**3GPP TSG-RAN4 Meeting #97-e *R4-2016814***

**Online, , 2nd Nov 2020 - 13th Nov 2020**

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| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| *CR-Form-v12.1* | | | | | | | | |
| **CHANGE REQUEST** | | | | | | | | |
|  | | | | | | | | |
|  | **38.101-1** | **CR** | **0507** | **rev** | **1** | **Current version:** | **16.5.0** |  |
|  | | | | | | | | |
| *For* [***HELP***](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:*** |  | | | | | | | | | |
|  |  | | | | | | | | | |
| ***Source to WG:*** | Nokia, Skyworks Inc., Qualcomm Inc. | | | | | | | | | |
| ***Source to TSG:*** | R4 | | | | | | | | | |
|  |  | | | | | | | | | |
| ***Work item code:*** | NR\_RF\_FR1-Core | | | | |  | ***Date:*** | | | 2020-10-22 |
|  |  | | | |  | |  | | |  |
| ***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:*** | | A-MPR is missing from CA configurations CA\_n7B, CA\_n41B, CA\_n41C and CA\_n48B altough these are already listed in specification as valid uplink configurations. CA\_7B needs MSD. | | | | | | | | |
|  | |  | | | | | | | | |
| ***Summary of change:*** | | Addition of A-MPR definition for CA\_n7B, CA\_n41B, CA\_n41C and CA\_n48B and associated requirements including general CA A-MPR section. CA\_7B MSD defined. | | | | | | | | |
|  | |  | | | | | | | | |
| ***Consequences if not approved:*** | | Uplink CA\_n7B, CA\_n41B, CA\_n41C and CA\_n48B needs to be removed from specification. | | | | | | | | |
|  | |  | | | | | | | | |
| ***Clauses affected:*** | | 5.5A.1, 6.2A.3, 6.5A.2.3, 6.5A.3.3, 7.3A.2 | | | | | | | | |
|  | |  | | | | | | | | |
|  | | **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:*** | |  | | | | | | | | |

\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\* Start of changes \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

### 5.5A.1 Configurations for intra-band contiguous CA

Table 5.5A.1-1: NR CA configurations and bandwidth combination sets defined for intra-band contiguous CA

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| NR CA configuration / Bandwidth combination set | | | | | | | | |
| NR CA configuration | Uplink CA configurations | Channel bandwidths for carrier (MHz) | Channel bandwidths for carrier (MHz) | Channel bandwidths for carrier (MHz) | Channel bandwidths for carrier (MHz) | Channel bandwidths for carrier (MHz) | Maximum aggregated  bandwidth (MHz) | Bandwidth combination set |
| CA\_n1B | - | 10 | 10,15 |  |  |  | 40 | 0 |
| 15 | 15,20 |  |  |  |
| 20 | 20 |  |  |  |
| CA\_n7B | CA\_n7B | 10, 15, 20 | 10, 15, 20, 30, 40 |  |  |  | 50 | 0 |
| CA\_n40B | - | 20 | 80 |  |  |  | 100 | 0 |
| 50 | 50 |  |  |  |
| CA\_n41B | CA\_n41B | 10, 20, 30, 40, 50 | 10, 20, 30, 40, 50 |  |  |  | 100 | 0 |
| CA\_n41C | CA\_n41C | 40 | 80, 100 |  |  |  | 180 | 0 |
| 50, 60, 80 | 60, 80, 100 |  |  |  |
| 10, 15, 20, 40, 50, 60, 80, 90 | 15, 20, 40, 50, 60, 80, 90, 100 |  |  |  | 190 | 1 |
| CA\_n46B | - | 20, 40, 60 | 20, 40 |  |  |  | 100 | 0 |
| CA\_n46C | - | 60, 80 | 60, 80 |  |  |  | 160 | 0 |
| CA\_n46D | - | 60, 80 | 80 | 80 |  |  | 240 | 0 |
| CA\_n46E | - | 80 | 80 | 80 | 80 |  | 320 | 0 |
| CA\_n46G | - | 40, 60 | 40 | 40 |  |  | 140 | 0 |
| CA\_n46H | - | 40, 80 | 40 | 40 | 40 |  | 200 | 0 |
| CA\_n46I | - | 60 | 40 | 40 | 40 | 40 | 220 | 0 |
| CA\_n46M | - | 20 | 20 | 20 |  |  | 60 | 0 |
| CA\_n46N | - | 20 | 20 | 20 | 20 |  | 80 | 0 |
| CA\_n46O | - | 20 | 20 | 20 | 20 | 20 | 100 | 0 |
| CA\_n48B | CA\_n48B | 5, 10 | 10, 15, 20 |  |  |  | 40 | 0 |
| 15, 20 | 5, 10, 15, 20 |  |  |  |
|  |  |  |  |  |
|  |  |  |  |  |
| - | 10 | 50, 60, 80, 90 |  |  |  | 100 | 1 |
| 15, 20 | 40, 50, 60, 80 |  |  |  |
| 40 | 40, 50, 60 |  |  |  |
|  |  |  |  |  |
| CA\_n48C | - | 10 | 100 |  |  |  | 140 | 0 |
| 15 | 90,100 |  |  |  |
| 20 | 90, 100 |  |  |  |
| 40 | 80, 90, 100 |  |  |  |
|  |  |  |  |  |
|  |  |  |  |  |
|  |  |  |  |  |
|  |  |  |  |  |
|  |  |  |  |  |
| CA\_n66B | - | 5 1 | 20, 40 |  |  |  | 50 | 0 |
| 10 | 15, 20, 40 |  |  |  |
| 15 | 10, 15, 20 |  |  |  |
| 20 | 5 1, 10, 15 |  |  |  |
| 40 | 5 1, 10 |  |  |  |
| CA\_n71B | - | 5 | 20 |  |  |  | 25 | 0 |
| 10 | 15 |  |  |  |
| 15 | 10 |  |  |  |
| 20 | 5 |  |  |  |
| 10 | 20 |  |  |  | 35 | 1 |
| 15 | 15, 20 |  |  |  |
| 20 | 10, 15 |  |  |  |
| CA\_n77C | CA\_n77C | 50 | 60, 80, 100 |  |  |  | 200 | 0 |
| 60 | 60, 80, 100 |  |  |  |
| 80 | 80, 100 |  |  |  |
| 100 | 100 |  |  |  |
| 10, 15, 20, 25, 30, 40, 50, 60, 70,80,90, 100 | 10, 15, 20, 25, 30, 40, 50, 60, 70,80,90, 100 |  |  |  | 200 | 1 |
| CA\_n77D | - | 100 | 100 | 100 |  |  | 300 | 0 |
| CA\_n78B | - | 20 | 50 |  |  |  | 70 | 0 |
| CA\_n78C | CA\_n78C | 50 | 60, 80, 100 |  |  |  | 200 | 0 |
| 60 | 60, 80, 100 |  |  |  |
| 80 | 80, 100 |  |  |  |
| 100 | 100 |  |  |  |
| 10, 15, 20, 25, 30, 40, 50, 60, 70,80,90, 100 | 10, 15, 20, 25, 30, 40, 50, 60, 70,80,90, 100 |  |  |  | 200 | 1 |
| CA\_n78D | - | 100 | 100 | 100 |  |  | 300 | 0 |
| CA\_n79C | CA\_n79C | 50 | 60, 80, 100 |  |  |  | 200 | 0 |
| 60 | 60, 80, 100 |  |  |  |
| 80 | 80, 100 |  |  |  |
| 100 | 100 |  |  |  |
| CA\_n79D | - | 100 | 100 | 100 |  |  | 300 | 0 |
| NOTE 1: 5 MHz is not applicable for 30/60 kHz SCS. | | | | | | | | |

\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\* Start of changes \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

### 6.2A.3 UE additional maximum output power reduction for CA

##### 6.2A.3.1.1 UE additional maximum output power reduction for Intra-band contiguous CA

Additional emission requirements can be signalled by the network. Each additional emission requirement is associated with a unique network signalling (NS) value indicated in RRC signalling by an NR frequency band number of the applicable operating band and an associated value in the field *additionalSpectrumEmission.* Throughout this specification, the notion of indication or signalling of an NS value refers to the corresponding indication of an NR frequency band number of the applicable operating band, the IE field *freqBandIndicatorNR* and an associated value of *additionalSpectrumEmission* in the relevant RRC information elements [7]*.* Relation between NR CA band and NR frequency band is specified in Table 5.2A.1-1.

To meet the additional requirements, additional maximum power reduction (A-MPR) is allowed for the maximum output power as specified in Table 6.2A.1.5-1. Unless stated otherwise, the total reduction to UE maximum output power is max(MPR, A-MPR) where MPR is defined in clause 6.2A.2.4. In absense of modulation and waveform types the A-MPR applies to all modulation and waveform types.

Table 6.2A.3.1.1-1 specifies the additional requirements with their associated network signalling values and the allowed A-MPR and applicable CA band(s) for each CA\_NS value. The mapping of NR CA band numbers and values of the *additionalSpectrumEmission* to network signalling labels is specified in Table 6.2.3.1.1-2.

Table 6.2A.3.1.1-1: Additional maximum power reduction (A-MPR)

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Network signalling label | Requirements (clause) | NR CA Band | Aggregated channel bandwidth (MHz) | Resources blocks (*N*RB) | A-MPR (dB) |
| CA\_NS\_01 |  | Table 5.2A.1-1 | All applicaple NR CA bands | All applicaple NR CA configurations | N/A |
| CA\_NS\_04 | 6.5A.2.3.1.1  6.5A.3.3.1.1 | CA\_n41 | Table 5.5A.1-1 | 6.2A.3.1.2 | 6.2A.3.1.2 |
| CA\_NS\_27 | 6.5A.2.3.1.2  6.5A.3.3.1.2 | CA\_n48 | Table 5.5A.1-1 | 6.2A.3.1.3 | 6.2A.3.1.3 |
| CA\_NS\_46 | 6.5A.3.3.1.3 | CA\_n7 | Table 5.5A.1-1 | 6.2A.3.1.4 | 6.2A.3.1.4 |
|  | | | | | |

[The CA\_NS\_01 label with the field *additionalPmax* [7] absent is default for all NR bands.]

Table 6.2.3.1.1-2: Mapping of network signaling label

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| NR CA band | Value of additionalSpectrumEmission | | | | | | | |
| **0** | **1** | **2** | **3** | **4** | **5** | **6** | **7** |
| CA\_n41 | CA\_NS\_01 | CA\_NS\_04 |  |  |  |  |  |  |
| CA\_n48 | CA\_NS\_01 | CA\_NS\_27 |  |  |  |  |  |  |
| CA\_n7 | CA\_NS\_01 | CA\_NS\_46 |  |  |  |  |  |  |
| NOTE: *additionalSpectrumEmission* corresponds to an information element of the same name defined in clause 6.3.2 of TS 38.331 [7]. | | | | | | | | |

##### 6.2A.3.1.2 A-MPR for CA\_NS\_04

###### 6.2A.3.1.2.1 Contiguous allocations

For all waveform type, modulations and scs when Fedge, low - BWChannel\_CA ≥ 2490.5 MHz, A-MPR = MPR

For all modulations and scs when Fedge, low - BWChannel\_CA < 2490.5 MHz

if the RB allocation is an inner allocation as defined in Table 6.2A.2.4-1 then A-MPR = MPR

Except for RBstart ≤ 0.33\*BWchannel\_CA/0.18MHz, AMPR= max (MPR, AMPRcc).

if the RB allocation is an outer allocation as defined in Table 6.2A.2.4-2,

then A-MPR = MPR+1.5dB for BW Class B A-MPR = MPR for BW class C.

Where

* MPR is the MPR as defined in Table 6.2A.2.4-1 for the respective CA bandwidth class

- AMPRcc is defined as the PC3\_A2 AMPR in table 6.2.3.2-2.

###### 6.2A.3.1.2.2 Non-contiguous allocations

For intra-band contiguous CA\_n41B and CA\_n41C and it receives IE CA\_ NS\_04, the UE determines the allowed Additional Maximum Power Reduction (AMPR) for the maximum output power as specified in this clause. The AMPR is specified by AMPRIM3 to meet -25dBm/MHz when IM3 falls in -25dBm/MHz region of Table 6.5A.2.3.1-1 or Table 6.5A.3.3.1-1. And uses MPR for all other cases.

The UE determines the AMPR type as follows:

For all waveform types, modulations and SCS when Fedge, low - BWChannel\_CA ≥ 2490.5 MHz,

if allocation is an inner or outer 1 allocation as defined in Table 6.2A.2.4-2 then A-MPR = MPR

if allocation is an outer 2 allocation as defined in Table 6.2A.2.4-2 then A-MPR = MPR-1dB

For all waveform types, modulations and SCS when Fedge, low - BWChannel\_CA < 2490.5 MHz

If AND( MIN(FIM3,low\_block,high, SEM-13,low) < Ffilter,low , MAX( SEM-13,high, FIM3,high\_block,low ) > Ffilter,high )

if RB allocation is an inner or outer 1 allocation as defined in Table 6.2A.2.4-1 then A-MPR = MPR

if RB allocation is an outer 2 allocation as defined in Table 6.2A.2.4-2 then A-MPR = MPR-1dB

Else

A-MPR = A-MPRIM3 defined in Clause 6.2A.3.1.2.2.1

where

- MPR is the MPR as defined in Table 6.2A.2.4-2 for the respective CA bandwidth class

- FIM3,low\_block,high =(2 \* Flow\_alloc,high\_edge ) – Fhigh\_alloc,low\_edge

- FIM3,high\_block,low = (2 \* Fhigh\_alloc,low\_edge) – Flow\_alloc,high\_edge

- Flow\_alloc,low\_edge is the lowermost frequency of lower transmission bandwidth allocation.

- Flow\_alloc,high\_edge is the uppermost frequency of lower transmission bandwidth allocation.

- Fhigh\_alloc,low\_edge is the lowermost frequency of upper transmission bandwidth allocation.

- Fhigh\_alloc,high\_edge is the uppermost frequency of upper transmission bandwidth allocation.

- Ffilter,low = 2480 MHz

- Ffilter,high = 2745 MHz

- SEM-13,high = Threshold frequency where upper spectral emission mask for upper channel drops from -13 dBm / 1MHz to -25 dBm / 1MHz, as specified in Clause 6.5A.2.3.1.1

- SEM-13,low = Threshold frequency where lower spectral emission mask below the lower channel drops from -13 dBm / MHz to -25 dBm / MHz, as specified in Subclause 6.5A.2.3.1.1

6.2A.3.1.2.2.1 AMPRIM3 to meet -25dBm/MHz

AMPR in this clause is for intra-band contiguous CA\_n41B and CA\_n41C. The allowed maximum output power reduction is defined as:

AMPRIM3=MA, Where MA is defined as follows

MA = 13; 0 ≤ B < 2.16

11.5; 2.16 ≤ B < 3.24

10.5; 3.24 ≤ B < 5.04

9.5; 5.04 ≤ B < 10.08

8; 10.08 ≤ B < 16.56

7; 16.56 ≤ B < 21.96

6; 21.96 ≤ B

Where:

B=(LCRB1\* 12\* SCS1 + LCRB2 \* 12 \* SCS2)/1,000,000

and LCRB1, SCS1 are for CC1, LCRB2, SCS2 are for CC2, CC1 is the component carrier with lower frequency.

###### 6.2A.3.1.3 A-MPR for CA\_NS\_27

6.2A.3.1.3.1 Contiguous allocations

For all modulations and scs when Fedge, low - BWChannel\_CA ≥ 3540 MHz AND Fedge, high + BWChannel\_CA ≤ 3710 MHz

if allocation is inner 1 then A-MPR = 0 dB where inner 1 is defined as

RBStart,Low = max(1, floor(LCRB/2))

where max() indicates the largest value of all arguments and floor(x) is the greatest integer less than or equal to x.

RBStart,High = NRB\_agg – RBStart,Low – LCRB

with following conditions

RBStart,Low ≤ RBStart ≤ RBStart,High,and

LCRB ≤ ceil(NRB\_agg /2)

Inner 1 region exceptions thresholds are for LCRB < 8 and

RBstart ≤ 30 and RBend ≥ 164 for BWChannel\_CA = 40MHz, and

when 3540 MHz + BWChannel\_CA ≤ Fedge, low < 3530 MHz + 2\*BWChannel\_CA,

RBstart ≤ 25 for BWChannel\_CA = 35MHz, and

RBstart ≤ 19 for BWChannel\_CA = 30MHz, and

RBstart ≤ 14 for BWChannel\_CA = 25MHz, and

RBstart ≤ 9 for BWChannel\_CA = 20MHz, and

RBstart ≤ 3 for BWChannel\_CA = 15MHz, and

when 3720 MHz – 2\*BWChannel\_CA < Fedge, high ≤ 3710 MHz - BWChannel\_CA,

RBend ≥ 144 for BWChannel\_CA = 35MHz, and

RBend ≥ 124 for BWChannel\_CA = 30MHz, and

RBend ≥ 104 for BWChannel\_CA = 25MHz, and

RBend ≥ 80 for BWChannel\_CA = 20MHz, and

RBend ≥ 68 for BWChannel\_CA = 15MHz,

For which AMPR = 5dB.

else A-MPR= 5 dB

For all modulations and scs when 3550 MHz ≤ Fedge, low < 3540 MHz + BWChannel\_CA

if allocation is inner 3 then A-MPR = 0 dB.

Inner 3 region exceptions thresholds are

RBstart ≤ 63 for BWChannel\_CA = 40MHz, and

RBstart ≤ 52 for BWChannel\_CA = 35MHz, and

RBstart ≤ 42 for BWChannel\_CA = 30MHz, and

For which AMPR = 7dB for BWChannel\_CA ≤ 20MHz and 11.5dB for BWChannel\_CA > 20MHz

where inner 3 is defined as

RBStart = NRB\_agg /4

LCRB = NRB\_agg/4

RBStart = NRB\_agg 3/4 − LCRB

with following conditions

NRB\_agg /4 < RBStart < NRB\_agg 3/4 − LCRB AND LCRB < NRB\_agg/4

else when BWagg ≤ 20 MHz, A-MPR = 7 dB or when BWagg > 20 MHz, A-MPR = 11.5dB.

For all modulations and scs when 3710 MHz - BWChannel\_CA < Fedge, high ≤ 3700

if allocation is inner 3 then A-MPR = 0 dB.

Inner 3 region exceptions thresholds are

RBend ≥ 132 for BWChannel\_CA = 40MHz, and

RBend ≥ 121 for BWChannel\_CA = 35MHz, and

RBend ≥ 110 for BWChannel\_CA = 30MHz, and

For which AMPR = 7dB for BWChannel\_CA ≤ 20MHz and 11.5dB for BWChannel\_CA > 20MHz

where inner 3 is defined as

RBStart = NRB\_agg /4

LCRB = NRB\_agg/4

RBStart = NRB\_agg 3/4 − LCRB

with following conditions

NRB\_agg /4 < RBStart < NRB\_agg 3/4 − LCRB AND LCRB < NRB\_agg/4

else when BWagg ≤ 20 MHz, A-MPR = 7 dB or when BWagg > 20 MHz, A-MPR = 11.5dB.

6.2A.3.1.3.2 Non-contiguous allocations

For all modulations and scs when Fedge, low - BWChannel\_CA ≥ 3540 MHz AND Fedge, high + BWChannel\_CA ≤ 3710 MHz

A-MPRCA\_IM5=

13; 0 ≤B<1.08

12; 1.08 ≤B<2.16

11; 2.16 ≤B<3.24

10.5; 3.24 ≤ B < 5.04

9.5; 5.04≤B< 10.08

8; 10.08 ≤B< 16.56

7; 16.56 ≤ B < 21.96

6.5; 21.96 ≤B

For all modulations and scs when 3550 MHz ≤ Fedge, low < 3540 MHz + BWChannel\_CA or 3710 MHz - BWChannel\_CA < Fedge, high ≤ 3700

when BWagg ≤ 20 MHz

A-MPRCA\_IM5=

13; 0 ≤B<1.08

12; 1.08 ≤B<2.16

11; 2.16 ≤B<3.24

10.5; 3.24 ≤ B < 5.04

9.5; 5.04 ≤B< 10.08

8; 10.08 ≤B< 16.56

7; 16.56 ≤ B < 21.96

6.5; 21.96 ≤B

or when BWagg > 20 MHz

A-MPRCA\_IM3 =

20; 0 ≤B<1.08

19.5; 1.08 ≤B<2.16

19; 2.16 ≤B<3.24

18.5; 3.24 ≤ B < 5.04

18; 5.04 ≤B< 10.08

17; 10.08 ≤B< 16.56

16; 16.56 ≤ B < 21.96

13; 21.96 ≤B.

Where:

B=(LCRB1\* 12\* SCS1 + LCRB2 \* 12 \* SCS2)/1,000,000

and LCRB1, SCS1 are for CC1, LCRB2, SCS2 are for CC2, CC1 is the component carrier with lower frequency.

###### 6.2A.3.1.4 A-MPR for CA\_NS\_46

###### 6.2A.3.1.4.1 Contiguous allocations

[For all modulations and scs when BWChannel\_CA > 25 MHz

IF RBend > NRB\_agg 3/4 OR RBend > 4/3 NRB\_agg - LCRB

THEN A-MPR = 11dB

ELSE IF RBend < NRB\_agg /6 AND LCRB < 5

THEN A-MPR = 5dB

ELSE IF LCRB 3/2< RBend < NRB\_agg 3/4 AND LCRB < NRB\_agg /4

THEN A-MPR = 0 dB,

OTHERWISE A-MPR = [7] dB.

For all modulations and scs when BWChannel\_CA <= 25 MHz and 2595 MHz – 2\*BWChannel\_CA < Fedge,high ≤ 2570 MHz

IF RBend ≥ 4/3 NRB\_agg - LCRB

THEN A-MPR = 6 dB.

OTHERWISE A-MPR = 0 dB.

For all modulations and scs when BWChannel\_CA <= 25 MHz and Fedge\_high <= 2595 MHz – 2\*BWChannel\_CA,

A-MPR = 0 dB.]

###### 6.2A.3.1.3.2 Non-contiguous allocations

[For all modulations and scs when BWChannel\_CA > 25 MHz and 2595 MHz - BWChannel\_CA ≤ Fedge\_high ≤ 2570 MHz

A-MPRCA\_IM3 =

20; 0 ≤B<1.08

19.5; 1.08 ≤B<2.16

19; 2.16 ≤B<3.24

18.5; 3.24 ≤ B < 5.04

18; 5.04 ≤B< 10.08

17; 10.08 ≤B< 16.56

16; 16.56 ≤ B < 21.96

13; 21.96 ≤B

For all modulations and scs when BWChannel\_CA > 25 MHz and Fedge\_high < 2595 MHz - BWChannel\_CA

A-MPRCA\_IM5 =

13; 0 ≤B<1.08

12; 1.08 ≤B<2.16

11; 2.16 ≤B<3.24

10.5; 3.24 ≤ B < 5.04

9.5; 5.04 ≤B< 10.08

8; 10.08 ≤B< 16.56

7.5; 16.56 ≤ B < 21.96

7; 21.96 ≤B

For all modulations and scs when BWChannel\_CA <= 25 MHz and 2595 MHz – 2\*BWChannel\_CA ≤ Fedge\_high ≤ 2570 MHz

A-MPRCA\_IM5 =

13; 0 ≤B<1.08

12; 1.08 ≤B<2.16

11; 2.16 ≤B<3.24

10.5; 3.24 ≤ B < 5.04

9.5; 5.04 ≤B< 10.08

8; 10.08 ≤B< 16.56

7.5; 16.56 ≤ B < 21.96

7; 21.96 ≤B

Where:

B=(LCRB1\* 12\* SCS1 + LCRB2 \* 12 \* SCS2)/1,000,000

and LCRB1, SCS1 are for CC1, LCRB2, SCS2 are for CC2, CC1 is the component carrier with lower frequency.]

\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\* No changes \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

#### 6.5A.2.3 Additional spectrum emission mask for CA

##### 6.5A.2.3.1 Additional spectrum emission mask for intra-band contiguous CA

###### 6.5A.2.3.1.1 Requirements for network signalled value "CA\_NS\_04"

When "CA\_NS\_04" is indicated in the cell, the power of any UE emission shall not exceed the levels specified in Table 6.5A.2.3.1.1-1.

Table 6.5A.2.3.1.1-1: Additional requirements for "CA\_NS\_04"

|  |  |  |  |
| --- | --- | --- | --- |
| ΔfOOB  MHz | BWChannel\_CA (MHz) / Spectrum emission limit (dBm) | | Measurement bandwidth |
| ≤50 | >50 |
| ± 0 – 1 | -10 |  | 2 % of BWChannel\_CA |
|  |  | -10 | 1 MHz |
| ± 1 – 5 | -10 | | 1 MHz |
| ± 5 – X | -13 | |
| ± X - (BWChannel\_CA + 5 MHz) | -25 | |
| NOTE: X is aggregated bandwidth | | | |

###### 6.5A.2.3.1.2 Requirements for network signalled value "CA\_NS\_27"

When "CA\_NS\_27" is indicated in the cell, the power of any UE emission shall not exceed the levels specified in Table 6.2A.2.3.2.1.-1.

Table 6.2A.2.3.2.1-1: Additional requirements for "CA\_NS\_27"

|  |  |  |
| --- | --- | --- |
| Spectrum emission limit (dBm) / measurement bandwidth  for each aggregated channel bandwidth | | |
| ΔfOOB  MHz | Aggregated channel bandwidth of  max 40 MHz | Measurement bandwidth |
| ± 0 – 1 | -13 | 1 % of X |
| ± 1 – X | -13 | 1 MHz |
| < – X or > X | -25 |
| NOTE 1: X is the aggregated channel bandwidth  NOTE 2: The requirements apply only at the frequency range from 3540 MHz to 3710 MHz. | | |

NOTE: As a general rule, the resolution bandwidth of the measuring equipment should be equal to the measurement bandwidth. However, to improve measurement accuracy, sensitivity and efficiency, the resolution bandwidth may be smaller than the measurement bandwidth. When the resolution bandwidth is smaller than the measurement bandwidth, the result should be integrated over the measurement bandwidth in order to obtain the equivalent noise bandwidth of the measurement bandwidth.

\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\* No changes \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

##### 6.5A.3.2.6 Transmit intermodulation for intra-band contiguous CA

For intra-band contiguous carrier aggregation the requirement of transmitting intermodulation is specified in Table 6.5A.3.2.6-1.

Table 6.5A.3.2.6-1: Transmit Intermodulation

|  |  |  |  |
| --- | --- | --- | --- |
| CA bandwidth class(UL) | B and C | | |
| Interference Signal  Frequency Offset | BWChannel\_CA | 2\*BWChannel\_CA | |
| Interference CW Signal Level | -40dBc | | |
| Intermodulation Product | -29dBc | -35dBc | |
| Measurement bandwidth  (NOTE1) | Nominal channel space+MBWACLR,low/2+ MBWACLR,high/2 | | |
| Measurement offset from channel center | BWChannel\_CA and 2\*BWChannel\_CA | | 2\*BWChannel\_CA and 4\*BWChannel\_CA |
| NOTE 1: MBWACLR,low and MBWACLR,high are the single-channel ACLR measurement bandwidths specified for channel bandwidths BWchannel(low) and BWchannel(high) in 6.5.2.4.1, respectively. | | | |

\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\* Start of changes \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

##### 6.5A.3.2.1 Spurious emissions for UE co-existence for intra-band contiguous CA

This clause specifies the requirements for the specified intra-band contiguous carrier aggregation configurations for coexistence with protected bands, the requirements in Table 6.5A.3.2.1-1 apply.

NOTE: For measurement conditions at the edge of each frequency range, the lowest frequency of the measurement position in each frequency range should be set at the lowest boundary of the frequency range plus MBW/2. The highest frequency of the measurement position in each frequency range should be set at the highest boundary of the frequency range minus MBW/2. MBW denotes the measurement bandwidth defined for the protected band.

Table 6.5A.3.2.1-1: Requirements for uplink intra-band contiguous carrier aggregation

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| NR CA combination | Spurious emission | | | | | | |
| Protected Band | Frequency range (MHz) | | | Maximum Level (dBm) | MBW (MHz) | NOTE |
| CA\_n7 | E-UTRA Band 1, 2, 3, 4, 5, 7, 8, 10, 12, 13, 14, 17, 20, 22, 26, 27, 28, 29, 30, 31, 32, 33, 34, 40, 42, 43, 50, 51, 52, 65, 66, 67, 68, 72, 74, 75, 76, 85,  NR Band n77, n78 | FDL\_low | - | FDL\_high | -50 | 1 |  |
|  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |
| CA\_n41 | E-UTRA Band 1, 2, 3, 4, 5, 8, 10, 12, 13, 14, 17, 24, 25, 26, 27, 28, 29, 30, 34, 39, 42, 44, 45, 48, 50, 51, 52, 65, 66, 70, 71, 73, 74, 85,  NR Band n77, n78 | FDL\_low | - | FDL\_high | -50 | 1 |  |
| NR Band n79 | FDL\_low | - | FDL\_high | -50 | 1 | 4 |
| E-UTRA Band 9, 11, 18, 19, 21 | FDL\_low | - | FDL\_high | -50 | 1 | 6 |
| Frequency range | 1884.5 |  | 1915.7 | -41 | 0.3 | 5, 6 |
| CA\_n48 | E-UTRA Band 2, 4, 5, 12, 13, 14, 17, 24, 25, 26, 29, 30, 41, 50, 51, 66, 70, 71, 74, 85 | FDL\_low | - | FDL\_high | -50 | 1 |  |
| CA\_n77 | E-UTRA Band 1, 3, 5, 7, 8, 11, 18, 19, 20, 21, 26, 28, 34, 39, 40, 41, 65 | FDL\_low | - | FDL\_high | -50 | 1 |  |
| Frequency range | 1884.5 | - | 1915.7 | -41 | 0.3 | 5 |
| CA\_n78 | E-UTRA Band 1, 3, 5, 7, 8, 11, 18, 19, 20, 21, 26, 28, 34, 39, 40, 41, 65 | FDL\_low | - | FDL\_high | -50 | 1 |  |
| Frequency range | 1884.5 | - | 1915.7 | -41 | 0.3 | 5 |
| CA\_n79 | E-UTRA Band 1, 3, 5, 8, 11, 18, 19, 21, 28, 34, 39, 40, 41, 42, 65 | FDL\_low | - | FDL\_high | -50 | 1 |  |
| Frequency range | 1884.5 | - | 1915.7 | -41 | 0.3 | 5 |
| NOTE 1: Void  NOTE 2: Void  NOTE 3: Void  NOTE 4: As exceptions, measurements with a level up to the applicable requirements defined in Table 6.5.3.1-2 are permitted for each assigned NR carrier used in the measurement due to 2nd, 3rd, 4th or 5th harmonic spurious emissions. Due to spreading of the harmonic emission the exception is also allowed for the first 1 MHz frequency range immediately outside the harmonic emission on both sides of the harmonic emission. This results in an overall exception interval centred at the harmonic emission of (2 MHz + N x LCRB x RBsize kHz), where N is 2, 3, 4, 5 for the 2nd, 3rd, 4th or 5th harmonic respectively. The exception is allowed if the measurement bandwidth (MBW) totally or partially overlaps the overall exception interval.  NOTE 5: Applicable when co-existence with PHS system operating in 1884.5 - 1915.7 MHz.  NOTE 6: This requirement applies when the NR carrier is confined within 2545 – 2575 MHz or 2595 – 2645 MHz and the channel bandwidth is 10 or 20 MHz | | | | | | | |

#### 6.5A.3.3 Additional spurious emissions for CA

##### 6.5A.3.3.1 Additional spurious emissions for intra-band contiguous CA

##### 6.5A.3.3.1.1 Requirement for network signalling value "CA\_ NS\_04"

When "CA\_NS04" is indicated in the cell, the power of any UE emission shall not exceed the levels specified in Table 6.5A.3.3.1.1-1. This requirement also applies for the frequency ranges that are less than FOOB (MHz) in Table 6.5A.3.1-1 from the edge of the aggregated channel bandwidth.

Table 6.5A.3.3.1.1-1: Additional requirements for "CA\_ NS\_04"

|  |  |  |
| --- | --- | --- |
| Frequency range  (MHz) | BWChannel\_CA (MHz) / Spectrum emission limit (dBm) | Measurement bandwidth |
| 20 to 190 MHz |
| 2495 ≤ f < 2496 | -13 | Max(1 % of BWChannel\_CA, 1 MHz) |
| 2490.5 ≤ f < 2495 | -13 | 1 MHz |
| 0.009 < f < 2490.5 | -25 | 1 MHz |

##### 6.5A.3.3.1.2 Requirement for network signalling value "CA\_ NS\_27"

When "CA\_NS 27" is indicated in the cell, the power of any UE emission shall not exceed the levels specified in Table 6.5A.3.3.1.2-1. This requirement also applies for the frequency ranges that are less than FOOB (MHz) in Table Table 6.5A.3.1-1 from the edge of the aggregated channel bandwidth.

Table 6.5A.3.3.1.2-1: Additional requirements for "CA\_ NS\_27"

|  |  |  |
| --- | --- | --- |
| Frequency range  (MHz) | Spectrum emission limit (dBm) for aggregated channel bandwidth of  max 40 MHz | Measurement bandwidth |
| 9 kHz – 3530 MHz | -40 | 1 MHz |
| 3530 MHz – 3540 MHz | -25 |
| 3710 MHz – 3720 MHz | -25 |
| 3720 MHz – 12.75 GHz | -40 |

##### 6.5A.3.3.1.3 Requirement for network signalling value "CA\_ NS\_46"

When "CA\_NS 46" is indicated in the cell, the power of any UE emission shall not exceed the levels specified in Table 6.5A.3.3.1.3-1. This requirement also applies for the frequency ranges that are less than FOOB (MHz) in Table Table 6.5A.3.1-1 from the edge of the aggregated channel bandwidth.

Table 6.5A.3.3.1.3-1: Additional requirements for “CA\_NS\_46”

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Protected band | Frequency range (MHz) | | | Maximum Level (dBm) | MBW (MHz) | NOTE |
| Frequency range | 2570 | - | 2575 | +1.6 | 5 | 1, 2 |
| Frequency range | 2575 | - | 2595 | -15.5 | 5 | 1, 2 |
| Frequency range | 2595 | - | 2620 | -40 | 1 | 1 |
| NOTE 1: This requirement is applicable for carriers confined in 2500-2570 MHz.  NOTE 2: For these adjacent bands, the emission limit could imply risk of harmful interference to UE(s) operating in the protected operating band. | | | | | | |

\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\* No changes \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

### 7.3A.2 Reference sensitivity power level for CA

#### 7.3A.2.1 Reference sensitivity power level for Intra-band contiguous CA

For intra-band contiguous carrier aggregation, the throughput of each component carrier shall be ≥ 95 % of the maximum throughput of the reference measurement channels as specified in Annexes A.2.2.2, A.2.3.2, 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 7.3.2-1, Table 7.3.2-2, and Table 7.3.2-3.

For UE(s) supporting one uplink carrier, the uplink configuration of the PCC shall be in accordance with Table 7.3.2-3 and the downlink PCC carrier center frequency shall be configured closer to uplink operating band than any of the downlink SCC center frequency.

For aggregation of two or more downlink FDD carriers with one uplink carrier the reference sensitivity is defined only for the specific uplink and downlink test points which are specified in Table 7.3A.2.1-1. The requirements apply with all downlink carriers active. Unless given by Table 7.3.2-4, the reference sensitivity requirements shall be verified with the network signaling value NS\_01 (Table 6.2.3.1-1) configured.

Table 7.3A.2.1-1: Intra-band contiguous CA uplink configuration for reference sensitivity

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| CA configuration | SCS  (kHz) | Aggregated channel bandwidth (PCC+SCC) | UL PCC allocation  (LCRB) | UL SCC allocation  (LCRB) | PCC ΔRIBNC (dB) | SCC ΔRIBNC (dB) | Duplex mode |
| CA\_n7B | 15+15 | 52RB+216RB | 20 (RBstart = 32) | 25 (RBstart = 191) | [34] | [25] | FDD |
| 52RB+216RB | 0 | 64 (RBstart = 152) | [8.5] | [5.5] |
| 106RB+160RB | 0 | 64 (RBstart = 96) | [8.5] | [4] |
| 79RB+160RB | 0 | 64 (RBstart = 15) | [8] | [0] |
| NOTE 1:   All combinations of channel bandwidths defined in Table 5.5A.1-1.  NOTE 2:   The carrier centre frequency of SCC in the UL operating band is configured closer to the DL operating band.  NOTE 3:   The transmitted power over both PCC and SCC shall be set to PUMAX as defined in subclause 6.2A.4.  NOTE 4:   The PCC allocation is same as Transmission bandwidth configuration NRB as defined in Table 5.3.2-1. | | | | | | | |

\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\* End of changes \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*