**3GPP TSG-RAN WG4 Meeting #95-e R4-2008760**

**Electronic Meeting, 25th May - 5th Jun, 2020**

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| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| *CR-Form-v12.0* | | | | | | | | |
| **CHANGE REQUEST** | | | | | | | | |
|  | | | | | | | | |
|  | **36.101** | **CR** | **-** | **rev** | **-** | **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 | **x** | Radio Access Network |  | Core Network |  |

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|  | | | | | | | | | | |
| ***Title:*** | CR addition on performance requirements for LTE-based 5G terrestrial broadcast | | | | | | | | | |
|  |  | | | | | | | | | |
| ***Source to WG:*** | Huawei, HiSilicon | | | | | | | | | |
| ***Source to TSG:*** | RAN4 | | | | | | | | | |
|  |  | | | | | | | | | |
| ***Work item code:*** | LTE\_terr\_bcast-Perf | | | | |  | ***Date:*** | | | 2020-05-15 |
|  |  | | | |  | |  | | |  |
| ***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-12 (Release 12)* *Rel-13 (Release 13) Rel-14 (Release 14) Rel-15 (Release 15) Rel-16 (Release 16)* | |
|  |  | | | | | | | | | |
| ***Reason for change:*** | | Add additional performance requirements and test applicability rule for LTE-based 5G terrestrial broadcast | | | | | | | | |
|  | |  | | | | | | | | |
| ***Summary of change:*** | | For LTE-based 5G terrestrial broadcast performance requirements and test applicability rule, add section 10.4. | | | | | | | | |
|  | |  | | | | | | | | |
| ***Consequences if not approved:*** | | The specification will still be unclear for test applicability rule and performance requirements for LTE-based 5G terrestrial broadcast. | | | | | | | | |
|  | |  | | | | | | | | |
| ***Clauses affected:*** | | 10.4 | | | | | | | | |
|  | |  | | | | | | | | |
|  | | **Y** | **N** |  | | | |  | | |
| ***Other specs*** | |  | **x** | Other core specifications | | | | TS/TR ... CR ... | | |
| ***affected:*** | | **x** |  | Test specifications | | | | TS 36.521-1 | | |
| ***(show related CRs)*** | |  | **x** | O&M Specifications | | | | TS/TR ... CR ... | | |
|  | |  | | | | | | | | |
| ***Other comments:*** | |  | | | | | | | | |
|  | |  | | | | | | | | |
| ***This CR's revision history:*** | |  | | | | | | | | |

*<Start of the change>*

## 10.4 FDD with 5G terrestrial broadcast

For all tests in section 10.4 the applicability rules are defined in Table 10.4-1 depending on the capabilities of the UE. The requirements in clause 10.4 are applicable to UEs that support 5G terrestrial broadcast.

Table 10.4-1: 5G terrestrial broadcast tests applicability

|  |  |
| --- | --- |
| Tests | Applicable if UE supports at least the following capability |
| Table 10.4.1.1-2 test 1 | 5G terrestrial broadcast support of *mbms-ScalingFactor0dot37-r16* and *timeSeparationSlot4-r16* |
| Table 10.4.1.1-2 test 2 | 5G terrestrial broadcast support of *mbms-ScalingFactor0dot37-r16* and *timeSeparationSlot2-r16* |
| Table 10.4.1.2-2 test 1 | 5G terrestrial broadcast support of *mbms-ScalingFactor2dot5-r16* |
| Table 10.4.2.1-1 test 1 | 5G terrestrial broadcast support of *mbms-ScalingFactor0dot37-r16*  and 5G terrestrial broadcast support of PBCH repetition in CAS |
| Table 10.4.2.1-1 test 2 | 5G terrestrial broadcast support of *mbms-ScalingFactor2dot5-r16*  and 5G terrestrial broadcast support of PBCH repetition in CAS |

For the requirements defined in this section, the difference between CRS EPRE and the MBSFN RS EPRE should be set to 16dB for subcarrier spacing as 0.37kHz, 7.8 dB for subcarrier spacing as 2.5kHz because the UE demodulation performance might be different when this condition is not met (e.g. in scenarios where power offsets are present, such as scenarios when reserved cells are present).

### 10.4.1 Minimum requirement for PMCH decoding

#### 10.4.1.1 Minimum requirement with 0.37kHz subcarrier spacing

The receive characteristic of MBMS is determined by the BLER.

For the parameters specified in Table 10.4.1.1-1 and Table A.3.8.1-9, the average downlink SNR shall be below the specified value for the BLER shown in Table 10.4.1.1-2.

Table 10.4.1.1-1: Test Parameters for Testing

|  |  |  |  |
| --- | --- | --- | --- |
| Parameter | | Unit |  |
| Downlink power allocation |  | dB | 0 |
|  | dB | 0 (Note 1) |
| σ | dB | 0 |
| at antenna port | | dBm/15kHz | -98 |
| PDSCH transmission mode in PCell | |  | 1 |
| Subcarrier spacing for MBSFN cell | | kHz | 0.37 kHz |
| Bandwidth | | MHz | 10(Note 2) |
| Note 1: .  Note 2: For both Pcell and Scell | | | |

Table 10.4.1.1-2: Minimum performance

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Test number | Cell | Bandwidth (MHz) | Reference Channel | MBSFN RS type | OCNG Pattern | Propagation  condition | Correlation Matrix and antenna | Reference value | | MBMS UE Category |
| BLER (%) | SNR(dB) |
| 1 | PCell | 10 | N/A | N/A | OP.1 FDD | AWGN | 1x1 | N/A | N/A | N/A |
| MBMS Dedicated Cell | 10 | R.106-1 FDD | Type 1 | N/A | MBSFN channel model (Table B.2.6.3-1) | 1x1 | 1 | [TBD] | [TBD] |
| 2 | PCell | 10 | N/A | N/A | OP.1 FDD | AWGN | 1x1 | N/A | N/A | N/A |
| MBMS Dedicated Cell | 10 | R.106-2  FDD | Type 2 | N/A | MBSFN channel model (Table B.2.6.3-1) | 1x1 | 1 | [TBD] | [TBD] |

#### 10.4.1.2 Minimum requirement with 2.5kHz subcarrier spacing

The receive characteristic of MBMS is determined by the BLER.

For the parameters specified in Table 10.4.1.2-1 and Table A.3.8.1-10, the average downlink SNR shall be below the specified value for the BLER shown in Table 10.4.1.2-2.

Table 10.4.1.2-1: Test Parameters for Testing

|  |  |  |  |
| --- | --- | --- | --- |
| Parameter | | Unit |  |
| Downlink power allocation |  | dB | 0 |
|  | dB | 0 (Note 1) |
| σ | dB | 0 |
| at antenna port | | dBm/15kHz | at antenna port |
| PDSCH transmission mode in PCell | |  | 1 |
| Subcarrier spacing for MBSFN cell | | kHz | 2.5 kHz |
| Bandwidth | | MHz | 10(Note 2) |
| Note 1: .  Note 2: For both Pcell and Scell | | | |

Table 10.4.1.2-2: Minimum performance

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Test number | Cell | Bandwidth (MHz) | Reference Channel | OCNG Pattern | Propagation  condition | Correlation Matrix and antenna | Reference value | | MBMS UE Category |
| BLER (%) | SNR(dB) |
| 1 | PCell | 10 | N/A | OP.1 FDD | AWGN | 1x2 low | N/A | N/A | N/A |
| MBMS Dedicated Cell | 10 | R.107 FDD | N/A | MBSFN channel model (Table B.2.6.4-1) | 1x2 low | 1 | [TBD] | ≥2 |

### 10.4.2 Minimum requirement for CAS detection

#### 10.4.2.1 Minimum requirement for PBCH detection

For the parameters specified in Table 8.6.1-1, the average probability of a miss-detected PBCH (Pm-bch) shall be below the specified value in Table 10.4.2.1-1. The downlink physical setup is in accordance with Annex C.3.2.

Table 10.4.2.1-1: Minimum performance

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Test number | Cell | Bandwidth (MHz) | Reference Channel | OCNG Pattern | Propagation  condition | Correlation Matrix and antenna | Reference value | | MBMS UE Category |
| Pm-bch (%) | SNR(dB) |
| 1 | PCell | 10 | N/A | OP.1 FDD | AWGN | 1x1 low | N/A | N/A | N/A |
| MBMS Dedicated Cell | 10 | R.23-1 | N/A | AWGN | 1x1 low | 1 | [-7.2] | [TBD] |
| 2 | PCell | 10 | N/A | OP.1 FDD | AWGN | 1x2 low | N/A | N/A | N/A |
| MBMS Dedicated Cell | 10 | R.23-1 | N/A | EVA 162Hz | 1x2 low | 1 | [-6.7] | ≥2 |

*<End of the change>*