 | G-FR2-A5-7 | G-FR2-A5-8 | G-FR2-A5-9 | G-FR2-A5-10 |
| Subcarrier spacing (kHz) | 60 | 60 | 120 | 120 | 120 |
| Allocated resource blocks | 66 | 132 | 32 | 66 | 132 |
| CP-OFDM Symbols per slot (Note 1) | 8 | 8 | 8 | 8 | 8 |
| Modulation | 64QAM | 64QAM | 64QAM | 64QAM | 64QAM |
| Code rate (Note 2) | 567/1024 | 567/1024 | 567/1024 | 567/1024 | 567/1024 |
| Payload size (bits) | 21000 | 42016 | 10248 | 21000 | 42016 |
| Transport block CRC (bits) | 24 | 24 | 24 | 24 | 24 |
| Code block CRC size (bits) | 24 | 24 | 24 | 24 | 24 |
| Number of code blocks - C | 3 | 5 | 2 | 3 | 5 |
| Code block size including CRC (bits) (Note 2) | 7032 | 8432 | 5160 | 7032 | 8432 |
| Total number of bits per slot without PT-RS | 38016 | 76032 | 18432 | 38016 | 76032 |
| Total number of bits per slot with PT-RS (Note 3) | 36432 | 72864 | 17664 | 36432 | 72864 |
| Total symbols per slot without PT-RS | 6336 | 12672 | 3072 | 6336 | 12672 |
| Total symbols per slot with PT-RS (Note 3) | 6072 | 12144 | 2944 | 6072 | 12144 |
| NOTE 1: DM-RS configuration type = 1 with DM-RS duration = single-symbol DM-RS and the number of DM-RS CDM groups without data is 2, additional DM-RS position = pos1 with *l0* = 0 and *l* = 8 as per table 6.4.1.1.3-3 of TS 38.211 [20].NOTE 2: Code block size including CRC (bits) equals to *K'* in clause 5.2.2 of TS 38.212 [19].NOTE 3: PT-RS configuration *KPT-RS =2, LPT-RS =1*. |

Table A.5-5: FRC parameters for FR1interlaced PUSCH performance requirements, transform precoding disabled, *additional DM-RS position = pos1* and 1 transmission layer (64QAM, R=567/1024)

|  |  |  |
| --- | --- | --- |
| Reference channel | G-FR1-A5-15 | G-FR1-A5-16 |
| Subcarrier spacing [kHz] | 15 | 30 |
| Allocated resource blocks | 11 | 11 |
| CP-OFDM Symbols per slot (Note 1) | 12 | 12 |
| Modulation | 64QAM | 64QAM |
| Code rate  | 567/1024 | 567/1024 |
| Payload size (bits) | 5248 | 5248 |
| Transport block CRC (bits) | 24 | 24 |
| Code block CRC size (bits) | 24 | 24 |
| Number of code blocks - C | 1 | 1 |
| Code block size including CRC (bits) (Note 2) | 5272 | 5272 |
| Total number of bits per slot (Note 3) | 9504 | 9504 |
| Total symbols per slot (Note 3) | 1584 | 1584 |
| NOTE 1: *DM-RS configuration type* = 1 with *DM-RS duration = single-symbol DM-RS* and the number of DM-RS CDM groups without data is 2, *Additional DM-RS position = pos1*, *l0*= 2 and *l* =11 for PUSCH mapping type A, *l0*= 0 and *l* =10 for PUSCH mapping type B as per table 6.4.1.1.3-3 of TS 38.211 [5].NOTE 2: Code block size including CRC (bits) equals to *K'* in clause 5.2.2 of TS 38.212 [15].NOTE 3: The calculation of the “Total number of bits per slot” and “Total symbols per slot” fields include the REs taken up by CG-UCI, if present. |

*------------------------------ End of modified section ------------------------------*