**3GPP TSG-RAN4 Meeting #102-e *draftR4-2207502***

**Online, , 21st Feb 2022 - 3rd Mar 2022**

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| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| *CR-Form-v12.2* | | | | | | | | |
| **CHANGE REQUEST** | | | | | | | | |
|  | | | | | | | | |
|  | **38.104** | **CR** | **XXXX** | **rev** | **-** | **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:*** |  | | | | | | | | | |
|  |  | | | | | | | | | |
| ***Source to WG:*** | MCC, Nokia | | | | | | | | | |
| ***Source to TSG:*** |  | | | | | | | | | |
|  |  | | | | | | | | | |
| ***Work item code:*** | NR\_unlic-Perf | | | | |  | ***Date:*** | | | 2022-03-04 |
|  |  | | | |  | |  | | |  |
| ***Category:*** | **A** |  | | | | | ***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-16 (Release 16) Rel-17 (Release 17) Rel-18 (Release 18) Rel-19 (Release 19)* | |
|  |  | | | | | | | | | |
| ***Reason for change:*** | | [R4-2207454]  The RB allocation for interaced PF0 and PF1 is not aligned with that corresponding to interlace index 0 | | | | | | | | |
|  | |  | | | | | | | | |
| ***Summary of change:*** | | [R4-2207454]  Change the RB allocation for interlaced PF0 and PF1 from RBs 0,10,20,…,90 to 0,10,20,…,100 for 15 kHz and from 0,5,10,…,45 to 0,5,10,…,50 for 30kHz | | | | | | | | |
|  | |  | | | | | | | | |
| ***Consequences if not approved:*** | | [R4-2207454]  The RB allocation is not correct. | | | | | | | | |
|  | |  | | | | | | | | |
| ***Clauses affected:*** | | [R4-2207454]  8.3.8.1; 8.3.9.1.1 | | | | | | | | |
|  | |  | | | | | | | | |
|  | | **Y** | **N** |  | | | |  | | |
| ***Other specs*** | |  | **x** | Other core specifications | | | | TS/TR ... CR ... | | |
| ***affected:*** | | **x** |  | Test specifications | | | | TS 38.141-1 | | |
| ***(show related CRs)*** | |  | **x** | O&M Specifications | | | | TS/TR ... CR ... | | |
|  | |  | | | | | | | | |
| ***Other comments:*** | |  | | | | | | | | |
|  | |  | | | | | | | | |
| ***This CR's revision history:*** | |  | | | | | | | | |

***<Start of change 1 [R4-2207454]>***

### 8.3.8 Performance requirements for interlaced PUCCH format 0

#### 8.3.8.1 General

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

The ACK missed detection probability performance requirement only apply to PUCCH format 0 with 1 UCI bit. The UCI information only contain ACK information.

The 1bit UCI information is further defined with the bitmap as [1].

Table 8.3.8.1-1: Test Parameters

|  |  |
| --- | --- |
| Parameter | Test |
| Number of UCI information bits | 1 |
| Number of symbols | 1 |
| Intra-slot frequency hopping | N/A |
| Group and sequence hopping | neither |
| Hopping ID | 0 |
| Initial cyclic shift | 0 |
| First symbol | 13 |
| Number of interlaces | 1 |
| Interlace index | 0Note1 |
| NOTE 1: RBs 0,10,20,…,100 are allocated for 15kHz SCS and RBs 0,5,10,…,50 are allocated for 30kHz SCS | |

#### 8.3.8.2 Minimum requirements

The ACK missed detection probability shall not exceed 1% at the SNR given in table 8.3.8.2-1

Table 8.3.8.2-1: Minimum requirements for interlaced PUCCH format 0 with 15 kHz SCS, 20MHz channel bandwidth

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Number of Tx antennas | Number of RX antennas | Propagation conditions and correlation matrix (Annex G) | Number of  OFDM symbols | SNR (dB) |
| 1 | 2 | TDLA30-10 Low | 1 | -2.8 |

Table 8.3.8.2-2: Minimum requirements for interlaced PUCCH format 0 with 30 kHz SCS, 20MHz channel bandwidth

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Number of Tx antennas | Number of RX antennas | Propagation conditions and correlation matrix (Annex G) | Number of  OFDM symbols | SNR (dB) |
| 1 | 2 | TDLA30-10 Low | 1 | -2.0 |

### 8.3.9 Performance requirements for interlaced PUCCH format 1

#### 8.3.9.1 NACK to ACK requirements

##### 8.3.9.1.1 General

The NACK to ACK detection probability is the probability that an ACK bit is falsely detected when an NACK bit was sent on the particular bit position, where the NACK to ACK detection probability is defined as follows:

**,

where:

- denotes the total number of NACK bits transmitted

- denotes the number of NACK bits decoded as ACK bits at the receiver, i.e. the number of received ACK bits

- NACK bits in the definition do not contain the NACK bits which are mapped from DTX, i.e. NACK bits received when DTX is sent should not be considered.

The NACK to ACK detection probability performance requirement only apply to PUCCH format 1 with 2 UCI bits. The UCI information only contain ACK/NACK information.

The 2bits UCI information is further defined with bitmap as [0 1].

Table 8.3.9.1.1-1: Test Parameters

|  |  |
| --- | --- |
| Parameter | Test |
| Number of information bits | 2 |
| Number of symbols | 14 |
| Intra-slot frequency hopping | N/A |
| Group and sequence hopping | neither |
| Hopping ID | 0 |
| Initial cyclic shift | 0 |
| First symbol | 0 |
| Index of orthogonal cover code (*timeDomainOCC*) | 0 |
| Number of interlace | 1 |
| Interlace index | 0Note1 |
| NOTE 1: RBs 0,10,20,…,100 are allocated for 15kHz SCS and RBs 0,5,10,…,50 are allocated for 30kHz SCS | |

##### 8.3.9.1.2 Minimum requirements

The NACK to ACK probability shall not exceed 0.1% at the SNR given in table 8.3.9.1.2-1.

Table 8.3.9.1.2-1: Minimum requirements for interlaced PUCCH format 1 with 15 kHz SCS, 20MHz channel bandwidth

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Number of Tx antennas | Number of RX antennas | Cyclic-Prefix | Propagation conditions and correlation matrix (Annex G) | SNR (dB) |
| 1 | 2 | Normal | TDLA30-10 Low | -13.8 |

Table 8.3.9.1.2-2: Minimum requirements for interlaced PUCCH format 1 with 30 kHz SCS, 20MHz channel bandwidth

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Number of Tx antennas | Number of RX antennas | Cyclic-Prefix | Propagation conditions and correlation matrix (Annex G) | SNR (dB) |
| 1 | 2 | Normal | TDLA30-10 Low | -13.3 |

***<End of change 1>***