**3GPP TSG-WG4 Meeting #113**

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| *CR-Form-v12.3* | | | | | | | | |
| **CHANGE REQUEST** | | | | | | | | |
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|  |  | **CR** | **0098** | **rev** | **1** | **Current version:** |  |  |
|  | | | | | | | | |
| *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:*** |  | | | | | | | | | |
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| ***Source to WG:*** |  | | | | | | | | | |
| ***Source to TSG:*** |  | | | | | | | | | |
|  |  | | | | | | | | | |
| ***Work item code:*** | NR\_netcon\_repeater-Core | | | | |  | ***Date:*** | | |  |
|  |  | | | |  | |  | | |  |
| ***Category:*** | F |  | | | | | ***Release:*** | | |  |
|  | *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-17 (Release 17) Rel-18 (Release 18) Rel-19 (Release 19)  Rel-20 (Release 20)* | |
|  |  | | | | | | | | | |
| ***Reason for change:*** | | For simultaneous NCR-Fwd and NCR-MT transmission cases, ACLR requirements may not be specified. | | | | | | | | |
|  | |  | | | | | | | | |
| ***Summary of change:*** | | Modify the notes in the ACLR limit tables to make the nominal channel bandwidth to be the possible widest channel bandwidth of the NCR-Fwd carrier. | | | | | | | | |
|  | |  | | | | | | | | |
| ***Consequences if not approved:*** | | ACLR requirements may remain not be specified for simultaneous NCR-Fwd and NCR-MT transmission cases. | | | | | | | | |
|  | |  | | | | | | | | |
| ***Clauses affected:*** | | 6.5.2.2, 7.5.2.2 | | | | | | | | |
|  | |  | | | | | | | | |
|  | | **Y** | **N** |  | | | |  | | |
| ***Other specs*** | |  | **x** | Other core specifications | | | | TS/TR ... CR ... | | |
| ***affected:*** | | **x** |  | Test specifications | | | | TS 38.115-1, 38.115-2 | | |
| ***(show related CRs)*** | |  | **x** | O&M Specifications | | | | TS/TR ... CR ... | | |
|  | |  | | | | | | | | |
| ***Other comments:*** | |  | | | | | | | | |
|  | |  | | | | | | | | |
| ***This CR's revision history:*** | | Updated the text in the note for the case NCR-MT is adjacent to the passband. | | | | | | | | |

**--------------Start of change-------------**

### 6.5.2 Adjacent Channel Leakage Power Ratio

#### 6.5.2.1 General

Adjacent Channel Leakage power Ratio (ACLR) is the ratio of the filtered mean power centred on the assigned channel frequency to the filtered mean power centred on an adjacent channel frequency.

The requirements shall apply outside the *repeater type 1-C passband* whatever the type of transmitter considered (single carrier or multi-carrier) and for all transmission modes foreseen by the manufacturer’s specification.

For a *repeater* operating in *non-contiguous spectrum*, the ACLR requirement in clause 6.5.2.2 shall apply in *Gaps between passbands* for the frequency ranges defined in table 6.5.2.2-3, while the CACLR requirement in clause 6.5.2.2 shall apply in *gaps between passbands* for the frequency ranges defined in table 6.5.2.2-4.

For a *multi-band connector*, the ACLR requirement in clause 6.5.2.2 shall apply in *inter-passband gaps* for the frequency ranges defined in table 6.5.2.2-3, while the CACLR requirement in clause 6.5.2.2 shall apply in *inter-passband gaps* for the frequency ranges defined in table 6.5.2.2-4.

The requirement shall apply during the *transmitter ON state*.

#### 6.5.2.2 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 DL (all repeater classes), and for UL for WA class, either the ACLR (CACLR) absolute *basic limits* in table 6.5.2.2-2, 6.5.2.2-5 or else the relevant the ACLR (CACLR) *limits* in table 6.5.2.2-1, 6.5.2.2-3 or 6.5.2.2-4, whichever is less stringent, shall apply for each *antenna connector*. For UL for LA class, the ACLR (CACLR) and *basic limits* in table 6.5.2.2-1a, 6.5.2.2-3 or 6.5.2.2-4a shall apply.

Table 6.5.2.2-1: ACLR limit for DL (all repeater classes) and for UL for Wide Area class

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| nominal channel bandwidth BWNominal (MHz) (NOTE 5) | *Repeater type 1-C* adjacent channel centre frequency offset below or above the passband edge | **Assumed adjacent channel carrier (informative)** | **Filter on the adjacent channel frequency and corresponding filter bandwidth** | **ACLR limit** |
| 5, 10, 15, 20, 25, 30, 35, 40, 45, 50, 60, 70, 80, 90, 100 | BWNominal/2 | NR of same BW (Note 2) | Square (BWConfig) | 45 dB  38 dB (Note 4) |
|  | 1.5 x BWNominal | NR of same BW (Note 2) | Square (BWConfig) | 45 dB  38 dB  (Note 4) |
|  | 2.5 MHz | 5 MHz E-UTRA | Square (4.5 MHz) | 45 dB (Note 3) |
|  | 7.5 MHz | 5 MHz E-UTRA | Square (4.5 MHz) | 45 dB (Note 3) |
| NOTE 1: BWNominal is the *nominal channel bandwidth.*BWConfigis the *transmission bandwidth configuration* assumed for the adjacent channel.  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.  NOTE 4: For repeater operating in band n104, ACLR requirement 38 dB applies. For repeater operating in other bands, ACLR requirement 45 dB applies.  NOTE 5: For simultaneous NCR-Fwd and NCR-MT transmission, if the NCR-MT carrier is within the passband then the nominal channel bandwidth shall be calculated based on the the bandwidth between the lower edge of the passband and the lower edge of the NCR-MT carrier for lower side, or between the upper edge of the passband and the upper edge of the NCR-MT carrier for upper side. If the NCT-MT carrier is adjacent to the passband then ACLR requirement for NCR-MT based on NCR-MT channel bandwidth shall be applied for the NCR-MT carrier side and the nominal channel bandwidth calculated with the passband bandwidth shall be used for the passband side. If the NCR-MT carrier is not adjacent to the passband then CACLR shall be applied in the gap between the passband and the NCR-MT carrier. | | | | |

Table 6.5.2.2-1a: ACLR limit for UL for Local Area

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| nominal channel bandwidth BWNominal (MHz) (NOTE 4) | *Repeater type 1-C* adjacent channel centre frequency offset below or above the passband edge | Assumed adjacent channel carrier (informative) | Filter on the adjacent channel frequency and corresponding filter bandwidth | ACLR limit |
| 5, 10, 15, 20, 25, 30, 35, 40, 45, 50, 60, 70, 80, 90, 100 | BWNominal/2 | NR of same BW (Note 2) | Square (BWConfig) | 31 dB |
|  | 1.5 x BWNominal | NR of same BW (Note 2) | Square (BWConfig) | 31 dB |
|  | 2.5 MHz | 5 MHz E-UTRA | Square (4.5 MHz) | 31 dB |
|  | 7.5 MHz | 5 MHz E-UTRA | Square (4.5 MHz) | 31 dB |
| NOTE 1: BWNominal is the *nominal channel bandwidth.*BWConfigis the *transmission bandwidth configuration* assumed for the adjacent channel.  NOTE 2: With SCS that provides the largest *transmission bandwidth configuration* (BWConfig).  NOTE 3: The requirements are applicable when the band is also defined for E-UTRA or UTRA.  NOTE 4: For simultaneous NCR-Fwd and NCR-MT transmission, if the NCR-MT carrier is within the passband then the nominal channel bandwidth shall be calculated based on the the bandwidth between the lower edge of the passband and the lower edge of the NCR-MT carrier for lower side, or between the upper edge of the passband and the upper edge of the NCR-MT carrier for upper side. If the NCT-MT carrier is adjacent to the passband then ACLR requirement for NCR-MT based on NCR-MT channel bandwidth shall be applied for the NCR-MT carrier side and the nominal channel bandwidth calculated with the passband bandwidth shall be used for the passband side. If the NCR-MT carrier is not adjacent to the passband then CACLR shall be applied in the gap between the passband and the NCR-MT carrier. | | | | |

The ACLR absolute *basic limit* is specified in table 6.5.2.2‑2 and is applicable for both contiguous spectrum, non-contiguous spectrum and multiple bands

Table 6.5.2.2-2: ACLR absolute *basic* limits for DL and UL for WA class, for DL for MR class and for DL for LA class

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

Table 6.5.2.2-3: ACLR limit in non-contiguous spectrum or multiple bands for DL (all repeater classes) and for UL for Wide Area class

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| nominal channel bandwidth BWNominal (MHz) (NOTE 6) | *Gap between passbands* or inter-*passband* *gap* size (Wgap) where the limit applies (MHz) | *Repeater type 1-C* adjacent channel centre frequency offset below or above the passband 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  38 dB (Note 5) |
|  | Wgap ≥ 20 (Note 3)  Wgap ≥ 50 (Note 4) | 7.5 MHz | 5 MHz NR (Note 2) | Square (BWConfig) | 45 dB  38 dB (Note 5) |
| 25, 30, 35, 40, 45, 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  38 dB (Note 5) |
|  | Wgap ≥ 80 (Note 4)  Wgap ≥ 50 (Note 3) | 30 MHz | 20 MHz NR (Note 2) | Square (BWConfig) | 45 dB  38 dB (Note 5) |
| NOTE 1: BWNominal is the *nominal channel bandwidth.*BWConfigis the *transmission bandwidth configuration* assumed for the adjacent channel.  NOTE 2: With SCS that provides the largest *transmission bandwidth configuration* (BWConfig).  NOTE 3: Applicable in case the *repeater type 1-C nominal channel bandwidth* at the other edge of the gap is ≤ 20 MHz.  NOTE 4: Applicable in case the *repeater type 1-C nominal channel bandwidth* at the other edge of the gap is > 20 MHz.  NOTE 5: For repeater operating in band n104, ACLR requirement 38 dB applies. For repeater operating in other bands, ACLR requirement 45 dB applies.  NOTE 6: For simultaneous NCR-Fwd and NCR-MT transmission, if the NCR-MT carrier is within the passband then the nominal channel bandwidth shall be calculated based on the the bandwidth between the lower edge of the passband and the lower edge of the NCR-MT carrier for lower side, or between the upper edge of the passband and the upper edge of the NCR-MT carrier for upper side. If the NCT-MT carrier is adjacent to the passband then ACLR requirement for NCR-MT based on NCR-MT channel bandwidth shall be applied for the NCR-MT carrier side and the nominal channel bandwidth calculated with the passband bandwidth shall be used for the passband side. If the NCR-MT carrier is not adjacent to the passband then CACLR shall be applied in the gap between the passband and the NCR-MT carrier. | | | | | |

Table 6.5.2.2-3a: ACLR limit in non-contiguous spectrum or multiple bands for UL for Local Area class

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| nominal channel bandwidth BWNominal (MHz) (NOTE 5) | Sub-block or inter-*passband* *gap* size (Wgap) where the limit applies (MHz) | *Repeater type 1-C* adjacent channel centre frequency offset below or above the passband 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) | 31 dB |
|  | Wgap ≥ 20 (Note 3)  Wgap ≥ 50 (Note 4) | 7.5 MHz | 5 MHz NR (Note 2) | Square (BWConfig) | 31 dB |
| 25, 30, 35, 40, 45, 50, 60, 70, 80, 90, 100 | Wgap ≥ 60 (Note 4)  Wgap ≥ 30 (Note 3) | 10 MHz | 20 MHz NR (Note 2) | Square (BWConfig) | 31 dB |
|  | Wgap ≥ 80 (Note 4)  Wgap ≥ 50 (Note 3) | 30 MHz | 20 MHz NR (Note 2) | Square (BWConfig) | 31 dB |
| NOTE 1: BWConfig is the *transmission bandwidth configuration* assumed for the adjacent channel.  NOTE 2: With SCS that provides the largest *transmission bandwidth configuration* (BWConfig).  NOTE 3: Applicable in case the *repeater type 1-C nominal channel bandwidth* at the other edge of the gap is ≤ 20 MHz.  NOTE 4: Applicable in case the *repeater type 1-C nominal channel bandwidth* at the other edge of the gap is > 20 MHz.  NOTE 5: For simultaneous NCR-Fwd and NCR-MT transmission, if the NCR-MT carrier is within the passband then the nominal channel bandwidth shall be calculated based on the the bandwidth between the lower edge of the passband and the lower edge of the NCR-MT carrier for lower side, or between the upper edge of the passband and the upper edge of the NCR-MT carrier for upper side. If the NCT-MT carrier is adjacent to the passband then ACLR requirement for NCR-MT based on NCR-MT channel bandwidth shall be applied for the NCR-MT carrier side and the nominal channel bandwidth calculated with the passband bandwidth shall be used for the passband side. If the NCR-MT carrier is not adjacent to the passband then CACLR shall be applied in the gap between the passband and the NCR-MT carrier. | | | | | |

**--------------Next change-------------**

### 7.5.2 OTA Adjacent Channel Leakage Power Ratio (ACLR)

#### 7.5.2.1 General

OTA Adjacent Channel Leakage power Ratio (ACLR) is the ratio of the filtered mean power centred on the assigned channel frequency to the filtered mean power centred on an adjacent channel frequency. The measured power is TRP.

The requirement shall be applied per RIB during the *transmitter ON state*.

#### 7.5.2.2 Minimum requirement for *NR Repeater*

The OTA ACLR limit is specified in table 7.5.2.2-1 for DL and UL for Wide Area class and DL for Local Area class.

The OTA ACLR limit is specified in table 7.5.2.2-1a for UL for Local Area class.

The OTA ACLR absolute limit is specified in table 7.5.2.2-2.

Either the OTA ACLR (CACLR) absolute limit in table 7.5.2.2-2 or 7.5.2.2-5 or the relevant ACLR (CACLR) limit in table 7.5.2.2-1, 7.5.2.2-1a, 7.5.2.2-3, 7.5.5.2-3a, 7.5.2.2-4 or 7.5.2.2-4a, whichever is less stringent, shall apply.

For a RIB operating in *non-contiguous spectrum*, the OTA ACLR requirement in table 7.5.2.2-3 shall apply in *gaps between passbands* for the frequency ranges defined in the table, while the OTA CACLR requirement in table 7.5.2.2-4 shall apply in *gaps between passbands* for the frequency ranges defined in the table.

The CACLR in a *gap between passbands* 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 *gap between passbands*, and

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

The assumed filter for the adjacent channel frequency is defined in table 7.5.2.2-4 and the filters on the assigned channels are defined in table 7.5.2.2-6.

For operation in *non-contiguous spectrum*, the CACLR for NR carriers located on either side of the *gap between passbands* shall be higher than the value specified in table 7.5.2.2-4.

Table 7.5.2.2-1: *Repeater type 2-O* ACLR limit for DL and UL for WA class and DL for LA class

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Repeater nominal channel bandwidth BWNominal (MHz) | Repeater adjacent channel centre frequency offset below or above the passband edge | **Assumed adjacent channel carrier** | **Filter on the adjacent channel frequency and corresponding filter bandwidth** | **ACLR limit**  **(dB)** |
| 50, 100, 200, 400 | BWNominal/2 | NR of same BW (Note 2) | Square (BWConfig) | 28 (Note 3)  26 (Note 4) |
| NOTE 1: BWNominal is the *nominal channel bandwidth.*BWConfigis the *transmission bandwidth configuration* assumed for the adjacent channel.  NOTE 2: With SCS that provides the 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:  For simultaneous NCR-Fwd and NCR-MT transmission, if the NCR-MT carrier is within the passband then the nominal channel bandwidth shall be calculated based on the the bandwidth between the lower edge of the passband and the lower edge of the NCR-MT carrier for lower side, or between the upper edge of the passband and the upper edge of the NCR-MT carrier for upper side. If the NCT-MT carrier is adjacent to the passband then ACLR requirement for NCR-MT based on NCR-MT channel bandwidth shall be applied for the NCR-MT carrier side and the nominal channel bandwidth calculated with the passband bandwidth shall be used for the passband side. If the NCR-MT carrier is not adjacent to the passband then CACLR shall be applied in the gap between the passband and the NCR-MT carrier. | | | | |

Table 7.5.2.2-1a: *Repeater type 2-O* ACLR limit for UL LA class

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Repeater nominal channel bandwidth BWNominal (MHz) | Repeater adjacent channel centre frequency offset below or above the passband edge | **Assumed adjacent channel carrier** | **Filter on the adjacent channel frequency and corresponding filter bandwidth** | **ACLR limit**  **(dB)** |
| 50, 100, 200, 400 | BWNominal/2 | NR of same BW (Note 2) | Square (BWConfig) | 17 (Note 3)  16 (Note 4) |
| NOTE 1: BWNominal is the *nominal channel bandwidth.*BWConfigis the *transmission bandwidth configuration* assumed for the adjacent channel.  NOTE 2: With SCS that provides the 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: For simultaneous NCR-Fwd and NCR-MT transmission, if the NCR-MT carrier is within the passband then the nominal channel bandwidth shall be calculated based on the the bandwidth between the lower edge of the passband and the lower edge of the NCR-MT carrier for lower side, or between the upper edge of the passband and the upper edge of the NCR-MT carrier for upper side. If the NCT-MT carrier is adjacent to the passband then ACLR requirement for NCR-MT based on NCR-MT channel bandwidth shall be applied for the NCR-MT carrier side and the nominal channel bandwidth calculated with the passband bandwidth shall be used for the passband side. If the NCR-MT carrier is not adjacent to the passband then CACLR shall be applied in the gap between the passband and the NCR-MT carrier. | | | | |

**--------------End of change-------------**