**3GPP TSG- Meeting # *R4-2419257***

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| *CR-Form-v12.3* |
| **CHANGE REQUEST** |
|  |
|  |  | **CR** | **0100** | **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 |  | Radio Access Network | **x** | Core Network |  |

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|  |
| ***Title:***  | CR for 38.108 on FR2-NTN PUCCH demodulation requirements  |
|  |  |
| ***Source to WG:*** |  |
| ***Source to TSG:*** |  |
|  |  |
| ***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 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-17 (Release 17)Rel-18 (Release 18)Rel-19 (Release 19) Rel-20 (Release 20)* |
|  |  |
| ***Reason for change:*** | The requirement values of FR2-NTN PUCCH format 0 and format 4 are TBD in the latest specification. The new simulation results are delivered and the corresponding SNR values could be updated accordingly.  |
|  |  |
| ***Summary of change:*** | * New SNR values for FR2-NTN PUCCH format 3 and remove [ ].
* Replace TBD by SNR values for FR2-NTN PUCCH format 0 and 4.
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|  |  |
| ***Consequences if not approved:*** | The FR2-NTN PUCCH format 3 requirment values are not aligned with the latest simulation results. The FR2-NTN PUCCH format 0 and 4 demodulation requirements are missing. |
|  |  |
| ***Clauses affected:*** | 11.3.2.2, 11.3.2.5, 11.3.2.6 |
|  |  |
|  | **Y** | **N** |  |  |
| ***Other specs*** |  | **x** |  Other core specifications  | TS/TR ... CR ...  |
| ***affected:*** | **x** |  |  Test specifications | TS 38.181 |
| ***(show related CRs)*** |  | **x** |  O&M Specifications | TS/TR ... CR ...  |
|  |  |
| ***Other comments:*** |  |
|  |  |
| ***This CR's revision history:*** | Revised from R4-2419257. |

################## Start of Change #1 ######################

### 11.3.2 Requirements for *SAN type 2-O*

#### 11.3.2.1 General

The DTX to ACK probability, i.e. the probability that ACK is detected when nothing was sent:

 $Prob\left(PUCCH DTX\rightarrow Ack bits\right)= \frac{\#(false ACK bits)}{\#\left(PUCCH DTX\right)\*\#(ACK/NACK bits)}$

where:

- #(false ACK bits) denotes the number of detected ACK bits.

- #(ACK/NACK bits) denotes the number of encoded bits per slot

- #(PUCCH DTX) denotes the number of DTX occasions

#### 11.3.2.2 Performance requirements for PUCCH format 0

##### 11.3.2.2.1 General

The ACK missed detection probability is the probability of not detecting an ACK when an ACK was sent.

Table 11.3.2.2.1-1: Test Parameters

|  |  |
| --- | --- |
| **Parameter** | **Value** |
| Number of UCI information bits | 1 |
| Number of PRBs | 1 |
| First PRB prior to frequency hopping | 0 |
| Intra-slot frequency hopping | Enabled |
| First PRB after frequency hopping | The largest PRB index – (Number of PRBs - 1) |
| Group and sequence hopping | neither |
| Hopping ID | 0 |
| Initial cyclic shift | 0 |
| First symbol | 12 for 2 symbols |
| Test metric | 1% of DTX to ACK probability1% of ACK missed detection probability  |

The transient period as specified in TS 38.101-1 [17] clause 6.3.3.1 and TS 38.101-2 [18] clause 6.3.3.1 is not taken into account for performance requirement testing, where the RB hopping is symmetric to the CC centre, i.e. intra-slot frequency hopping is enabled.

##### 11.3.2.2.2 Minimum requirements

The ACK missed detection probability shall not exceed 1% at the SNR given in table 11.3.2.2.2-1.

Table 11.3.2.2.2-1: Minimum requirements for PUCCH format 0 and 120 kHz SCS in FR2-NTN

|  |  |  |  |
| --- | --- | --- | --- |
| Number | Number of | Propagation conditions and |  |
| of TX antennas | demodulation branches | correlation matrix (Annex D) | 50 MHz |
| 1 | 1 | NTN-TDLC5-1200 Low | 6.3 |
|  | 2 | NTN-TDLC5-1200 Low | 1.3 |

#### 11.3.2.3 Performance requirements for PUCCH format 1.

Omit unchanged text.

#### 11.3.2.5 Performance requirements for PUCCH format 3

##### 11.3.2.5.1 General

The performance is measured by the required SNR at UCI block error probability not exceeding 1%.

The UCI block error probability is defined as the conditional probability of incorrectly decoding the UCI information when the UCI information is sent. The UCI information does not contain CSI part 2.

The transient period as specified in TS 38.101-2 [18] clause 6.3.3.1 is not taken into account for performance requirement testing, where the RB hopping is symmetric to the CC centre, i.e. intra-slot frequency hopping is enabled.

Table 11.3.2.5.1-1: Test parameters

|  |  |
| --- | --- |
| Parameter | Value |
| Modulation order | QPSK |
| First PRB prior to frequency hopping | 0 |
| Intra-slot frequency hopping | enabled |
| First PRB after frequency hopping | The largest PRB index – (Number of PRBs - 1) |
| Group and sequence hopping | neither |
| Hopping ID | 0 |
| Number of PRBs | 1 |
| Number of symbols | 14 |
| The number of UCI information bits | 16 |
| First symbol | 0 |

##### 11.3.2.5.2 Minimum requirements

The UCI block error probability shall not exceed 1% at the SNR given in Table 11.3.2.5.2-1.

Table 11.3.2.5.2-2: Required SNR for PUCCH format 3 with 120kHz SCS in FR2-NTN

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Number of TX  | Number of demodulation  | Cyclic Prefix | Propagation conditions and  | Additional DM‑RS  | Channel Bandwidth / SNR (dB) |
| antennas | branches |  | correlation matrix (Annex D) | configuration | 50 MHz |
|  | 1 | Normal | NTN-TDLC5-1200 Low | No additional DM-RS | 2.3 |
|  |  |  |  | Additional DM-RS | 1.7 |
| 1 | 2 | Normal | NTN-TDLC5-1200 Low | No additional DM-RS | -1.9 |
|  |  |  |  | Additional DM-RS | -2.5 |

#### 11.3.2.6 Performance requirements for PUCCH format 4

##### 11.3.2.6.1 General

The performance is measured by the required SNR at UCI block error probability not exceeding 1%.

The UCI block error probability is defined as the conditional probability of incorrectly decoding the UCI information when the UCI information is sent. The UCI information does not contain CSI part 2.

The transient period as specified in TS 38.101-2 [18] clause 6.3.3.1 is not taken into account for performance requirement testing, where the RB hopping is symmetric to the CC centre, i.e. intra-slot frequency hopping is enabled.

Table 11.3.2.6.1-1: Test parameters

|  |  |
| --- | --- |
| Parameter | Value |
| Modulation order | QPSK |
| First PRB prior to frequency hoppingstartingPRB | 0 |
| Number of PRBs | 1 |
| Intra-slot frequency hopping | enabled |
| First PRB after frequency hopping | The largest PRB index – (Number of PRBs – 1) |
| Group and sequence hopping | neither |
| Hopping ID | 0 |
| Number of symbols | 14 |
| The number of UCI information bits | 22 |
| First symbol | 0 |
| Length of the orthogonal cover code | n2 |
| Index of the orthogonal cover code  | n0 |

##### 11.3.2.6.2 Minimum requirements

The UCI block error probability shall not exceed 1% at the SNR given in Table 11.3.2.6.2-1.

Table 11.3.2.6.2-1: Required SNR for PUCCH format 4 with 120 kHz SCS in FR2-NTN

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Number of TX  | Number of demodulation  | Cyclic Prefix | Propagation conditions and  | Additional DM‑RS  | Channel Bandwidth / SNR (dB) |
| antennas | branches |  | correlation matrix (Annex D) | configuration | 50 MHz |
|  | 1 | Normal | NTN-TDLC5-1200 Low | No additional DM-RS | 4.1 |
|  |  |  |  | Additional DM-RS | 5.8 |
| 1 | 2 | Normal | NTN-TDLC5-1200 Low | No additional DM-RS | -0.2 |
|  |  |  |  | Additional DM-RS | -0.6 |

## 11.4 Performance requirements for PRACH

################## End of Change #1 ######################