**3GPP TSG-RAN4 Meeting #107 *R4-2309839***

**Incheon, Korea (Republic Of), 22nd May 2023 - 26th May 2023**

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| *CR-Form-v12.2* |
| **CHANGE REQUEST** |
|  |
|  | **38.104** | **CR** | **0493** | **rev** | **1** | **Current version:** | **15.18.0** |  |
|  |
| *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 |  | Radio Access Network | **X** | Core Network |  |

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| ***Title:***  | CR to 38.104: Correction to ACLR and CACLR requirement |
|  |  |
| ***Source to WG:*** | Ericsson |
| ***Source to TSG:*** |  |
|  |  |
| ***Work item code:*** | NR\_newRAT-Core |  | ***Date:*** | 2023-05-15 |
|  |  |  |  |  |
| ***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-16 (Release 16)Rel-17 (Release 17)Rel-18 (Release 18)Rel-19 (Release 19)* |
|  |  |
| ***Reason for change:*** | For ACLR and CACLR in non-contiguous spectrum or multiple bands, the carriers surrounding a sub-block gap or BS RF Bandwidth gap are referred to as “lowest/highest carrier transmitted”, which is not correct. They should be referred to as “carrier transmitted adjacent to sub-block gap or inter RF Bandwidth gap” (FR1) and as “carrier transmitted adjacent to sub-block gap” (FR2). This also aligns with the title in the “BS adjacent channel centre frequency offset” column of the tables. |
|  |  |
| ***Summary of change:*** | The text reference for BS channel bandwidth in ACLR and CACLR tables for non-contiguous spectrum is changed to “BS channel bandwidth of carrier transmitted adjacent to sub-block gap or inter RF Bandwidth gap” (FR1) and to “BS channel bandwidth of carrier transmitted adjacent to sub-block” (FR2). |
|  |  |
| ***Consequences if not approved:*** | The BS channel bandwidth reference for the ACLR CACLR requirement in non-contiguous spectrum or multiple bands would be incorrect. |
|  |  |
| ***Clauses affected:*** | 6.6.3.2, 9.7.3.3 |
|  |  |
|  | **Y** | **N** |  |  |
| ***Other specs*** |  | **X** |  Other core specifications  |  |
| ***affected:*** | **X** |  |  Test specifications | TS 38.141-1, TS 38.141-2 |
| ***(show related CRs)*** |  | **X** |  O&M Specifications |  |
|  |  |
| ***Other comments:*** |  |
|  |  |
| ***This CR's revision history:*** |  |

#### 6.6.3.2 Limits and *Basic limits*

The ACLR is defined with a square filter of bandwidth equal to the *transmission bandwidth configuration* of the transmitted signal (BWConfig) centred on the assigned channel frequency and a filter centred on the adjacent channel frequency according to the tables below.

For operation in paired and unpaired spectrum, the ACLR shall be higher than the value specified in table 6.6.3.2‑1.

Table 6.6.3.2-1: Base station ACLR limit

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| *BS channel bandwidth* of *lowest/highest carrier* transmitted BWChannel (MHz)  | BS adjacent channel centre frequency offset below the lowest or above the *highest carrier* centre frequency transmitted | Assumed adjacent channel carrier (informative) | Filter on the adjacent channel frequency and corresponding filter bandwidth | ACLR limit |
| 5, 10, 15, 20, 25, 30, 40, 50, 60, 70, 80, 90,100  | BWChannel | NR of same BW (Note 2) | Square (BWConfig) | 45 dB |
| 2 x BWChannel | NR of same BW (Note 2) | Square (BWConfig) | 45 dB |
| BWChannel /2 + 2.5 MHz | 5 MHz E-UTRA | Square (4.5 MHz) | 45 dB (Note 3) |
| BWChannel /2 + 7.5 MHz | 5 MHz E-UTRA | Square (4.5 MHz) | 45 dB (Note 3) |
| NOTE 1: BWChannel and BWConfig are the *BS channel bandwidth* and *transmission bandwidth configuration* of the *lowest/highest carrier* transmitted on the assigned channel frequency.NOTE 2: With SCS that provides largest *transmission bandwidth configuration* (BWConfig).NOTE 3: The requirements are applicable when the band is also defined for E-UTRA or UTRA. |

The ACLR absolute *basic limit* is specified in table 6.6.3.2‑2.

Table 6.6.3.2-2: Base station ACLR absolute *basic limit*

|  |  |
| --- | --- |
| BS category / BS class | ACLR absolute *basic limit* |
| Category A Wide Area BS | -13 dBm/MHz |
| Category B Wide Area BS | -15 dBm/MHz |
| Medium Range BS | -25 dBm/MHz |
| Local Area BS | -32 dBm/MHz |

For operation in *non-contiguous spectrum* or multiple bands, the ACLR shall be higher than the value specified in Table 6.6.3.2‑2a.

Table 6.6.3.2-2a: Base Station ACLR limit in *non-contiguous spectrum* or multiple bands

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| *BS channel bandwidth* of *carrier* transmitted adjacent to s*ub-block gap* or *inter RF Bandwidth gap* BWChannel (MHz)  | *Sub-block* or *Inter RF Bandwidth gap* size (Wgap) where the limit applies (MHz) | BS adjacent channel centre frequency offset below or above the *sub-block* or *Base Station RF Bandwidth edge* (inside the gap) | Assumed adjacent channel carrier | Filter on the adjacent channel frequency and corresponding filter bandwidth | ACLR limit |
| 5, 10, 15, 20 | Wgap ≥ 15 (Note 3)Wgap ≥ 45 (Note 4) | 2.5 MHz | 5 MHz NR (Note 2) | Square (BWConfig) | 45 dB |
| Wgap ≥ 20 (Note 3)Wgap ≥ 50 (Note 4) | 7.5 MHz | 5 MHz NR (Note 2) | Square (BWConfig) | 45 dB |
| 25, 30, 40, 50, 60, 70, 80, 90, 100 | Wgap ≥ 60 (Note 4)Wgap ≥ 30 (Note 3)  | 10 MHz | 20 MHz NR (Note 2) | Square (BWConfig) | 45 dB |
| Wgap ≥ 80 (Note 4)Wgap ≥ 50 (Note 3) | 30 MHz | 20 MHz NR (Note 2) | Square (BWConfig) | 45 dB |
| NOTE 1: BWConfig is the *transmission bandwidth configuration* of the assumed adjacent channel carrier.NOTE 2: With SCS that provides largest *transmission bandwidth configuration* (BWConfig).NOTE 3: Applicable in case the *BS channel bandwidth* of the NR carrier transmitted at the other edge of the gap is 5, 10, 15, 20 MHz.NOTE 4: Applicable in case the *BS channel bandwidth* of the NR carrier transmitted at the other edge of the gap is 25, 30, 40, 50, 60, 70, 80, 90, 100 MHz. |

The Cumulative Adjacent Channel Leakage power Ratio (CACLR) in a *sub-block* gap or the *Inter RF Bandwidth* *gap* is the ratio of:

a) the sum of the filtered mean power centred on the assigned channel frequencies for the two carriers adjacent to each side of the *sub-block gap* or the *Inter RF Bandwidth gap*, and

b) the filtered mean power centred on a frequency channel adjacent to one of the respective *sub-block* edges or *Base Station RF Bandwidth edges*.

The assumed filter for the adjacent channel frequency is defined in table 6.6.3.2-3 and the filters on the assigned channels are defined in table 6.6.3.2-4.

For operation in *non-contiguous spectrum* or multiple bands, the CACLR for NR carriers located on either side of the *sub-block* gap or the *Inter RF Bandwidth gap* shall be higher than the value specified in table 6.6.3.2-3.

Table 6.6.3.2-3: Base Station CACLR limit

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| *BS channel bandwidth* of *carrier* transmitted adjacent to s*ub-block gap* or *inter RF Bandwidth gap* BWChannel (MHz)  | *Sub-block* or *Inter RF Bandwidth gap* size (Wgap) where the limit applies (MHz) | BS adjacent channel centre frequency offset below or above the *sub-block* or *Base Station RF Bandwidth* edge (inside the gap) | Assumed adjacent channel carrier | Filter on the adjacent channel frequency and corresponding filter bandwidth | CACLR limit |
| 5, 10, 15, 20 | 5 ≤Wgap < 15 (Note 3)5 ≤Wgap < 45 (Note 4) | 2.5 MHz | 5 MHz NR (Note 2) | Square (BWConfig) | 45 dB |
| 10 < Wgap < 20 (Note 3)10 ≤Wgap < 50 (Note 4) | 7.5 MHz | 5 MHz NR (Note 2) | Square (BWConfig) | 45 dB |
| 25, 30, 40, 50, 60, 70, 80,90, 100 | 20 ≤Wgap < 60 (Note 4)20 ≤Wgap < 30 (Note 3) | 10 MHz | 20 MHz NR (Note 2) | Square (BWConfig) | 45 dB |
| 40 < Wgap < 80 (Note 4)40 ≤Wgap < 50 (Note 3) | 30 MHz | 20 MHz NR (Note 2) | Square (BWConfig) | 45 dB |
| NOTE 1: BWConfig is the *transmission bandwidth configuration* of the assumed adjacent channel carrier.NOTE 2: With SCS that provides largest *transmission bandwidth configuration* (BWConfig).NOTE 3: Applicable in case the *BS channel bandwidth* of the NR carrier transmitted at the other edge of the gap is 5, 10, 15, 20 MHz.NOTE 4: Applicable in case the *BS channel bandwidth* of the NR carrier transmitted at the other edge of the gap is 25, 30, 40, 50, 60, 70, 80, 90, 100 MHz. |

The CACLR absolute *basic limit* is specified in table 6.6.3.2‑3a.

Table 6.6.3.2-3a: Base station CACLR absolute *basic limit*

|  |  |
| --- | --- |
| BS category / BS class | CACLR absolute *basic limit* |
| Category A Wide Area BS | -13 dBm/MHz |
| Category B Wide Area BS | -15 dBm/MHz |
| Medium Range BS | -25 dBm/MHz |
| Local Area BS | -32 dBm/MHz |

Table 6.6.3.2-4: Filter parameters for the assigned channel

|  |  |
| --- | --- |
| RAT of the carrier adjacent to the *sub-block* or *Inter RF Bandwidth gap*  | Filter on the assigned channel frequency and corresponding filter bandwidth |
| NR | NR of same BW with SCS that provides largest *transmission bandwidth configuration* |

\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*End of change\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*Next changed section\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

#### 9.7.3.3 Minimum requirement for *BS type 2-O*

The OTA ACLR limit is specified in table 9.7.3.3-1.

The OTA ACLR absolute limit is specified in table 9.7.3.3-2.

The OTA ACLR (CACLR) absolute limit in table 9.7.3.3-2 or 9.7.3.3-4a or the ACLR (CACLR) limit in table 9.7.3.3-1, 9.7.3.3-3 or 9.7.3.3-4, whichever is less stringent, shall apply.

For a *RIB* operating in multi-carrier or contiguous CA, the OTA ACLR requirements in table 9.7.3.3-1 shall apply to *BS channel bandwidths* of the outermost carrier for the frequency ranges defined in the table.For a RIB operating in *non-contiguous spectrum*, the OTA ACLR requirement in table 9.7.3.3-3 shall apply in *sub-block gaps* for the frequency ranges defined in the table, while the OTA CACLR requirement in table 9.7.3.3-4 shall apply in *sub-block gaps* for the frequency ranges defined in the table.

The CACLR in a *sub-block gap* is the ratio of:

a) the sum of the filtered mean power centred on the assigned channel frequencies for the two carriers adjacent to each side of the *sub-block gap*, and

b) the filtered mean power centred on a frequency channel adjacent to one of the respective *sub-block* edges.

The assumed filter for the adjacent channel frequency is defined in table 9.7.3.3-4 and the filters on the assigned channels are defined in table 9.7.3.3-5.

For operation in *non-contiguous spectrum*, the CACLR for NR carriers located on either side of the *sub-block gap* shall be higher than the value specified in table 9.7.3.3-4.

Table 9.7.3.3-1: *BS type 2-O* ACLR limit

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| *BS channel bandwidth* of *lowest/highest carrier* transmittedBWChannel (MHz) | BS adjacent channel centre frequency offset below the lowest or above the highest carrier centre frequency transmitted | Assumed adjacent channel carrier | Filter on the adjacent channel frequency and corresponding filter bandwidth | ACLR limit(dB) |
| 50, 100, 200, 400 | BWChannel | NR of same BW (Note 2) | Square (BWConfig) | 28 (Note 3)26 (Note 4) |
| NOTE 1: BWChannel and BWConfig are the *BS channel bandwidth* and *transmission bandwidth configuration* of the *lowest/highest carrier* transmitted on the assigned channel frequency.NOTE 2: With SCS that provides largest *transmission bandwidth configuration* (BWConfig).NOTE 3: Applicable to bands defined within the frequency spectrum range of 24.25 – 33.4 GHzNOTE 4: Applicable to bands defined within the frequency spectrum range of 37 – 52.6 GHz |

Table 9.7.3.3-2: *BS type 2-O* ACLR absolute limit

|  |  |
| --- | --- |
| BS class | ACLR absolute limit |
| Wide area BS | -13 dBm/MHz |
| Medium range BS | -20 dBm/MHz |
| Local area BS | -20 dBm/MHz |

Table 9.7.3.3-3: *BS type 2-O* ACLR limit in *non-contiguous spectrum*

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| *BS channel bandwidth* of *carrier* transmitted adjacent to s*ub-block gap* (MHz) | *Sub-block gap* size (Wgap) where the limit applies (MHz) | BS adjacent channel centre frequency offset below or above the *sub-block* edge (inside the gap) | Assumed adjacent channel carrier | Filter on the adjacent channel frequency and corresponding filter bandwidth | ACLR limit |
| 50, 100 | Wgap ≥ 100 (Note 5)Wgap ≥ 250 (Note 6) | 25 MHz | 50 MHz NR (Note 2) | Square (BWConfig) | 28 (Note 3)26 (Note 4) |
| 200, 400 | Wgap ≥ 400 (Note 6)Wgap ≥ 250 (Note 5)  | 100 MHz | 200 MHz NR (Note 2) | Square (BWConfig) | 28 (Note 3)26 (Note 4) |
| NOTE 1: BWConfig is the *transmission bandwidth configuration* of the assumed adjacent channel carrier.NOTE 2: With SCS that provides largest *transmission bandwidth configuration* (BWConfig).NOTE 3: Applicable to bands defined within the frequency spectrum range of 24.25 – 33.4 GHz.NOTE 4: Applicable to bands defined within the frequency spectrum range of 37 – 52.6 GHz.NOTE 5: Applicable in case the *BS channel bandwidth* of the NR carrier transmitted at the other edge of the gap is 50 or 100 MHz.NOTE 6: Applicable in case the *BS channel bandwidth* of the NR carrier transmitted at the other edge of the gap is 200 or 400 MHz. |

Table 9.7.3.3-4: *BS type 2-O* CACLR limit in *non-contiguous spectrum*

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| *BS channel bandwidth* of *carrier* transmitted adjacent to s*ub-block gap* (MHz)  | *Sub-block gap* size (Wgap) where the limit applies (MHz) | BS adjacent channel centre frequency offset below or above the *sub-block* edge (inside the gap) | Assumed adjacent channel carrier | Filter on the adjacent channel frequency and corresponding filter bandwidth | CACLR limit |
| 50, 100 | 50 ≤Wgap < 100 (Note 5)50 ≤Wgap < 250 (Note 6) | 25 MHz | 50 MHz NR (Note 2) | Square (BWConfig) | 28 (Note 3)26 (Note 4) |
| 200, 400 | 200 ≤Wgap < 400 (Note 6)200 ≤Wgap < 250 (Note 5) | 100 MHz | 200 MHz NR (Note 2) | Square (BWConfig) | 28 (Note 3)26 (Note 4) |
| NOTE 1: BWConfig is the *transmission bandwidth configuration* of the assumed adjacent channel carrier.NOTE 2: With SCS that provides largest *transmission bandwidth configuration* (BWConfig).NOTE 3: Applicable to bands defined within the frequency spectrum range of 24.25 – 33.4 GHz.NOTE 4: Applicable to bands defined within the frequency spectrum range of 37 – 52.6 GHz.NOTE 5: Applicable in case the *BS channel bandwidth* of the NR carrier transmitted at the other edge of the gap is 50 or 100 MHz.NOTE 6: Applicable in case the *BS channel bandwidth* of the NR carrier transmitted at the other edge of the gap is 200 or 400 MHz. |

Table 9.7.3.3-4a: *BS type 2-O* CACLR absolute limit

|  |  |
| --- | --- |
| BS class | CACLR absolute limit |
| Wide area BS | -13 dBm/MHz |
| Medium range BS | -20 dBm/MHz |
| Local area BS | -20 dBm/MHz |

Table 9.7.3.3-5: Filter parameters for the assigned channel

|  |  |
| --- | --- |
| RAT of the carrier adjacent to the *sub-block gap*  | Filter on the assigned channel frequency and corresponding filter bandwidth |
| NR | NR of same BW with SCS that provides largest *transmission bandwidth configuration* |