3GPP TSG-RAN WG4 Meeting # 101-bis-e R4-2203014

Electronic Meeting, January 17-25, 2022

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| *CR-Form-v12.1* |
| **CHANGE REQUEST** |
|  |
|  | **38.104** | **CR** | **-** | **rev** | **1** | **Current version:** | **17.4.0** |  |
|  |
| *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 |  | Radio Access Network | **x** | Core Network |  |

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|  |
| ***Title:***  | Draft CR to TS 38.104: implementation of FR2-2 requirements: FRC annex |
|  |  |
| ***Source to WG:*** | Huawei  |
| ***Source to TSG:*** | R4 |
|  |  |
| ***Work item code:*** | NR\_ext\_to\_71GHz-Core |  | ***Date:*** | 2022-01-10 |
|  |  |  |  |  |
| ***Category:*** | **B** |  | ***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 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-15 (Release 15)Rel-16 (Release 16)Rel-17 (Release 17)Rel-18 (Release 18)* |
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| ***Reason for change:*** | Referring to the WF in R4-2120678, the following work-split was agreed:

| **Specification clauses** | **Volunteer company** |
| --- | --- |
| 1-5 | N/A, handled in thread 128 |
| 9.1 – 9.5 | Nokia |
| 9.6 – 9.8 | Ericsson |
| 10.1 – 10.5 | CATT |
| 10.6 – 10.9 | ZTE |
| Annexes for FRCs | Huawei |

Related modifications to FRC annex are provided, to introduce G-FR2-A1-6 and G-FR2-A1-7 FRCs for FR2-2.  |
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| ***Summary of change:*** | Introduction of G-FR2-A1-6 and G-FR2-A1-7 FRCs for FR2-2.  |
|  |  |
| ***Consequences if not approved:*** | FR2-2 RX requirements would not be possible to define.  |
|  |  |
| ***Clauses affected:*** | A.1  |
|  |  |
|  | **Y** | **N** |  |  |
| ***Other specs*** |  | **x** |  Other core specifications  |  |
| ***affected:*** | **X** |  |  Test specifications | TS 38.141-2 |
| ***(show related CRs)*** |  | **x** |  O&M Specifications |  |
|  |  |
| ***Other comments:*** |  |
|  |  |
| ***This CR's revision history:*** |  |

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

Annex A (normative):
Reference measurement channels

# A.1 Fixed Reference Channels for reference sensitivity level, ACS, in-band blocking, out-of-band blocking, receiver intermodulation and in-channel selectivity (QPSK, R=1/3)

The parameters for the reference measurement channels are specified in table A.1-1 for FR1 reference sensitivity level, ACS, in-band blocking, out-of-band blocking, receiver intermodulation, in-channel selectivity, OTA sensitivity, OTA reference sensitivity level, OTA ACS, OTA in-band blocking, OTA out-of-band blocking, OTA receiver intermodulation and OTA in-channel selectivity. The parameters for the band n46 and n96 reference measurement channels are specified in table A.1-1a and A.1-1b for reference sensitivity level, ACS, in-band blocking, out-of-band blocking, receiver intermodulation, in-channel selectivity.

The parameters for the reference measurement channels are specified in table A.1-2 for FR2 OTA reference sensitivity level, OTA ACS, OTA in-band blocking, OTA out-of-band blocking, OTA receiver intermodulation and OTA in-channel selectivity.

Table A.1-1: FRC parameters for FR1 reference sensitivity level, ACS, in-band blocking, out-of-band blocking, receiver intermodulation, in-channel selectivity, OTA sensitivity, OTA reference sensitivity level, OTA ACS, OTA in-band blocking, OTA out-of-band blocking, OTA receiver intermodulation and OTA in-channel selectivity

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| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Reference channel | G-FR1-A1-1 | G-FR1-A1-2 | G-FR1-A1-3 | G-FR1-A1-4 | G-FR1-A1-5 | G-FR1-A1-6 | G-FR1-A1-7 | G-FR1-A1-8 | G-FR1-A1-9 | G-FR1-A1-10 | G-FR1-A1-11 |
| Subcarrier spacing (kHz) | 15 | 30 | 60 | 15 | 30 | 60 | 15 | 30 | 60 | 15 | 15 |
| Allocated resource blocks | 25 | 11 | 11 | 106 | 51 | 24 | 15 | 6 | 6 | 24 | 105 |
| CP-OFDM Symbols per slot (Note 1) | 12 | 12 | 12 | 12 | 12 | 12 | 12 | 12 | 12 | 12 | 12 |
| Modulation | QPSK | QPSK | QPSK | QPSK | QPSK | QPSK | QPSK | QPSK | QPSK | QPSK | QPSK |
| Code rate (Note 2) | 1/3 | 1/3 | 1/3 | 1/3 | 1/3 | 1/3 | 1/3 | 1/3 | 1/3 | 1/3 | 1/3 |
| Payload size (bits) | 2152 | 984 | 984 | 9224 | 4352 | 2088 | 1320 | 528 | 528 | [2088] | [8968] |
| Transport block CRC (bits) | 16 | 16 | 16 | 24 | 24 | 16 | 16 | 16 | 16 | 16 | 24 |
| Code block CRC size (bits) | - | - | - | 24 | - | - | - | - | - | - | 24 |
| Number of code blocks - C | 1 | 1 | 1 | 2 | 1 | 1 | 1 | 1 | 1 | 1 | 2 |
| Code block size including CRC (bits) (Note 3) | 2168 | 1000 | 1000 | 4648 | 4376 | 2104 | 1336 | 544 | 544 | [2104] | [4520] |
| Total number of bits per slot | 7200 | 3168 | 3168 | 30528 | 14688 | 6912 | 4320 | 1728 | 1728 | [6912] | [30240] |
| Total symbols per slot | 3600 | 1584 | 1584 | 15264 | 7344 | 3456 | 2160 | 864 | 864 | [3456] | [15120] |
| NOTE 1: *UL-DMRS-config-type* = 1 with *UL-DMRS-max-len* = 1, *UL-DMRS-add-pos* = 1 with = 2, = 11 as per table 6.4.1.1.3-3 of TS 38.211 [9].NOTE 2: MCS index 4 and target coding rate = 308/1024 are adopted to calculate payload size for receiver sensitivity and in-channel selectivityNOTE 3: Code block size including CRC (bits) equals to  in sub-clause 5.2.2 of TS 38.212 [15].NOTE 2: MCS index 4 and target coding rate = 308/1024 are adopted to calculate payload size for receiver sensitivity and in-channel selectivityNOTE 3: Code block size including CRC (bits) equals to  in sub-clause 5.2.2 of TS 38.212 [15]. |

Table A.1-1a: FRC parameters for band n46 and n96 reference sensitivity level, ACS, in-band blocking, out-of-band blocking, receiver intermodulation, in-channel selectivity

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Reference channel | G-FR1-A1-12 | G-FR1-A1-13 | G-FR1-A1-14 | G-FR1-A1-15 | G-FR1-A1-16 | G-FR1-A1-17 | G-FR1-A1-18 | G-FR1-A1-19 |
| Channel bandwidth (MHz) | 10 | 10 | 20 | 20 | 40 | 40 | 60 | 80 |
| Subcarrier spacing (kHz) | 15 | 30 | 15 | 30 | 15 | 30 | 30 | 30 |
| Allocated resource blocks | 5 | 4 | 10 | 10 | 21 | 21 | 32 | 43 |
| CP-OFDM Symbols per slot (Note 1) | 12 | 12 | 12 | 12 | 12 | 12 | 12 | 12 |
| Modulation | QPSK | QPSK | QPSK | QPSK | QPSK | QPSK | QPSK | QPSK |
| Code rate (Note 2) | 1/3 | 1/3 | 1/3 | 1/3 | 1/3 | 1/3 | 1/3 | 1/3 |
| Payload size (bits) | 432 | 352 | 888 | 888 | 1864 | 1864 | 2792 | 3752 |
| Transport block CRC (bits) | 16 | 16 | 16 | 16 | 16 | 16 | 16 | 16 |
| Code block CRC size (bits) | - | - | - | - | - | - | - | - |
| Number of code blocks - C | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| Code block size including CRC (bits) (Note 3) | 448 | 368 | 904 | 904 | 1880 | 1880 | 2808 | 3768 |
| Total number of bits per slot | 1440 | 1152 | 2880 | 2880 | 6048 | 6048 | 9216 | 12384 |
| Total symbols per slot | 720 | 576 | 1440 | 1440 | 3024 | 3024 | 4608 | 6192 |
| NOTE 1: *UL-DMRS-config-type* = 1 with *UL-DMRS-max-len* = 1, *UL-DMRS-add-pos* = 1 with = 2, = 11 as per table 6.4.1.1.3-3 of TS 38.211 [9].NOTE 2: MCS index 4 and target coding rate = 308/1024 are adopted to calculate payload size for receiver sensitivity and in-channel selectivityNOTE 3: Code block size including CRC (bits) equals to  in sub-clause 5.2.2 of TS 38.212 [15].NOTE 4: For reference channel A1-12, the allocated RB’s are uniformly spaced over the channel bandwidth at RB index N, N+10, N+20, N+30, N+40 where N={0,1,2,3,4,…,9}. NOTE 5: For reference channel A1-13, the allocated RB’s are uniformly spaced over the channel bandwidth at RB index N, N+5, N+10, N+15 where N={0,1,2,3,4}.NOTE 7: For reference channel A1-14, the allocated RB’s are uniformly spaced over the channel bandwidth at RB index N, N+10,N+20,..N+90 where N={0,1,2,3,...,9}.NOTE 8: For reference channel A1-15, the allocated RB’s are uniformly spaced over the channel bandwidth at RB index N, N+5,N+10,..,N+45 where N={0,1,2,3,4}.NOTE 10: For reference channel A1-16, the allocated RB’s are uniformly spaced over the channel bandwidth at RB index N, N+10,N+20,...,N+200 where N={0,1,2,3,4,...,9}.NOTE 11: For reference channel A1-17, the allocated RB’s are uniformly spaced over the channel bandwidth at RB index N, N+5, N+10, ..., N+100 where N={0,1,2,3,4}.NOTE 12: For reference channel A1-18, the allocated RB’s are uniformly spaced over the channel bandwidth at RB index N, N+5,N+10,...,N+155 where N={0,1,2,3,4}.NOTE 13: For reference channel A1-19, the allocated RB’s are uniformly spaced over the channel bandwidth at RB index N, N+5,N+10,...,N+210 where N={0,1,2,3,4}. |

Table A.1-2: FRC parameters for FR2 OTA reference sensitivity level, OTA ACS, OTA in-band blocking, OTA out-of-band blocking, OTA receiver intermodulation and OTA in-channel selectivity

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Reference channel | G-FR2-A1-1 | G-FR2-A1-2 | G-FR2-A1-3 | G-FR2-A1-4 | G-FR2-A1-5 | G-FR2-A1-6 | G-FR2-A1-7 |
| Subcarrier spacing (kHz) | 60 | 120 | 120 | 60 | 120 | 480 | 960 |
| Allocated resource blocks | 66 | 32 | 66 | 33 | 16 | TBD From Table 5.3.2-2; 400 MHz channel | TBDFrom Table 5.3.2-2; 400 MHz channel |
| CP-OFDM Symbols per slot (Note 1) | 12 | 12 | 12 | 12 | 12 | 12 | 12 |
| Modulation | QPSK | QPSK | QPSK | QPSK | QPSK | QPSK | QPSK |
| Code rate (Note 2) | 1/3 | 1/3 | 1/3 | 1/3 | 1/3 | 1/3 | 1/3 |
| Payload size (bits) | 5632 | 2792 | 5632 | 2856 | 1416 | TBD | TBD |
| Transport block CRC (bits) | 24 | 16 | 24 | 16 | 16 | TBD | TBD |
| Code block CRC size (bits) | - | - | - | - | - | - | - |
| Number of code blocks - C | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| Code block size including CRC (bits) (Note 3) | 5656 | 2808 | 5656 | 2872 | 1432 | TBD | TBD |
| Total number of bits per slot | 19008 | 9216 | 19008 | 9504 | 4608 | TBD | TBD |
| Total symbols per slot | 9504 | 4608 | 9504 | 4752 | 2304 | TBD | TBD |
| NOTE 1: DM-RS configuration type = 1 with DM-RS duration = single-symbol DM-RS, additional DM-RS position = pos1 with *l0* = 2, *l* = 11 as per table 6.4.1.1.3-3 of TS 38.211 [9].NOTE 2: MCS index 4 and target coding rate = 308/1024 are adopted to calculate payload size.NOTE 3: Code block size including CRC (bits) equals to *K'* in sub-clause 5.2.2 of TS 38.212 [15]. |

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