**3GPP TSG-RAN WG4 Meeting #102-e R4-2207258**

**Electronic Meeting, 21st Feb – 3rd Mar, 2022**

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| *CR-Form-v12.2* | | | | | | | | |
| **CHANGE REQUEST** | | | | | | | | |
|  | | | | | | | | |
|  | **38.101-4** | **CR** | **Draft** | **rev** | **-** | **Current version:** | **16.7.0** |  |
|  | | | | | | | | |
| *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)*.* | | | | | | | | |
|  | | | | | | | | |

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| ***Proposed change affects:*** | UICC apps |  | ME | **X** | Radio Access Network |  | Core Network |  |

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | | | | | | | | | | |
| ***Title:*** | Draft CR on correction to test applicability reference for CA performance requirements (TS38.101-4, Rel-16) | | | | | | | | | |
|  |  | | | | | | | | | |
| ***Source to WG:*** | Huawei, HiSilicon | | | | | | | | | |
| ***Source to TSG:*** | R4 | | | | | | | | | |
|  |  | | | | | | | | | |
| ***Work item code:*** | NR\_perf\_enh-Perf | | | | |  | ***Date:*** | | | 2022-02-14 |
|  |  | | | |  | |  | | |  |
| ***Category:*** | **F** |  | | | | | ***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-16 (Release 16) Rel-17 (Release 17) Rel-18 (Release 18) Rel-19 (Release 19)* | |
|  |  | | | | | | | | | |
| ***Reason for change:*** | | There is wrong reference to the applicability rule for normal CA performance requirements. | | | | | | | | |
|  | |  | | | | | | | | |
| ***Summary of change:*** | | For correcting clause reference, update clause 5.2A.2.1 and 5.2A.3.1. | | | | | | | | |
|  | |  | | | | | | | | |
| ***Consequences if not approved:*** | | There will be inconsistence between the specification 38.101-4 and RAN 4 agreements. | | | | | | | | |
|  | |  | | | | | | | | |
| ***Clauses affected:*** | | 5.2A.2.1, 5.2A.3.1 | | | | | | | | |
|  | |  | | | | | | | | |
|  | | **Y** | **N** |  | | | |  | | |
| ***Other specs*** | |  | **x** | Other core specifications | | | | TS/TR ... CR ... | | |
| ***affected:*** | | **X** |  | Test specifications | | | | TS 38.521-4 | | |
| ***(show related CRs)*** | |  | **x** | O&M Specifications | | | | TS/TR ... CR ... | | |
|  | |  | | | | | | | | |
| ***Other comments:*** | |  | | | | | | | | |
|  | |  | | | | | | | | |
| ***This CR's revision history:*** | |  | | | | | | | | |

*<START OF THE CHANGE 1>*

5.2A.2.1 Minimum requirements

For CA with different numbers of DL component carriers, the requirements are defined in Table 5.2A.2.1-4 based on the single carrier requirements for different SCSs and different bandwidth specified in Table 5.2A.2.1-1 ~ Table 5.2A.2.1-3, with the parameters in Table 5.2A-1 ~ Table 5.2A-3 and the downlink physical channel setup according to Annex C.3.1. The performance requirements specified in this sub-cluase do not apply for UE single carrier test.

**Table 5.2A.2.1-1: Single carrier performance for FDD 15 kHz SCS for CA configurations**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Bandwidth (MHz)** | **Reference channel** | **Modulation format and code rate** | **Propagation condition** | **Correlation matrix and antenna configuration** | **Reference value** | |
| **Fraction of maximum throughput (%)** | **SNR (dB)** |
| 5 | R.PDSCH.1-9.1 FDD | 16QAM, 0.48 | TDLA30-10 | 2x2, ULA Low | 70 | 13.6 |
| 10 | R.PDSCH.1-2.2 FDD | 16QAM, 0.48 | TDLA30-10 | 2x2, ULA Low | 70 | 13.6 |
| 15 | R.PDSCH.1-9.2 FDD | 16QAM, 0.48 | TDLA30-10 | 2x2, ULA Low | 70 | 13.6 |
| 20 | R.PDSCH.1-9.3 FDD | 16QAM, 0.48 | TDLA30-10 | 2x2, ULA Low | 70 | 13.8 |
| 25 | R.PDSCH.1-9.4 FDD | 16QAM, 0.48 | TDLA30-10 | 2x2, ULA Low | 70 | 14.0 |
| 30 | R.PDSCH.1-9.5 FDD | 16QAM, 0.48 | TDLA30-10 | 2x2, ULA Low | 70 | 13.8 |
| 40 | R.PDSCH.1-10.1 FDD | 16QAM, 0.48 | TDLA30-10 | 2x2, ULA Low | 70 | 14.0 |
| 50 | R.PDSCH.1-10.2 FDD | 16QAM, 0.48 | TDLA30-10 | 2x2, ULA Low | 70 | 14.4 |

**Table 5.2A.2.1-2 Single carrier performance for TDD 15 kHz SCS for CA configurations**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Bandwidth (MHz)** | **Reference channel** | **Modulation format and code rate** | **Propagation condition** | **Correlation matrix and antenna configuration** | **Reference value** | |
| **Fraction of maximum throughput (%)** | **SNR (dB)** |
| 5 | R.PDSCH.1-2.1 TDD | 16QAM, 0.48 | TDLA30-10 | 2x2, ULA Low | 70 | 13.6 |
| 10 | R.PDSCH.1-2.2 TDD | 16QAM, 0.48 | TDLA30-10 | 2x2, ULA Low | 70 | 13.8 |
| 15 | R.PDSCH.1-2.3 TDD | 16QAM, 0.48 | TDLA30-10 | 2x2, ULA Low | 70 | 13.8 |
| 20 | R.PDSCH.1-2.4 TDD | 16QAM, 0.48 | TDLA30-10 | 2x2, ULA Low | 70 | 13.9 |
| 25 | R.PDSCH.1-2.5 TDD | 16QAM, 0.48 | TDLA30-10 | 2x2, ULA Low | 70 | 14.0 |
| 30 | R.PDSCH.1-3.1 TDD | 16QAM, 0.48 | TDLA30-10 | 2x2, ULA Low | 70 | 13.9 |
| 40 | R.PDSCH.1-3.2 TDD | 16QAM, 0.48 | TDLA30-10 | 2x2, ULA Low | 70 | 14.2 |
| 50 | R.PDSCH.1-3.3 TDD | 16QAM, 0.48 | TDLA30-10 | 2x2, ULA Low | 70 | 14.5 |

**Table 5.2A.2.1-3 Single carrier performance for TDD 30 kHz SCS for CA configurations**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Bandwidth (MHz)** | **Reference channel** | **Modulation format and code rate** | **Propagation condition** | **Correlation matrix and antenna configuration** | **Reference value** | |
| **Fraction of maximum throughput (%)** | **SNR (dB)** |
| 5 | R.PDSCH.2-13.1 TDD | 16QAM, 0.48 | TDLA30-10 | 2x2, ULA Low | 70 | 13.6 |
| 10 | R.PDSCH.2-13.2 TDD | 16QAM, 0.48 | TDLA30-10 | 2x2, ULA Low | 70 | 13.6 |
| 15 | R.PDSCH.2-13.3 TDD | 16QAM, 0.48 | TDLA30-10 | 2x2, ULA Low | 70 | 13.6 |
| 20 | R.PDSCH.2-13.4 TDD | 16QAM, 0.48 | TDLA30-10 | 2x2, ULA Low | 70 | 13.7 |
| 25 | R.PDSCH.2-13.5 TDD | 16QAM, 0.48 | TDLA30-10 | 2x2, ULA Low | 70 | 13.7 |
| 30 | R.PDSCH.2-14.1 TDD | 16QAM, 0.48 | TDLA30-10 | 2x2, ULA Low | 70 | 13.7 |
| 40 | R.PDSCH.2-2.2 TDD | 16QAM, 0.48 | TDLA30-10 | 2x2, ULA Low | 70 | 13.9 |
| 50 | R.PDSCH.2-14.2 TDD | 16QAM, 0.48 | TDLA30-10 | 2x2, ULA Low | 70 | 14.1 |
| 60 | R.PDSCH.2-14.3 TDD | 16QAM, 0.48 | TDLA30-10 | 2x2, ULA Low | 70 | 14.0 |
| 80 | R.PDSCH.2-14.4 TDD | 16QAM, 0.48 | TDLA30-10 | 2x2, ULA Low | 70 | 14.5 |
| 90 | R.PDSCH.2-14.5 TDD | 16QAM, 0.48 | TDLA30-10 | 2x2, ULA Low | 70 | 14.3 |
| 100 | R.PDSCH.2-15.1 TDD | 16QAM, 0.48 | TDLA30-10 | 2x2, ULA Low | 70 | 14.7 |

**Table 5.2A.2.1-4: Minimum performance for multiple CA configurations**

|  |  |  |
| --- | --- | --- |
| **Test number** | **CA duplex mode** | **Minimum performance requirements** |
| 1 | FDD 15 kHz + FDD 15 kHz | As defined in Table 5.2A.2.1-1 |
| 2 | TDD 30 kHz + TDD 30 kHz | As defined in Table 5.2A.2.1-3 |
| 3 | FDD 15 kHz + TDD 30 kHz | As defined in Table 5.2A.2.1-1 and Table 5.2A.2.1-3 per CC |
| 4 | FDD 15 kHz + TDD 15 kHz | As defined in Table 5.2A.2.1-1 and Table 5.2A.2.1-2 per CC |
| 5 | TDD 15 kHz + TDD 30 kHz | As defined in Table 5.2A.2.1-2 and Table 5.2A.2.1-3 per CC |
| Note 1: The applicability of requirements for different CA duplex modes, SCSs, CA configurations and bandwidth combination sets is defined in 5.1.1.7. | | |

*<END OF THE CHANGE 1>*

*<START OF THE CHANGE 2>*

5.2A.3.1 Minimum requirements

For CA with different numbers of DL component carriers, the requirements are defined in Table 5.2A.3.1-4 based on the single carrier requirements for different SCSs and different bandwidth specified in Table 5.2A.3.1-1 ~ Table 5.2A.3.1-3, with the parameters in Table 5.2A-1 ~ Table 5.2A-3 and the downlink physical channel setup according to Annex C.3.1. The performance requirements specified in this sub-cluase do not apply for UE single carrier test.

**Table 5.2A.3.1-1: Single carrier performance for FDD 15 kHz SCS for CA configurations**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Bandwidth (MHz)** | **Reference channel** | **Modulation format and code rate** | **Propagation condition** | **Correlation matrix and antenna configuration** | **Reference value** | |
| **Fraction of maximum throughput (%)** | **SNR (dB)** |
| 5 | R.PDSCH.1-9.1 FDD | 16QAM, 0.48 | TDLA30-10 | 2x4, ULA Low | 70 | [8.5] |
| 10 | R.PDSCH.1-2.2 FDD | 16QAM, 0.48 | TDLA30-10 | 2x4, ULA Low | 70 | [8.5] |
| 15 | R.PDSCH.1-9.2 FDD | 16QAM, 0.48 | TDLA30-10 | 2x4, ULA Low | 70 | [8.6] |
| 20 | R.PDSCH.1-9.3 FDD | 16QAM, 0.48 | TDLA30-10 | 2x4, ULA Low | 70 | [8.6] |
| 25 | R.PDSCH.1-9.4 FDD | 16QAM, 0.48 | TDLA30-10 | 2x4, ULA Low | 70 | [8.7] |
| 30 | R.PDSCH.1-9.5 FDD | 16QAM, 0.48 | TDLA30-10 | 2x4, ULA Low | 70 | [8.6] |
| 40 | R.PDSCH.1-10.1 FDD | 16QAM, 0.48 | TDLA30-10 | 2x4, ULA Low | 70 | [8.7] |
| 50 | R.PDSCH.1-10.2 FDD | 16QAM, 0.48 | TDLA30-10 | 2x4, ULA Low | 70 | [8.9] |

**Table 5.2A.3.1-2: Single carrier performance for TDD 15 kHz SCS for CA configurations**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Bandwidth (MHz)** | **Reference channel** | **Modulation format and code rate** | **Propagation condition** | **Correlation matrix and antenna configuration** | **Reference value** | |
| **Fraction of maximum throughput (%)** | **SNR (dB)** |
| 5 | R.PDSCH.1-2.1 TDD | 16QAM, 0.48 | TDLA30-10 | 2x4, ULA Low | 70 | [8.5] |
| 10 | R.PDSCH.1-2.2 TDD | 16QAM, 0.48 | TDLA30-10 | 2x4, ULA Low | 70 | [8.6] |
| 15 | R.PDSCH.1-2.3 TDD | 16QAM, 0.48 | TDLA30-10 | 2x4, ULA Low | 70 | [8.7] |
| 20 | R.PDSCH.1-2.4 TDD | 16QAM, 0.48 | TDLA30-10 | 2x4, ULA Low | 70 | [8.6] |
| 25 | R.PDSCH.1-2.5 TDD | 16QAM, 0.48 | TDLA30-10 | 2x4, ULA Low | 70 | [8.8] |
| 30 | R.PDSCH.1-3.1 TDD | 16QAM, 0.48 | TDLA30-10 | 2x4, ULA Low | 70 | [8.6] |
| 40 | R.PDSCH.1-3.2 TDD | 16QAM, 0.48 | TDLA30-10 | 2x4, ULA Low | 70 | [8.8] |
| 50 | R.PDSCH.1-3.3 TDD | 16QAM, 0.48 | TDLA30-10 | 2x4, ULA Low | 70 | [9.0] |

**Table 5.2A.3.1-3: Single carrier performance for TDD 30 kHz SCS for CA configurations**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Bandwidth (MHz)** | **Reference channel** | **Modulation format and code rate** | **Propagation condition** | **Correlation matrix and antenna configuration** | **Reference value** | |
| **Fraction of maximum throughput (%)** | **SNR (dB)** |
| 5 | R.PDSCH.2-13.1 TDD | 16QAM, 0.48 | TDLA30-10 | 2x4, ULA Low | 70 | [8.5] |
| 10 | R.PDSCH.2-13.2 TDD | 16QAM, 0.48 | TDLA30-10 | 2x4, ULA Low | 70 | [8.5] |
| 15 | R.PDSCH.2-13.3 TDD | 16QAM, 0.48 | TDLA30-10 | 2x4, ULA Low | 70 | [8.5] |
| 20 | R.PDSCH.2-13.4 TDD | 16QAM, 0.48 | TDLA30-10 | 2x4, ULA Low | 70 | [8.6] |
| 25 | R.PDSCH.2-13.5 TDD | 16QAM, 0.48 | TDLA30-10 | 2x4, ULA Low | 70 | [8.6] |
| 30 | R.PDSCH.2-14.1 TDD | 16QAM, 0.48 | TDLA30-10 | 2x4, ULA Low | 70 | [8.6] |
| 40 | R.PDSCH.2-2.2 TDD | 16QAM, 0.48 | TDLA30-10 | 2x4, ULA Low | 70 | [8.7] |
| 50 | R.PDSCH.2-14.2 TDD | 16QAM, 0.48 | TDLA30-10 | 2x4, ULA Low | 70 | [8.9] |
| 60 | R.PDSCH.2-14.3 TDD | 16QAM, 0.48 | TDLA30-10 | 2x4, ULA Low | 70 | [8.8] |
| 80 | R.PDSCH.2-14.4 TDD | 16QAM, 0.48 | TDLA30-10 | 2x4, ULA Low | 70 | [9.1] |
| 90 | R.PDSCH.2-14.5 TDD | 16QAM, 0.48 | TDLA30-10 | 2x4, ULA Low | 70 | [9.0] |
| 100 | R.PDSCH.2-15.1 TDD | 16QAM, 0.48 | TDLA30-10 | 2x4, ULA Low | 70 | [9.3] |

**Table 5.2A.3.1-4: Minimum performance for multiple CA configurations**

|  |  |  |
| --- | --- | --- |
| **Test number** | **CA duplex mode** | **Minimum performance requirements** |
| 1 | FDD 15 kHz + FDD 15 kHz | As defined in Table 5.2A.3.1-1 |
| 2 | TDD 30 kHz + TDD 30 kHz | As defined in Table 5.2A.3.1-3 |
| 3 | FDD 15 kHz + TDD 30 kHz | As defined in Table 5.2A.3.1-1 and Table 5.2A.3.1-3 per CC |
| 4 | FDD 15 kHz + TDD 15 kHz | As defined in Table 5.2A.3.1-1 and Table 5.2A.3.1-2 per CC |
| 5 | TDD 15 kHz + TDD 30 kHz | As defined in Table 5.2A.3.1-2 and Table 5.2A.3.1-3 per CC |
| Note 1: The applicability of requirements for different CA duplex modes, SCSs, CA configurations and bandwidth combination sets is defined in 5.1.1.7. | | |

*<END OF THE CHANGE 2>*