**3GPP TSG-RAN WG4 Meeting #97-e *R4-2017566***

**E-meeting, 2nd – 13th November 2020**

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| *CR-Form-v12.1* |
| **CHANGE REQUEST** |
|  |
|  | **38.101-4** | **CR** | **0108** | **rev** | **1** | **Current version:** | **16.2.0** |  |
|  |
| *For* [***HELP***](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 on Applicability rules for Normal NR CA demodulation requirements |
|  |  |
| ***Source to WG:*** | Intel Corporation |
| ***Source to TSG:*** | RAN4 |
|  |  |
| ***Work item code:*** | NR\_perf\_enh-Perf |  | ***Date:*** | 2020-10-23 |
|  |  |  |  |  |
| ***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 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-15 (Release 15)Rel-16 (Release 16)Rel-17 (Release 17)Rel-18 (Release 18)* |
|  |  |
| ***Reason for change:*** | Definition of applicability rules for Normal CA requirements |
|  |  |
| ***Summary of change:*** | Added definition of CA capabilities and applicability/test rules for different CA configuration and bandwidth combination sets |
|  |  |
| ***Consequences if not approved:*** | Normal CA requirements are not complited |
|  |  |
| ***Clauses affected:*** | 5.1.1, 7.11 |
|  |  |
|  | **Y** | **N** |  |  |
| ***Other specs*** |  | **X** |  Other core specifications  |  |
| ***affected:*** | **X** |  |  Test specifications | TS 38.521-4  |
| ***(show related CRs)*** |  | **X** |  O&M Specifications |  |
|  |  |
| ***Other comments:*** |  |
|  |  |
| ***This CR's revision history:*** | R4-2016003 |

**START OF CHANGE**

5.1.1 Applicability of requirements

<SKIP UNCHANGED PART>

#### 5.1.1.5 Applicability of CA requirements

##### 5.1.1.5.1 Definition of CA capability

The definition with respect to CA capabilities is given as in Table 5.1.1.5.1-1.

Table 5.1.1.5.1-1: Definition of CA capability

|  |  |
| --- | --- |
| CA Capability | CA Capability Description |
| CA\_C | Intra-band contiguous CA |
| CA\_N | Intra-band non-contiguous CA |
| CA\_AX | Inter-band CA (X bands)  |
| NOTE 1: CA\_C corresponds to NR CA configurations and bandwidth combination sets defined in Clause 5.5A.1 of TS 38.101-1 [6].CA\_N corresponds to NR CA configurations and bandwidth combination sets defined in Clause 5.5A.2 of TS 38.101-1 [6].CA\_AX corresponds to NR CA configurations and bandwidth combination sets defined in Clause 5.5A.3 of TS 38.101-1 [6]. |

##### 5.1.1.5.2 Applicability and test rules for different CA configurations and bandwidth combination sets

The performance requirement for CA UE demodulation tests in Clause 5.2A are defined independent of CA configurations and bandwidth combination sets specified in Clause 5.5A of TS 38.101-1. For UEs supporting different CA configurations and bandwidth combination sets, the applicability and test rules are defined in Table 5.1.1.5.2-1 and Table 5.1.1.5.2-2. For simplicity, CA configuration below refers to combination of CA configuration and bandwidth combination set.

Table 5.1.1.5.2-1: Applicability and test rules for CA UE demodulation tests

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Tests | CA capability where the tests apply | CA configuration from the selected CA capability where the tests apply | CA Bandwidth combination to be tested in priority order | PCell CC configuration |
| Test 1 in Clause 5.2A.2.1 and 5.2A.3.1 | CA\_C, CA\_N, CA\_AX | Table 5.1.1.5.2-2 | Largest aggregated CA bandwidth combination | Any of CCs |
| Test 2 in Clause 5.2A.2.1 and 5.2A.3.1 | CA\_C, CA\_N, CA\_AX | Table 5.1.1.5.2-2 | Largest aggregated CA bandwidth combination | Any of CCs |
| Test 3 in Clause 5.2A.2.1 and 5.2A.3.1 | CA\_AX | Table 5.1.1.5.2-2 | Largest aggregated CA bandwidth combination | TDD CC if supported, otherwise FDD CC |
| Test 4 in Clause 5.2A.2.1 and 5.2A.3.1 (NOTE 2) | CA\_AX | Table 5.1.1.5.2-2 | Largest aggregated CA bandwidth combination | Any of CCs |
| Test 5 in Clause 5.2A.2.1 and 5.2A.3.1 (NOTE 3) | CA\_AX | Table 5.1.1.5.2-2 | Largest aggregated CA bandwidth combination | 15 kHz CC if supported, otherwise 30 kHz CC |
| NOTE 1: In case CA\_AX with different number of X is supported then one or two CA configurations are selected based on procedure from Table 5.1.1.5.2-2.NOTE 2: These scenarios are only tested for UEs which are not verified with Test 3 in Clause 5.2A.2.1 and 5.2A.3.1.NOTE 3: These scenarios are only tested for UEs which are not verified with Test 2 in Clause 5.2A.2.1 and 5.2A.3.1. |

Table 5.1.1.5.2-2: Selection of CA configurations

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| CA capability | Step 1 | Step 2 | Step 3 | Step 4 |
| CA\_C or CA\_N | Select the CA configurations with the maximum number of CCs, for which the supported maximum number of MIMO layers is not lower than 2. | Select any one of CA configurations, which contain CA bandwidth combination with the largest aggregated channel bandwidth and supported maximum data rate is not lower than the tested date rate, among all the selected CA configurations from Step 1. | N/A | N/A |
| CA\_AX | Select the CA configurations with the maximum number of CCs, for which the supported maximum number of MIMO layers is not lower than 2. | Select any one of CA configurations, which contain CA bandwidth combination with the largest aggregated channel bandwidth and supported maximum data rate is not lower than the tested date rate, among all the selected CA configurations from Step 1. | Select the CA configurations with the largest number of bands and with the maximum number of CCs, for which the supported maximum number of MIMO layers is not lower than 2. | Select any one of CA configurations, which contain CA bandwidth combination with the largest aggregated channel bandwidth and supported maximum data rate is not lower than the tested date rate, among all the selected CA configurations from Step 3. |
| NOTE 1: For CA\_AX capability, if CA configuration from step 2 is CA configuration with the largest number of bands then Step 3 and Step 4 are skipped. Otherwise, the two CA configurations selected from Step 2 and Step 4 are used for testing.NOTE 2: Maximum supported data rate for Step 2 and Step 4 is calculated based clause 4.1.2 of TS 38.306 [14].NOTE 3: Tested data rate for Step 2 and Step 4 is calculated based on the equation $DataRate=10^{-3}\sum\_{j=1}^{J}TBS\_{j}2^{μ\_{j}}$ and FRCs used in the test. |

##### 5.1.1.5.3 Antenna connection for CA tests with 4 RX

Within the CA configuration, the UE shall support 2 or 4 RX antenna ports for different RF operating bands, depending on UE declaration. If any of the PCell and/or the SCells is a 4 RX supported RF band, all 4 RX should be connected with data source from system simulator. If any of the PCell and/or the SCells is a 2 RX supported RF band, 2 out of the 4 RX should be connected with data source from system simulator, and the other 2 RX are connected with zero input.

<SKIP UNCHANGED PART>

7.1.1 Applicability of requirements

<SKIP UNCHANGED PART>

#### 7.1.1.5 Applicability of CA requirements

##### 7.1.1.5.1 Definition of CA capability

The definition with respect to CA capabilities is given as in Table 7.1.1.5.1-1.

Table 7.1.1.5.1-1: Definition of CA capability

|  |  |
| --- | --- |
| CA Capability | CA Capability Description |
| CA\_C | Intra-band contiguous CA |
| CA\_N | Intra-band non-contiguous CA |
| CA\_AX | Inter-band CA (X bands)  |
| NOTE 1: CA\_C corresponds to NR CA configurations and bandwidth combination sets defined in Clause 5.5A.1 of TS 38.101-2 [7].CA\_N corresponds to NR CA configurations and bandwidth combination sets defined in Clause 5.5A.2 of TS 38.101-2 [7].CA\_AX corresponds to NR CA configurations and bandwidth combination sets defined in Clause 5.5A.3 of TS 38.101-2 [7]. |

##### 7.1.1.5.2 Applicability and test rules for different CA configurations and bandwidth combination sets

The performance requirement for CA UE demodulation tests in Clause 7.2A are defined independent of CA configurations and bandwidth combination sets specified in Clause 5.5A of TS 38.101-2. For UEs supporting different CA configurations and bandwidth combination sets, the applicability and test rules are defined in Table 7.1.1.5.2-1 and Table 7.1.1.5.2-2. For simplicity, CA configuration below refers to combination of CA configuration and bandwidth combination set.

Table 7.1.1.5.2-1: Applicability and test rules for CA UE demodulation tests

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Tests | CA capability where the tests apply | CA configuration from the selected CA capability where the tests apply | CA Bandwidth combination to be tested in priority order | PCell CC configuration |
| Test 1 in Clause 7.2A.2.1 | CA\_C, CA\_N, CA\_AX | Table 7.1.1.5.2-2 | Largest aggregated CA bandwidth combination | Any of CCs |

Table 7.1.1.5.2-2: Selection of CA configurations

|  |  |  |  |
| --- | --- | --- | --- |
| CA capability | Step 1 | Step 2 | Step 3 |
| CA\_C or CA\_N or CA\_AX | Select CA configuration(s), which contain all CA bandwidth combinations requiring SNR below test equipment maximum achievable SNR | Select the CA configurations with the maximum number of CCs, for which the supported maximum number of MIMO layers is not lower than 2, among all the selected CA configurations from Step 1. | Select any one of CA configurations, which contain CA bandwidth combination with the largest aggregated channel bandwidth and supported maximum data rate is not lower than the tested date rate, among all the selected CA configurations from Step 2. |
| NOTE 2: Maximum supported data rate for Step 3 is calculated based clause 4.1.2 of TS 38.306 [14]NOTE 3: Tested data rate for Step 3 is calculated based on the equation $DataRate=10^{-3}\sum\_{j=1}^{J}TBS\_{j}2^{μ\_{j}}$ and FRCs used in the test. |

**END OF CHANGE**