**3GPP TSG-RAN4 Meeting #101-eR4-2120071**

 **Electronic meeting, 1st Nov – 12th Nov 2021**

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| *CR-Form-v12.1* |
| **CHANGE REQUEST** |
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|  | **38.101-2** | **CR** | **-** | **rev** | **-** | **Current version:** | **15.15.0** |  |
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| *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:***  | Big CR for TS 38.101-2 Maintenance (Rel-15) |
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| ***Source to WG:*** | MCC, OPPO |
| ***Source to TSG:*** | R4 |
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| ***Work item code:*** | NR\_newRAT-Core |  | ***Date:*** | 2021-11-16 |
|  |  |  |  |  |
| ***Category:*** | F |  | ***Release:*** | Rel-15 |
|  | *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)* |
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| ***Reason for change:*** | This big CRs merge the mutiple endorsed draft CRs. The reason for change in each endorsed draft CR is copied below.R4-2118976 Draft CR to correct the requirement of aggregate power tolerance<Reason for change>The core requirement of aggregate power tolerance is defined for two ranges, “Pint ≥ P ≥ Pmin” and “Pmax ≥ P ≥ Pint”, where P is the target power level : the power ranges are overlapping at Pint.R4-2118171 Draft CR to TS 38.101-2: Correction on the CA nominal channel spacing<Reason for change>The channel spacing for intra-band contiguous carrier aggregation can be adjusted less than the nominal channel spacing for both BS the UE. And according to the different specfications below:In TS38.104 spec (For both FR1 and FR2)*“The channel spacing for intra-band contiguous carrier aggregation can be adjusted to* ***any multiple of least common multiple of channel raster and sub-carrier spacing*** *less than the nominal channel spacing to optimize performance in a particular deployment scenario.”*And in TS38.101-1 spec*“The channel spacing for intra-band contiguous carrier aggregation can be adjusted to* ***any multiple of least common multiple of channel raster and sub-carrier spacing*** *less than the nominal channel spacing to optimize performance in a particular deployment scenario.”*However, in current TS38.101-2 spec: *The channel spacing for intra-band contiguous carrier aggregation can be adjusted to* ***any multiple of sub-carrier spacing*** *less than the nominal channel spacing to optimize performance in a particular deployment scenario.*It can be seen that the descriptions in TS38.101-2 are not consistency with the other two specs.Actually, the channel spacing for intra-band contiguous CA needs to guarantee the orthogonality between the two carriers based on LCM{channel raster, SCS} approach. However, the descriptions in TS38.101-2 may not keep this orthogonality may not keep this orthogonality since it is decoupled with channel raster.Therefore, the descriptions in TS38.101-2 needs to be updated from the perspective of the consistency among the specs and guarantee the orthogonality between the two carriers.R4-2118055 Update of FR2 UL MIMO transmit signal quality requirements<Reason for change>FR2 UL MIMO requirements have been defined on a per layer basis. For IBE this should not be the case, since here we compare the emissions of occupied RBs to unoccupied RBs, which must be judged for the whole transmission. Therefore it must be measured in the same way as for single layer.Additionally there is some missing text, that the transmit signal quality requirements are defined in the Tx beam peak direction. |
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| ***Summary of change:*** | The summary of change in each endorsed draft CR is copied below.R4-2118976 Draft CR to correct the requirement of aggregate power tolerance<Summary of change>Correct the title of Table 6.3.4.4-2 from “Pmax ≥ P ≥ Pint” to “Pmax ≥ P > Pint”.R4-2118171 Draft CR to TS 38.101-2: Correction on the CA nominal channel spacing<Summary of change>Updating the descriptions by adding ‘least common multiple of channel raster and ’ in the sentence.R4-2118055 Update of FR2 UL MIMO transmit signal quality requirements<Summary of change>Change IBE requirements to the same metrics as other emission measurements.Added statement that defines the requirements in Tx beam peak direction. |
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| ***Consequences if not approved:*** | The consequences if not approved for each endorsed draft CR are coppied below.R4-2118976 Draft CR to correct the requirement of aggregate power tolerance<Consequences if not approved>Indetermination of which aggregate power tolerance should apply for P = Pint between two values (±3.5dB & ±5.5dB) instead of a single value (±5.5dB).R4-2118171 Draft CR to TS 38.101-2: Correction on the CA nominal channel spacing<Consequences if not approved>non-orthogonal may happen for the two adjacent carriers when the channel spacing for intra-band contiguous CA is adjusted, also inconsistency among the specsR4-2118055 Update of FR2 UL MIMO transmit signal quality requirements<Consequences if not approved>IBE will be measured incorrectly. |
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| ***Clauses affected:*** | 5.4A.1; 6.3.4.4; 6.4D.2 |
|  |  |
|  | **Y** | **N** |  |  |
| ***Other specs*** |  | **X** |  Other core specifications  | TS/TR ... CR ...  |
| ***affected:*** | **X** |  |  Test specifications | TS 38.521-2  |
| ***(show related CRs)*** |  | **X** |  O&M Specifications | TS/TR ... CR ...  |
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| ***Other comments:*** |  |
|  |  |
| ***This CR's revision history:*** |  |

## << Start of change1 >>

## 5.4A Channel arrangement for CA

### 5.4A.1 Channel spacing for CA

For intra-band contiguous carrier aggregation with two or more component carriers, the nominal channel spacing between two adjacent NR component carriers is defined as the following unless stated otherwise:

For NR operating bands with 60kHz channel raster:



with

*n = µ0 – 2*

where BWChannel(1) and BWChannel(2) are the channel bandwidths of the two respective NR component carriers according to Table 5.3.2-1 with values in MHz, o is the largest  value among the subcarrier spacing configurations supported in the operating band for both of the channel bandwidths according to Table 5.3.5-1, and *GBChannel(i)* is the minimum guard band for channel bandwidth *i* according to Table 5.3.3-1 for the said  value, with  as defined in TS 38.211 [9].

The channel spacing for intra-band contiguous carrier aggregation can be adjusted to any multiple of least common multiple of channel raster and sub-carrier spacing less than the nominal channel spacing to optimize performance in a particular deployment scenario.

For intra-band non-contiguous carrier aggregation, the channel spacing between two NR component carriers in different sub-blocks shall be larger than the nominal channel spacing defined in this clause.

## << End of change1 >>

<<Start of change2>>

#### 6.3.4.4 Aggregate power tolerance

The aggregate power control tolerance is the ability of the UE transmitter to maintain its power in a sub-frame (1 ms) during non-contiguous transmissions within 21ms in response to 0 dB TPC commands with respect to the first UE transmission and all other power control parameters as specified in 38.213 kept constant.

The minimum requirements specified in Table 6.3.4.4-1 apply when the power of the target and reference sub-frames are within the power range bounded by the minimum output power as defined in clause 6.3.1 and Pint as defined in clause 6.3.4.2. The minimum requirements specified in Table 6.3.4.4-2 apply when the power of the target and reference sub-frames are within the power range bounded by Pint as defined in clause 6.3.4.2 and the maximum output power as specified in clause 6.2.1.

Table 6.3.4.4-1: Aggregate power tolerance, Pint ≥ P ≥ Pmin

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| --- | --- | --- |
| TPC command | UL channel | Aggregate power tolerance within 21 ms |
| 0 dB | PUCCH | ± 5.5 dB |
| 0 dB | PUSCH | ± 5.5 dB |

Table 6.3.4.4-2: Aggregate power tolerance, Pmax ≥ P > Pint

|  |  |  |
| --- | --- | --- |
| TPC command | UL channel | Aggregate power tolerance within 21 ms |
| 0 dB | PUCCH | ± 3.5 dB |
| 0 dB | PUSCH | ± 3.5 dB |

<<End of change2>>

<<Start of change3>>

### 6.4D.2 Transmit modulation quality for UL MIMO

For UE supporting UL MIMO, the transmit modulation quality requirements are specified per layer in terms of:

 Error Vector Magnitude (EVM) for the allocated resource blocks (RBs)

 EVM equalizer spectrum flatness derived from the equalizer coefficients generated by the EVM measurement process

 Carrier leakage (caused by IQ offset)

For UE supporting UL MIMO, the transmit modulation quality requirements are specified as the total component of EIRP in terms of:

 In-band emissions for the non-allocated RB

The requirements are defined as directional requirements. The requirements are verified in beam locked mode in the TX beam peak direction (Link=TX beam peak direction, Meas=Link angle).

In case the parameter 3300 or 3301 is reported from UE via the parameter *txDirectCurrentLocation* in *UplinkTxDirectCurrentList* IE (as defined in TS 38.331 [13]), carrier leakage measurement requirement in clause 6.4D.2.2 and 6.4D.2.3 shall be waived, and the RF correction with regard to the carrier leakage and IQ image shall be omitted during the calculation of transmit modulation quality.

<<End of change3>>