**3GPP TSG-RAN WG4 Meeting#97-e *REV\_R4-2015974***

**Electronic meeting, 2 – 13 November 2020**

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| *CR-Form-v12.1* | | | | | | | | |
| **CHANGE REQUEST** | | | | | | | | |
|  | | | | | | | | |
|  | **38.101-1** | **CR** | **0552** | **rev** | **1** | **Current version:** | **16.5.0** |  |
|  | | | | | | | | |
| *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:*** | Correction to receiver requirements for shared spectrum channel access | | | | | | | | | |
|  |  | | | | | | | | | |
| ***Source to WG:*** | Ericsson | | | | | | | | | |
| ***Source to TSG:*** | R4 | | | | | | | | | |
|  |  | | | | | | | | | |
| ***Work item code:*** | NR\_unlic-Core | | | | |  | ***Date:*** | | | 2020-10-23 |
|  |  | | | |  | |  | | |  |
| ***Category:*** | **F** |  | | | | | ***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 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-15 (Release 15) Rel-16 (Release 16) Rel-17 (Release 17) Rel-18 (Release 18)* | |
|  |  | | | | | | | | | |
| ***Reason for change:*** | | Correct general applicability of the the in-band and out-of-band blocking requirement and add requirements for spurious response.  The spurious response requirement in clause 7.7 for licensed bands do not apply for operations with shared spectrum channel access (different blocker interferer range). | | | | | | | | |
|  | |  | | | | | | | | |
| ***Summary of change:*** | | Clause 7.6.1: add statement that the blocking requirements for shared spectrum channel access is specified under suffix F (otherwise the general requirements also apply), this should not be stated in clause 7.6F.  Clause 7.6F.4: the statement that narrow-band blocking requirements in 7.6.4 are not applicable is removed (not needed).  Clause 7.7F (new): requirements for spurious response added. | | | | | | | | |
|  | |  | | | | | | | | |
| ***Consequences if not approved:*** | | IBB requirements not specified with a 20 MHz interferer bandwidth. Unduly relaxed IBB requirements for intra-band contigous CA. | | | | | | | | |
|  | |  | | | | | | | | |
| ***Clauses affected:*** | | 7.6.1, 7.6F.2, 7.6F.3, 7.6F.4, 7.7F (new) | | | | | | | | |
|  | |  | | | | | | | | |
|  | | **Y** | **N** |  | | | |  | | |
| ***Other specs*** | |  | **X** | Other core specifications | | | |  | | |
| ***affected:*** | |  | **X** | Test specifications | | | | . | | |
| ***(show related CRs)*** | |  | **X** | O&M Specifications | | | |  | | |
|  | |  | | | | | | | | |
| ***Other comments:*** | |  | | | | | | | | |
|  | |  | | | | | | | | |
| ***This CR's revision history:*** | |  | | | | | | | | |

*< start of changes >*

### 7.6.1 General

The blocking characteristic is a measure of the receiver's ability to receive a wanted signal at its assigned channel frequency in the presence of an unwanted interferer on frequencies other than those of the spurious response or the adjacent channels, without this unwanted input signal causing a degradation of the performance of the receiver beyond a specified limit. The blocking performance shall apply at all frequencies except those at which a spurious response occurs.

For shared spectrum channel access and band combinations with operating bands intended for shared spectrum channel access, the blocking characteristics is specified in sub-clause 7.6F.

*< text omitted >*

## 7.6F Blocking characteristics

### 7.6F.1 General

The blocking characteristic is a measure of the receiver's ability to receive a wanted signal at its assigned channel frequency in the presence of an unwanted interferer on frequencies other than those of the spurious response or the adjacent channels, without this unwanted input signal causing a degradation of the performance of the receiver beyond a specified limit. The blocking performance shall apply at all frequencies except those at which a spurious response occurs.

### 7.6F.2 In-band blocking

#### 7.6F.2.1 General

In-band blocking (IBB) is defined for an unwanted interfering signal falling into the UE receive band or into the first 60 MHz below or above the UE receive band. The throughput of the wanted signal shall be ≥ 95 % of the maximum throughput of the reference measurement channels as specified in Annexes A.2.2, A.2.3, A.3.2 and A.3.3 (with one sided dynamic OCNG Pattern OP.1 FDD/TDD for the DL-signal as described in Annex A.5.1.1/A.5.2.1) with parameters specified in Table 7.6F.2.1-1 and Table 7.6F.2.1-2. The relative throughput requirement shall be met for any SCS specified for the channel bandwidth of the wanted signal.

Table 7.6F.2.1-1: In-band blocking parameters for shared access bands

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| RX parameter | Units | Channel bandwidth | | | |
| 20 MHz | 40 MHz | 60 MHz | 80 MHz |
| Power in transmission bandwidth configuration | dBm | REFSENS + channel bandwidth specific value below | | | |
| dB | 9 | 12 | 13.8 | 15 |
| BWinterferer | MHz | 20 | | | |
| FIoffset, case 1 | MHz | 30 | | | |
| FIoffset, case 2 | MHz | ≥ 50 | | | |

Table 7.6F.2.1-2: In-band blocking for shared access bands

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Operating band | Parameter | Unit | Case 1 | Case 2 |
| Pinterferer | dBm | -56 | -44 |
| Finterferer (offset) | MHz | -CBW/2 –  FIoffset, case 1  and  CBW/2 +  FIoffset, case 1 | ≤ -CBW/2 –  FIoffset, case 2  and  ≥ CBW/2 +  FIoffset, case 2 |
| n46, n96 | Finterferer |  | NOTE 2 | FDL\_low – 3\*CBW  to  FDL\_high + 3\*CBW,  NOTE 4 |
| NOTE 1: The absolute value of the interferer offset Finterferer (offset) shall be further adjusted to MHz with SCS the sub-carrier spacing of the wanted signal in MHz. The interferer is an NR signal with an SCS equal to that of the wanted signal.  NOTE 2: For each carrier frequency, the requirement applies for two interferer carrier frequencies: a: -CBW/2 – FIoffset, case 1; b: CBW/2 + FIoffset, case 1  NOTE 3: CBW denotes the channel bandwidth of the wanted signal  NOTE 4: Interferer carrier frequencies in the frequency range for Case 2 shall be located at discrete frequencies in integer multiples of 20 MHz offset from -CBW/2 – FIoffset, case 2 and CBW/2 + FIoffset, case 2 | | | | |

#### 7.6F.2.2 Intra-band contiguous shared spectrum channel access CA

In-band blocking for intra-band contiguous shared access CA requirements are specified in Table 7.6F.2.2-1. These requirements apply for any SCS specified for the channel bandwidth of the wanted signal. For the test parameters specified in Table 7.6F.2.2-2, the throughput of each carrier shall be ≥ 95 % of the maximum throughput of the reference measurement channels as specified in Annexes A.2.2, A.2.3, A.3.2, and A.3.3 (with one sided dynamic OCNG Pattern OP.1 FDD/TDD for the DL-signal as described in Annex A.5.1.1/A.5.2.1).

Table 7.6F.2.2-1: In-band blocking parameters for intra-band contiguous shared access CA

|  |  |  |
| --- | --- | --- |
| Rx Parameter | Units | Shared access CA bandwidth class |
| B, C, D, E, I, M, N, O |
| Pw in Transmission Bandwidth Configuration, per CC | dBm | REFSENS + aggregated channel bandwidth value below |
| dB | 9 + 10log(BWChannel\_CA/20) |
| BWInterferer | MHz | 20 |
| FIoffset, case 1 | MHz | 30 |
| FIoffset, case 2 | MHz | ≥ 50 |
| NOTE 1: The transmitter shall be set to 4dB below PCMAX\_L,f,c at the minimum UL configuration specified in Table 7.3.2-3 with PCMAX\_L,f,c defined in clause 6.2.4.  NOTE 2: The interferer consists of the Reference measurement channel specified in Annexes A.3.2 and A.3.3 with one sided dynamic OCNG Pattern OP.1 FDD/TDD as described in Annex A.5.1.1/A.5.2.1 and set-up according to Annex C.3.1 | | |

Table 7.6F.2.2-2: In-band blocking for intra-band contiguous shared access CA

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Operating band | Parameter | Unit | Case 1 | Case 2 |
| Pinterferer | dBm | -56 | -44 |
| Finterferer (offset) | MHz | -BWchannel CA/2 –FIoffset, case 1  and  BWchannel CA/2 +FIoffset, case 1 | ≤ -BWchannel CA/2 –FIoffset, case 2  and  ≥ BWchannel CA/2 +FIoffset, case 2 |
| n46 | Finterferer | MHz | NOTE 2 | FDL\_low – 3\* BWchannel CA  to  FDL\_high + 3\* BWchannel CA  NOTE 4 |
| NOTE 1: The absolute value of the interferer offset Finterferer (offset) shall be further adjusted to MHz with SCS the sub-carrier spacing of the carrier closest to the interferer in MHz. The interferer is an NR signal with an SCS equal to that of the closest carrier.  NOTE 2: For each carrier frequency, the requirement applies for two interferer carrier frequencies: a: -BWchannel CA/2 – FIoffset, case 1; b: BWchannel CA/2 + FIoffset, case 1  NOTE 3: BWchannel CA denotes the aggregated channel bandwidth of the wanted signal  NOTE 4: Interferer carrier frequencies in the frequency range for Case 2 shall be located at discrete frequencies in integer multiples of 20 MHz offset from - BWchannel CA /2 – FIoffset, case 2 and BWchannel CA /2 + FIoffset, case 2 | | | | |

### 7.6F.3 Out-of-band blocking

#### 7.6F.3.1 General

Out-of-band band blocking is defined for an unwanted CW interfering signal falling outside a frequency range 60 MHz or greater below or above the UE receive band. The throughput of the wanted signal shall be ≥ 95% of the maximum throughput of the reference measurement channels as specified in Annexes A.2.2, A.2.3, A.3.2 and A.3.3 (with one sided dynamic OCNG Pattern OP.1 FDD/TDD for the DL-signal as described in Annex A.5.1.1/A.5.2.1) with parameters specified in Table 7.6F.3.1-1 and Table 7.6F.3.1-2. The relative throughput requirement shall be met for any SCS specified for the channel bandwidth of the wanted signal.

Table 7.6F.3.1-1: Out-of-band blocking parameters for shared access bands

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| RX parameter | Units | Channel bandwidth | | | |
| 20 MHz | 40 MHz | 60 MHz | 80 MHz |
| Power in transmission bandwidth configuration | dBm | REFSENS + channel bandwidth specific value below | | | |
| dB | 9 | | | |
| NOTE 1: The transmitter shall be set to 4 dB below PCMAX\_L,f,c at the minimum UL configuration specified in Table 7.3.2-3 with PCMAX\_L,f,c defined in clause 6.2.4. | | | | | |

Table 7.6F.3.1-2: Out of-band blocking for shared access bands

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Operating band | Parameter | Unit | Range1 | Range 2 | Range 3 |
| Pinterferer | dBm | -44 | -30 | -15 |
| n46, n96 | Finterferer (CW) | MHz | N/A | -200 < f – FDL\_low ≤ -3\*CBW  or  3\*CBW ≤ f – FDL\_high < 200 | 1 ≤ f ≤ FDL\_low – MAX(200,3\*CBW)  or  FDL\_high + MAX(200,3\*CBW)  ≤ f ≤ 12750 |
| NOTE 1: The power level of the interferer (PInterferer) for Range 3 shall be modified to -20 dBm for FInterferer > 4200 MHz.  NOTE 2: CBW denotes the channel bandwidth of the wanted signal | | | | | |

For interferer frequencies across ranges 1, 2 and 3 in Table 7.6F.3-2, a maximum of



exceptions are allowed for spurious response frequencies in each assigned frequency channel when measured using a step size of  MHz withthe number of resource blocks in the downlink transmission bandwidth configuration, *CBW* the bandwidth of the frequency channel in MHz and *n* = 1, 2, 3 for SCS = 15, 30, 60 kHz, respectively. For these exceptions, the requirements in clause 7.7F apply.

#### 7.6F.3.2 Intra-band contiguous shared spectrum channel access CA

Out-of-band blocking for intra-band contiguous shared access CA requirements are specified in Table 7.6F.3.2-1. These requirements apply for any SCS specified for the channel bandwidth of the wanted signal. For the test parameters specified in Table 7.6F.3.2-2, the throughput of each carrier shall be ≥ 95 % of the maximum throughput of the reference measurement channels as specified in Annexes A.2.2, A.2.3, A.3.2, and A.3.3 (with one sided dynamic OCNG Pattern OP.1 FDD/TDD for the DL-signal as described in Annex A.5.1.1/A.5.2.1).

Table 7.6F.3.2-1: Out-of-band blocking parameters for intra-band contiguous shared access CA

|  |  |  |
| --- | --- | --- |
| Rx Parameter | Units | Shared access CA bandwidth class |
| B, C, D, E, I, M, N,O |
| Pw in Transmission Bandwidth Configuration, per CC | dBm | REFSENS + CA bandwidth class specific value below |
| dB | 9 |
| NOTE 1: The transmitter shall be set to 4dB below PCMAX\_L,f,c at the minimum UL configuration specified in Table 7.3.2-3 with PCMAX\_L,f,c defined in clause 6.2.4. | | |

Table 7.6F.3.2-2: Out of-band blocking for intra-band contiguous CA

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Operating band | Parameter | Unit | Range1 | Range 2 | Range 3 |
| Pinterferer | dBm | -45 | -30 | -15 |
| n46 | Finterferer (CW) | MHz | N/A | -200 < f – FDL\_low ≤ -3\*BWChannel\_CA  or  3\*BWChannel\_CA ≤ f – FDL\_high < 200 | 1 ≤ f ≤ FDL\_low – MAX(200,3\*BWChannel\_CA)  or  FDL\_high + MAX(200,3\*BWChannel\_CA)  ≤ f ≤ 12750 |
| NOTE 1: The power level of the interferer (PInterferer) for Range 3 shall be modified to -20 dBm, for FInterferer > 4200 MHz. | | | | | |

## 7.7 Spurious response

*< text omitted >*

### 7.7E.2 Spurious response for V2X con-current operation

For the inter-band con-current NR V2X operation, the requirements specified in subclause 7.7E shall apply for the NR sidelink reception in Band n47 and the requirements specified in subclause 7.7 shall apply for the NR downlink reception in licensed band while all downlink carriers are active.

## 7.7F Spurious response for shared spectrum channel access

### 7.7F.1 General

For spurious responses, the throughput of the wanted signal shall be ≥ 95% of the maximum throughput of the reference measurement channels as specified in Annexes A.2.2, A.2.3, A.3.2 and A.3.3 (with one sided dynamic OCNG Pattern OP.1 FDD/TDD for the DL-signal as described in Annex A.5.1.1/A.5.2.1) with parameters specified in Table 7.7F.1-1 and Table 7.7F.1-2. The relative throughput requirement shall be met for any SCS at any other frequency at which a response is obtained i.e. for which the limit as specified in subclause 7.6F.3.1 is not met.

Table 7.7F.1-1: Spurious response parameters for shared access bands

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| RX parameter | Units | Channel bandwidth | | | |
| 20 MHz | 40 MHz | 60 MHz | 80 MHz |
| Power in transmission bandwidth configuration | dBm | REFSENS + channel bandwidth specific value below | | | |
| dB | 9 | | | |
| NOTE 1: The transmitter shall be set to 4 dB below PCMAX\_L,f,c at the minimum UL configuration specified in Table 7.3.2-3 with PCMAX\_L,f,c defined in clause 6.2.4. | | | | | |

Table 7.7F.1-2: Spurious response for shared spectrum channel access

|  |  |  |
| --- | --- | --- |
| Parameter | Unit | Level |
| PInterferer (CW) | dBm | -44 |
| FInterferer | MHz | Spurious response frequencies |

#### 7.7F.2 Intra-band contiguous shared spectrum channel access CA

For spurious responses, the throughput of each carrier shall be ≥ 95 % of the maximum throughput of the reference measurement channels as specified in Annexes A.2.2, A.2.3, A.3.2, and A.3.3 (with one sided dynamic OCNG Pattern OP.1 FDD/TDD for the DL-signal as described in Annex A.5.1.1/A.5.2.1) with parameters specified in Table 7.7F.2-1 and Table 7.7F.2-2. The relative throughput requirement shall be met for any SCS at any other frequency at which a response is obtained i.e. for which the limit as specified in subclause 7.6F.3.2 is not met.

Table 7.7F.2-1: Spurious response parameters for intra-band contiguous shared access CA

|  |  |  |
| --- | --- | --- |
| Rx Parameter | Units | Shared access CA bandwidth class |
| B, C, D, E, I, M, N,O |
| Pw in Transmission Bandwidth Configuration, per CC | dBm | REFSENS + CA bandwidth class specific value below |
| dB | 9 |
| NOTE 1: The transmitter shall be set to 4dB below PCMAX\_L,f,c at the minimum UL configuration specified in Table 7.3.2-3 with PCMAX\_L,f,c defined in clause 6.2.4. | | |

Table 7.7F.2-2: Spurious response for intra-band contiguous shared access CA

|  |  |  |
| --- | --- | --- |
| Parameter | Unit | Level |
| PInterferer (CW) | dBm | -44 |
| FInterferer | MHz | Spurious response frequencies |

*< end of changes >*