**3GPP TSG-RAN4 Meeting #97-e *R4-2017520***

**Electronic meeting, 2nd Nov - 13th Nov, 2020**

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| *CR-Form-v12.1* | | | | | | | | |
| **CHANGE REQUEST** | | | | | | | | |
|  | | | | | | | | |
|  | **38.141-2** | **CR** | **CR#** | **rev** | **1** | **Current version:** | **16.5.0** |  |
|  | | | | | | | | |
| *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 on FRC for URLLC BS radiated performance requirement for TS 38.141-2 | | | | | | | | | |
|  |  | | | | | | | | | |
| ***Source to WG:*** | Samsung | | | | | | | | | |
| ***Source to TSG:*** | R4 | | | | | | | | | |
|  |  | | | | | | | | | |
| ***Work item code:*** | NR\_L1enh\_URLLC-Perf | | | | |  | ***Date:*** | | | 2020-10-20 |
|  |  | | | |  | |  | | |  |
| ***Category:*** | **B** |  | | | | | ***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 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-15 (Release 15) Rel-16 (Release 16) Rel-17 (Release 17) Rel-18 (Release 18)* | |
|  |  | | | | | | | | | |
| ***Reason for change:*** | | PUSCH requirements with high reliability and lower latency have been introduced in URLLC in Rel-16. There is no FRC table for FR2 PUSCH requirements with high reliablity and lower latency requirement testing | | | | | | | | |
|  | |  | | | | | | | | |
| ***Summary of change:*** | | Add FRC table for FR2 in Annex A.3A | | | | | | | | |
|  | |  | | | | | | | | |
| ***Consequences if not approved:*** | | The Rel-16 PUSCH requirements with high reliability and lower latency requirement can not be verfied | | | | | | | | |
|  | |  | | | | | | | | |
| ***Clauses affected:*** | | A.3A | | | | | | | | |
|  | |  | | | | | | | | |
|  | | **Y** | **N** |  | | | |  | | |
| ***Other specs*** | |  | **X** | Other core specifications | | | | TS/TR ... CR ... | | |
| ***affected:*** | |  | **X** | Test specifications | | | | TS/TR ... CR ... | | |
| ***(show related CRs)*** | |  | **X** | O&M Specifications | | | | TS/TR ... CR ... | | |
|  | |  | | | | | | | | |
| ***Other comments:*** | |  | | | | | | | | |
|  | |  | | | | | | | | |
| ***This CR's revision history:*** | |  | | | | | | | | |

<Start of Change 1>

# A.3 Fixed Reference Channels for performance requirements (QPSK, R=193/1024)

# A.3A Fixed Reference Channels for performance requirements (QPSK, R=99/1024)

The parameters for the reference measurement channels are specified in table A.3A-2 to A.3A-3 for FR2 PUSCH performance requirements:

- FRC parameters are specified in table A.3A-2 for FR2 PUSCH with transform precoding disabled, additional DM-RS position = pos0 and 1 transmission layer.

- FRC parameters are specified in table A.3A-3 for FR2 PUSCH with transform precoding disabled, additional DM-RS position = pos1 and 1 transmission layer.

**Table A.3A-2: FRC parameters for FR2 PUSCH performance requirements, transform precoding disabled, additional DM-RS position = pos0 and 1 transmission layer (QPSK, R=99/1024)**

|  |  |  |
| --- | --- | --- |
| Reference channel | G-FR2-A3A-1 | G-FR2-A3A-2 |
| Subcarrier spacing [kHz] | 60 | 120 |
| Allocated resource blocks | 66 | 32 |
| CP-OFDM Symbols per slot (Note 1) | 9 | 9 |
| Modulation | QPSK | QPSK |
| Code rate (Note 2) | 99/1024 | 99/1024 |
| Payload size (bits) | 1416 | 672 |
| Transport block CRC (bits) | 16 | 16 |
| Code block CRC size (bits) | - | - |
| Number of code blocks - C | 1 | 1 |
| Code block size including CRC (bits) (Note 2) | 1432 | 688 |
| Total number of bits per slot | 14256 | 6912 |
| Total symbols per slot | 7128 | 3456 |
| 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, *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 subclause 5.2.2 of TS 38.212 [19]. | | |

**Table A.3A-3: FRC parameters for FR2 PUSCH performance requirements, transform precoding disabled, additional DM-RS position = pos1 and 1 transmission layer (QPSK, R=99/1024)**

|  |  |  |
| --- | --- | --- |
| Reference channel | G-FR2-A3A-3 | G-FR2-A3A-4 |
| Subcarrier spacing [kHz] | 60 | 120 |
| Allocated resource blocks | 66 | 32 |
| CP-OFDM Symbols per slot (Note 1) | 8 | 8 |
| Modulation | QPSK | QPSK |
| Code rate (Note 2) | 99/1024 | 99/1024 |
| Payload size (bits) | 1224 | 608 |
| Transport block CRC (bits) | 16 | 16 |
| Code block CRC size (bits) | - | - |
| Number of code blocks - C | 1 | 1 |
| Code block size including CRC (bits) (Note 2) | 1240 | 624 |
| Total number of bits per slot | 12672 | 6144 |
| Total symbols per slot | 6336 | 3072 |
| 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*= 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 subclause 5.2.2 of TS 38.212 [19]. | | |

<End of Change 1>