**3GPP TSG-RAN4 Meeting #102-e *R4-2206294***

**Online Meeting, Feb.-Mar. 2022**

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| *CR-Form-v12.1* |
| **CHANGE REQUEST** |
|  |
|  | **38.101-2** | **CR** |  | **rev** | **-** | **Current version:** | **15.15.0** |  |
|  |
| *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:***  | Draft CR to 38.101-2: missing image location for CA IBE (cat. F) |
|  |  |
| ***Source to WG:*** | Qualcomm Incorporated |
| ***Source to TSG:*** | R4 |
|  |  |
| ***Work item code:*** | NR\_newRAT-Core |  | ***Date:*** | 2022-02-14 |
|  |  |  |  |  |
| ***Category:*** | **F** |  | ***Release:*** | Rel-17 |
|  | *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:*** | Image location detail is present in the single CC IBE requiement, but not present for CA cases. |
|  |  |
| ***Summary of change:*** | Replicate image location detail in the IBE requirement from the single CC case to CA case. |
|  |  |
| ***Consequences if not approved:*** | Image location remains ambigious for CA cases. |
|  |  |
| ***Clauses affected:*** | 6.4A.2.3 |
|  |  |
|  | **Y** | **N** |  |  |
| ***Other specs*** |  | **x** |  Other core specifications  | TS/TR ... CR ...  |
| ***affected:*** |  | **x** |  Test specifications | TS/TR ... CR ...  |
| ***(show related CRs)*** |  | **x** |  O&M Specifications | TS/TR ... CR ...  |
|  |  |
| ***Other comments:*** |  |
|  |  |
| ***This CR's revision history:*** |  |

\*\*\* Begin Change \*\*\*

#### 6.4A.2.3 Inband emissions

##### 6.4A.2.3.1 General

Inband emission requirement is defined over the spectrum occupied by all configured UL and DL CCs. The measurement interval is as defined in clause 6.4.2.4. The requirement is verified with the test metric of In-band emission (Link=TX beam peak direction, Meas=Link angle).

For intra-band contiguous carrier aggregation, the requirements in this clause apply with all component carriers active and with one single contiguous PRB allocation in one of uplink component carriers. The inband emission is defined as the interference falling into the non-allocated resource blocks for all component carriers.

##### 6.4A.2.3.2 Inband emissions for power class 1

The average of the in-band emission measurement over 10 sub-frames shall not exceed the values specified in Table 6.4A.2.3.2-1 for power class 1 UEs.

Table 6.4A.2.3.2-1: Requirements for in-band emissions for power class 1

|  |  |  |  |
| --- | --- | --- | --- |
| Parameter description | Unit | Limit (NOTE 1) | Applicable Frequencies |
| General | dB |  | Any non-allocated RB in allocated component carrier and not allocated component carriers(NOTE 2) |
| IQ Image | dB | -25 | Output power > 27 dBm | Image frequencies (NOTES 2, 3) |
| -20 | Output power ≤ 27 dBm |
| Carrier leakage | dBc | -25 | Output power > 17 dBm  | Carrier frequency (NOTES 4, 5) |
| -20 | 4 dBm ≤ Output power ≤ 17 dBm |
| NOTE 1: An in-band emissions combined limit is evaluated in each non-allocated RB. For each such RB, the minimum requirement is calculated as the higher of (- 25 dB) and the power sum of all limit values (General, IQ Image or Carrier leakage) that apply. is defined in NOTE 9.NOTE 2: The measurement bandwidth is 1 RB and the limit is expressed as a ratio of measured power in one non-allocated RB to the measured average power per allocated RB, where the averaging is done across all allocated RBs. For Pi/2 BPSK with Spectrum Shaping, the limit is expressed as a ratio of measured power in one non-allocated RB to the measured power in the allocated RB with highest PSD.NOTE 3: Image frequencies for UL CA are specified in relation to either UL or DL carrier frequency. The applicable frequencies for this limit are those that are enclosed in the reflection of the allocated bandwidth, based on symmetry with respect to the ~~carrier frequency~~ reported DC location position, but excluding any allocated RBs.NOTE 4: The measurement bandwidth is 1 RB and the limit is expressed as a ratio of measured power in one non-allocated RB to the measured total power in all allocated RBs.NOTE 5: The applicable frequencies for this limit are those that are enclosed in the RBs containing the DC frequency, or in the two RBs immediately adjacent to the DC frequency but excluding any allocated RB.NOTE 6: is the Transmission Bandwidth for kth allocated component carrier (see Figure 5.3.3-1).NOTE 7: EVM s the limit for the modulation format used in the allocated RBs.NOTE 8: is the starting frequency offset between the allocated RB and the measured non-allocated RB (e.g. = 1 or = -1 for the first adjacent RB outside of the allocated bandwidth), and may take non-integer values when the carrier spacing between the CCs is not a multiple of RB.NOTE 9: is an average of the transmitted power over 10 sub-frames normalized by the number of allocated RBs, measured in dBmNOTE 10: All powers are EIRP in beam peak direction. |

##### 6.4A.2.3.3 Inband emissions for power class 2

The average of the in-band emission measurement over 10 sub-frames shall not exceed the values specified in Table 6.4A.2.3.3-1 for power class 2.

Table 6.4A.2.3.3-1: Requirements for in-band emissions for power class 2

|  |  |  |  |
| --- | --- | --- | --- |
| Parameter description | Unit | Limit (NOTE 1) | Applicable Frequencies |
| General | dB |  | Any non-allocated RB in allocated component carrier and not allocated component carriers(NOTE 2) |
| IQ Image | dB | -25 | Output power > 16 dBm | Image frequencies (NOTES 2, 3) |
| -20 | Output power ≤ 16 dBm |
| Carrier leakage | dBc | -25 | Output power > 6 dBm  | Carrier frequency (NOTES 4, 5) |
| -20 | -13 dBm ≤ Output power ≤ 6 dBm |
| NOTE 1: An in-band emissions combined limit is evaluated in each non-allocated RB. For each such RB, the minimum requirement is calculated as the higher of (- 25 dB) and the power sum of all limit values (General, IQ Image or Carrier leakage) that apply. is defined in NOTE 9.NOTE 2: The measurement bandwidth is 1 RB and the limit is expressed as a ratio of measured power in one non-allocated RB to the measured average power per allocated RB, where the averaging is done across all allocated RBs. For Pi/2 BPSK with Spectrum Shaping, the limit is expressed as a ratio of measured power in one non-allocated RB to the measured power in the allocated RB with highest PSD.NOTE 3: Image frequencies for UL CA are specified in relation to either UL or DL carrier frequency. The applicable frequencies for this limit are those that are enclosed in the reflection of the allocated bandwidth, based on symmetry with respect to the reported DC location position, but excluding any allocated RBs.NOTE 4: The measurement bandwidth is 1 RB and the limit is expressed as a ratio of measured power in one non-allocated RB to the measured total power in all allocated RBs.NOTE 5: The applicable frequencies for this limit are those that are enclosed in the RBs containing the DC frequency, or in the two RBs immediately adjacent to the DC frequency but excluding any allocated RB.NOTE 6: is the Transmission Bandwidth for kth allocated component carrier (see Figure 5.3.3-1).NOTE 7: EVM s the limit for the modulation format used in the allocated RBs.NOTE 8: is the starting frequency offset between the allocated RB and the measured non-allocated RB (e.g. = 1 or = -1 for the first adjacent RB outside of the allocated bandwidth), and may take non-integer values when the carrier spacing between the CCs is not a multiple of RB.NOTE 9: is an average of the transmitted power over 10 sub-frames normalized by the number of allocated RBs, measured in dBmNOTE 10: All powers are EIRP in beam peak direction. |

##### 6.4A.2.3.4 Inband emissions for power class 3

The average of the in-band emission measurement over 10 sub-frames shall not exceed the values specified in Table 6.4A.2.3.4-1 for power class 3 UEs.

Table 6.4A.2.3.4-1: Requirements for in-band emissions for power class 3

|  |  |  |  |
| --- | --- | --- | --- |
| Parameter description | Unit | Limit (NOTE 1) | Applicable Frequencies |
| General | dB |  | Any non-allocated RB in allocated component carrier and not allocated component carriers(NOTE 2) |
| IQ Image | dB | -25 | Output power > 10 dBm | Image frequencies (NOTES 2, 3) |
| -20 | Output power ≤ 10 dBm |
| Carrier leakage | dBc | -25 | Output power > 0 dBm  | Carrier frequency (NOTES 4, 5) |
| -20 | -13 dBm ≤ Output power ≤ 0 dBm |
| NOTE 1: An in-band emissions combined limit is evaluated in each non-allocated RB. For each such RB, the minimum requirement is calculated as the higher of (- 25 dB) and the power sum of all limit values (General, IQ Image or Carrier leakage) that apply. is defined in NOTE 9.NOTE 2: The measurement bandwidth is 1 RB and the limit is expressed as a ratio of measured power in one non-allocated RB to the measured average power per allocated RB, where the averaging is done across all allocated RBs. For Pi/2 BPSK with Spectrum Shaping, the limit is expressed as a ratio of measured power in one non-allocated RB to the measured power in the allocated RB with highest PSD.NOTE 3: Image frequencies for UL CA are specified in relation to either UL or DL carrier frequency. The applicable frequencies for this limit are those that are enclosed in the reflection of the allocated bandwidth, based on symmetry with respect to the reported DC location position, but excluding any allocated RBs.NOTE 4: The measurement bandwidth is 1 RB and the limit is expressed as a ratio of measured power in one non-allocated RB to the measured total power in all allocated RBs.NOTE 5: The applicable frequencies for this limit are those that are enclosed in the RBs containing the DC frequency, or in the two RBs immediately adjacent to the DC frequency but excluding any allocated RB.NOTE 6: is the Transmission Bandwidth for kth allocated component carrier (see Figure 5.3.3-1).NOTE 7: EVM s the limit for the modulation format used in the allocated RBs.NOTE 8: is the starting frequency offset between the allocated RB and the measured non-allocated RB (e.g. = 1 or = -1 for the first adjacent RB outside of the allocated bandwidth), and may take non-integer values when the carrier spacing between the CCs is not a multiple of RB.NOTE 9: is an average of the transmitted power over 10 sub-frames normalized by the number of allocated RBs, measured in dBmNOTE 10: All powers are EIRP in beam peak direction. |

##### 6.4A.2.3.5 Inband emissions for power class 4

The average of the in-band emission measurement over 10 sub-frames shall not exceed the values specified in Table 6.4A.2.3.5-1 for power class 4 UEs.

Table 6.4A.2.3.5-1: Requirements for in-band emissions for power class 4

|  |  |  |  |
| --- | --- | --- | --- |
| Parameter description | Unit | Limit (NOTE 1) | Applicable Frequencies |
| General | dB |  | Any non-allocated RB in allocated component carrier and not allocated component carriers(NOTE 2) |
| IQ Image | dB | -25 | Output power > 21 dBm | Image frequencies (NOTES 2, 3) |
| -20 | Output power ≤ 21 dBm |
| Carrier leakage | dBc | -25 | Output power > 11 dBm  | Carrier frequency (NOTES 4, 5) |
| -20 | -13 dBm ≤ Output power ≤ 11 dBm |
| NOTE 1: An in-band emissions combined limit is evaluated in each non-allocated RB. For each such RB, the minimum requirement is calculated as the higher of (- 25 dB) and the power sum of all limit values (General, IQ Image or Carrier leakage) that apply. is defined in NOTE 9.NOTE 2: The measurement bandwidth is 1 RB and the limit is expressed as a ratio of measured power in one non-allocated RB to the measured average power per allocated RB, where the averaging is done across all allocated RBs. For pi/2 BPSK with Spectrum Shaping, the limit is expressed as a ratio of measured power in one non-allocated RB to the measured power in the allocated RB with highest PSD.NOTE 3: Image frequencies for UL CA are specified in relation to either UL or DL carrier frequency. The applicable frequencies for this limit are those that are enclosed in the reflection of the allocated bandwidth, based on symmetry with respect to the reported DC location position, but excluding any allocated RBs.NOTE 4: The measurement bandwidth is 1 RB and the limit is expressed as a ratio of measured power in one non-allocated RB to the measured total power in all allocated RBs.NOTE 5: The applicable frequencies for this limit are those that are enclosed in the RBs containing the DC frequency, or in the two RBs immediately adjacent to the DC frequency but excluding any allocated RB.NOTE 6: is the Transmission Bandwidth for kth allocated component carrier (see Figure 5.3.3-1).NOTE 7: EVM s the limit for the modulation format used in the allocated RBs.NOTE 8: is the starting frequency offset between the allocated RB and the measured non-allocated RB (e.g. = 1 or = -1 for the first adjacent RB outside of the allocated bandwidth), and may take non-integer values when the carrier spacing between the CCs is not a multiple of RB.NOTE 9: is an average of the transmitted power over 10 sub-frames normalized by the number of allocated RBs, measured in dBmNOTE 10: All powers are EIRP in beam peak direction. |

\*\*\* End Change \*\*\*