**3GPP TSG- Meeting #**

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| *CR-Form-v12.0* |
| **CHANGE REQUEST** |
|  |
|  |  | **CR** |  | **rev** | 1 | **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 | **x** | Radio Access Network |  | Core Network |  |

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|  |
| ***Title:***  |  |
|  |  |
| ***Source to WG:*** |  |
| ***Source to TSG:*** | R4 |
|  |  |
| ***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-12 (Release 12)**Rel-13 (Release 13)Rel-14 (Release 14)Rel-15 (Release 15)Rel-16 (Release 16)* |
|  |  |
| ***Reason for change:*** | Introduction of enhanced MPDCCH demodulation requirements. |
|  |  |
| ***Summary of change:*** | Introduction of enhanced MPDCCH demodulation requirements.Set the requirements according to R4-2010475. |
|  |  |
| ***Consequences if not approved:*** | Enhanced MPDCCH demodulation requirements are missing. |
|  |  |
| ***Clauses affected:*** | 8.11.2.1.5 (new), 8.11.2.2.5 (new) |
|  |  |
|  | **Y** | **N** |  |  |
| ***Other specs*** |  | **x** |  Other core specifications  | TS/TR ... CR ...  |
| ***affected:*** | **x** |  |  Test specifications | TS36.521-1 CR ...  |
| ***(show related CRs)*** |  | **x** |  O&M Specifications | TS/TR ... CR ...  |
|  |  |
| ***Other comments:*** |  |
|  |  |
| ***This CR's revision history:*** |  |

----------------------------------------------------- Beginning of Change ------------------------------------------------------------

##### 8.11.2.1.5 CE Mode A and CE Mode B when CRS-ChEstMPDCCH-Config is configured

For the parameters specified in Table 8.11.2.1.5-1 the average probability of a missed downlink scheduling grant (Pm-dsg) shall be below the specified value in Table 8.11.2.1.5-2 for CE Mode A and in Table 8.11.2.1.5-3 for CE Mode B. The downlink physical setup is in accordance with Annex C.3.2.

Table 8.11.2.1.5-1: Test Parameters for MPDCCH (Category M1)

|  |  |  |  |
| --- | --- | --- | --- |
| Parameter | Unit | CE Mode A (Test 1) | CE Mode B (Test 1) |
| OFDM starting symbol (startSymbolLC) | symbols | 2 | 2 |
| Unused RE-s and PRB-s |  | OCNG | OCNG |
| Cell ID |  | 0 | 0 |
| Downlink power allocation |  | dB | -3 | 0 |
|  | dB | -3 | 0 |
| σ | dB | 0 | -3 |
| δ | dB | 3 | 0 |
| at antenna port | dBm/15kHz | -98 | -98 |
| Cyclic prefix |  | Normal | Normal |
| Subframe Configuration |  | Non-MBSFN | Non-MBSFN |
| Precoder Update Granularity | PRB | N/A | Note 2 |
| ms | N/A | Note 2 |
| Beamforming Pre-Coder |  | Note 2 | Note 2 |
| Cell Specific Reference Signal |  | Port 0 and 1 | Port 0 and 1 |
| Number of PRB per MPDCCH Set |  | 4 | 2+4 |
| Transmission type |  | Distributed | Localized |
| Frequency hopping |  | Disabled | Enabled |
| Number of frequency hopping narrowbands |  | N/A | 4 |
| Frequency hopping offset  |  | N/A | 1 |
| Frequency hopping interval | ms | N/A | 16 |
| Value of G in MPDCCH start subframe (*mpdcch-startSF-UESS*) (Note 3) |  | 1.5 | 1.5 |
| Maximum number of repetitions (*mPDCCH-NumRepetition*) |  | 16 | 32 |
| MPDCCH repetition number |  | 16 | 32 |
| MPDCCH narrowband (*mpdcch-Narrowband*) |  | 1 | 7 |
| PDSCH TM |  | TM2 | TM2 |
| DCI Format |  | 6-1A | 6-1B |
| fdd-DownlinkOrTddSubframeBitmapBR |  | 1111111111 | 1111111111 |
| mpdcch-crs-config |  | Configured | Configured |
| Power offset between CRS and DMRS antenna ports of MPDCCH | dB | 0 | 0 |
| mpdcch-crs-localized-mapping-type |  | N/A | Not configured |
| Note 1: For each test, DC subcarrier puncturing shall be considered.Note 2: TS 36.211 6.8B.5.Note 3: For MPDCCH UE-specific search space the formula for the start subframe k0 is given in TS 36.213 [6] clause 9.1.5.Note 4: If not otherwise stated, the values in this table refer to parameters in TS 36.211 [4] or/and TS 36.213 [6] as appropriate. |

Table 8.11.2.1.5-2: Minimum performance CE Mode A MPDCCH

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Test number | Bandwidth  | Aggregation level | Reference Channel | OCNG Pattern | Propagation Condition | Antenna configuration and correlation Matrix  | Reference value | UECategory |
| Pm-dsg (%) | SNR (dB) |
| 1  | 10 MHz | 16 ECCE | R.82 FDD | OP.2 FDD | EPA5 | 2 x 1 Low | 1 | [-3.4] | M1 |

Table 8.11.2.1.5-3: Minimum performance CE Mode B MPDCCH

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Test number | Bandwidth  | Aggregation level | Reference Channel | OCNG Pattern | Propagation Condition | Antenna configuration and correlation Matrix  | Reference value | UECategory |
| Pm-dsg (%) | SNR (dB) |
| 1  | 10 MHz | 24 ECCE | R.83 FDD | OP.2 FDD | ETU1 | 2 x 1 Low | 1 | [-9.5] | M1 |

------------------------------------------------- Unchanged sections omitted --------------------------------------------------------

##### 8.11.2.2.5 CE Mode A and CE Mode B when CRS-ChEstMPDCCH-Config is configured

For the parameters specified in Table 8.11.2.2.5-1 the average probability of a missed downlink scheduling grant (Pm-dsg) shall be below the specified value in Table 8.11.2.2.5-2 for CE Mode A and in Table 8.11.2.2.5-3 for CE Mode B. The downlink physical setup is in accordance with Annex C.3.2.

Table 8.11.2.2.5-1: Test Parameters for MPDCCH (Category M1)

|  |  |  |  |
| --- | --- | --- | --- |
| Parameter | Unit | CE Mode A | CE Mode B |
| OFDM starting symbol (startSymbolLC) | symbols | 2 | 2 |
| Unused RE-s and PRB-s |  | OCNG | OCNG |
| Cell ID |  | 0 | 0 |
| Downlink power allocation |  | dB | -3 | 0 |
|  | dB | -3 | 0 |
| σ | dB | 0 | -3 |
| δ | dB | 3 | 0 |
| at antenna port | dBm/15kHz | -98 | -98 |
| Cyclic prefix |  | Normal | Normal |
| Subframe Configuration |  | Non-MBSFN | Non-MBSFN |
| Precoder Update Granularity | PRB | N/A | Not e2 |
| ms | N/A | Note 2 |
| Beamforming Pre-Coder |  | Note 2 | Note 2 |
| Cell Specific Reference Signal |  | Port 0 and 1 | Port 0 and 1 |
| Number of PRB per MPDCCH Set |  | 4 | 2+4 |
| Transmission type |  | Distributed | Localized |
| Frequency hopping |  | Disabled | Enabled |
| Number of frequency hopping narrowbands |  | N/A | 4 |
| Frequency hopping offset  |  | N/A | 1 |
| Frequency hopping interval | ms | N/A | 20 |
| Value of G in MPDCCH start subframe (*mpdcch-startSF-UESS*) (Note 4) |  | 5 | 5 |
| Maximum number of repetitions(*mPDCCH-NumRepetition*) |  | 16 | 32 |
| MPDCCH repetition number |  | 16 | 32 |
| MPDCCH narrowband (*mpdcch-Narrowband*) |  | 1 | 7 |
| PDSCH TM |  | TM2 | TM2 |
| DCI Format |  | 6-1A | 6-1B |
| TDD UL/DL Configuration |  | 0 | 0 |
| TDD Special Subframe |  | 1 | 1 |
| fdd-DownlinkOrTddSubframeBitmapBR |  | 1000010000 | 1000010000 |
| mpdcch-crs-config |  | Configured | Configured |
| Power offset between CRS and DMRS antenna ports of MPDCCH | dB | 0 | 0 |
| mpdcch-crs-localized-mapping-type |  | N/A | Not configured |
| Note 1: For each test, DC subcarrier puncturing shall be considered.Note 2: TS 36.211 6.8B.5Note 3: The special subframes are not supported by MPDCCH and are assumed as non- BL/CE DL subframes.Note 4: For MPDCCH UE-specific search space the formula for the start subframe k0 is given in TS 36.213 [6] clause 9.1.5.Note 5: If not otherwise stated, the values in this table refer to parameters in TS 36.211 [4] or/and TS 36.213 [6] as appropriate. |

Table 8.11.2.2.5-2: Minimum performance CE Mode A MPDCCH

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Test number | Bandwidth  | Aggregation level | Reference Channel | OCNG Pattern | Propagation Condition | Antenna configuration and correlation Matrix  | Reference value | UECategory |
| Pm-dsg (%) | SNR (dB) |
| 1  | 10 MHz | 16 ECCE | R.82 TDD | OP.2 TDD | EPA5 | 2 x 1 Low | 1 | [-4.1] | M1 |

Table 8.11.2.2.5-3: Minimum performance CE Mode B MPDCCH

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Test number | Bandwidth  | Aggregation level | Reference Channel | OCNG Pattern | Propagation Condition | Antenna configuration and correlation Matrix  | Reference value | UECategory |
| Pm-dsg (%) | SNR (dB) |
| 1  | 10 MHz | 24 ECCE | R.83 TDD | OP.2 TDD | ETU1 | 2 x 1 Low | 1 | [-9.7] | M1 |

------------------------------------------------------------- End of change ------------------------------------------------------------