**3GPP TSG-RAN WG4 Meeting #95-e *REV\_R4-2007799***

**Electronic meeting, 25 May – 5 June April 2020**

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| *CR-Form-v12.0* | | | | | | | | |
| **CHANGE REQUEST** | | | | | | | | |
|  | | | | | | | | |
|  | **38.101-1** | **CR** | **0362** | **rev** | **1** | **Current version:** | **16.3.0** |  |
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| *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:*** | Introduction of requirements for NR-DC | | | | | | | | | |
|  |  | | | | | | | | | |
| ***Source to WG:*** | Ericsson | | | | | | | | | |
| ***Source to TSG:*** | R4 | | | | | | | | | |
|  |  | | | | | | | | | |
| ***Work item code:*** | LTE\_NR\_DC\_CA\_enh-Core | | | | |  | ***Date:*** | | | 2020-06-09 |
|  |  | | | |  | |  | | |  |
| ***Category:*** | **B** |  | | | | | ***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-12 (Release 12)* *Rel-13 (Release 13) Rel-14 (Release 14) Rel-15 (Release 15) Rel-16 (Release 16)* | |
|  |  | | | | | | | | | |
| ***Reason for change:*** | | Introduce requirements for inter-band NR-DC in FR1 for UEs configured with one cell per cell group (band). | | | | | | | | |
|  | |  | | | | | | | | |
| ***Summary of change:*** | | Subclause 6.2B:  6.2B.1: maximum output power specified for DC\_n2A-n5A.  6.2B.2 and 6.2B.3: MPR and A-MPR the same as the non-CA requirements per cell group.  6.2B.4:  Pcmax is specified for both MCG and SCG (changes are relative to clause 6.2.4, include cell-group P-max values).  The total NR-DC power os specified for all *NR-DC-PC-modes,* including the applicable maximum configured power per CG in accordance with 38.213 for each NR-DC PC mode. Power class 3 is assumed on both CG and that the total NR-DC power complies with Power class 3.  Test cases are specified for the total measured NR-DC power (PUMAX) and the measured CG power (both depend on NR-DC PC mode).  The evaluation of the PUMAX is specified like for EN-DC reusing the same notions (some change of notation could be motivated, e.g. “physical channel” is undefined, but not addressed in this CR).  The remaining requirements are specified by reference to the corresponding inter-band CA configurations (no implicit specification).  Subclauses 6.3B, 6.4B and 6.5B: requirements for an inter-band NR-DC configuration are referred to the corresponding requirements for the corresponding inter-band CA configuration.  Subclauses 7.3B, 7.4B, 7.5B, 7.6B, 7.7B, 7.8B and 7.9B: requirements for an inter-band NR-DC configuration are referred to the corresponding requirements for the corresponding inter-band CA configuration. | | | | | | | | |
|  | |  | | | | | | | | |
| ***Consequences if not approved:*** | | Requirements for NR-DC within FR1 are not specified. | | | | | | | | |
|  | |  | | | | | | | | |
| ***Clauses affected:*** | | 6.2B, new subclauses 6.3B, 6.4B and 6.5B, 7.3B, new subclauses 7.4B, 7.5B, 7.6B, 7.7B, 7.8B and 7.9B. | | | | | | | | |
|  | |  | | | | | | | | |
|  | | **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:*** | | r1: square brackets removed in sub-clause 6.2B.4.1. Editorial correction: the numbering of table notes in Table 6.2B.1.3-1 corrected, incomplete (Note 3 and Note 4) | | | | | | | | |

*< start of changes >*

## 6.2B Transmitter power for NR-DC

### 6.2B.0 General

The requirements apply for inter-band NR-DC with one uplink serving cell configured per CG.

### 6.2B.1 UE maximum output power for NR-DC

For inter-band NR-DC with one uplink carrier assigned per NR band, the transmitter power requirements in clause 6.2 apply per band.

For inter-band NR-DC with one uplink assigned per band, the UE maximum output power shall be measured over all component carriers from different bands. If each band has separate antenna connectors, the maximum output power is measured as the sum of maximum output power at each UE antenna connector. The period of measurement shall be at least one sub frame (1 ms). The maximum output power is specified in Table 6.2B.1.3-1.

Table 6.2B.1.3-1 UE Power Class for inter-band NR-DC

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Uplink CA Configuration | Class 1 (dBm) | Tolerance (dB) | Class 2 (dBm) | Tolerance  (dB) | Class 3 (dBm) | Tolerance (dB) | Class 4 (dBm) | Tolerance (dB) |
| DC\_n2A-n5A |  |  |  |  | 23 | +2/-31 |  |  |
| NOTE 1: For transmission bandwidths confined within FUL\_low and FUL\_low + 4 MHz or FUL\_high – 4 MHz and FUL\_high within each CG, the maximum output power requirement is relaxed by reducing the lower tolerance limit by 1.5 dB  NOTE 2: PPowerClass is the maximum UE power specified without account o the tolerance  NOTE 3: The maximum power requirement applies to the total transmitted power over both the MCG and SCG.  NOTE 4: Power class 3 is the default power class unless otherwise stated. | | | | | | | | |

### 6.2B.2 UE maximum output power reduction for NR-DC

For inter-band NR-DC with one uplink assigned per band, the requirements in clause 6.2.2 apply for each uplink component carrier.

### 6.2B.3 UE additional maximum output power reduction for NR-DC

For inter-band NR-DC with one uplink assigned per band, the requirements in clause 6.2.3 apply for each uplink component carrier.

#### 6.2B.4.1 Configured transmitted power level for NR-DC

The UE is allowed to set its configured maximum output power PCMAX,f,*c,*MCGand PCMAX,f,*c,*SCGfor the respective MCG and SCG and its total configured maximum output power for NR-DC operation with as specified in clause 7.6.2 of [8]. The UE is configured with an inter-CG power sharing mode by *NR-DC-PC-mode.*The requirements apply for one uplink serving cell configured per CG and for asynchronous and synchronous NR-DC if not otherwise stated.

Unless otherwise stated, the configured maximum output power PCMAX,f,*c,*MCG(*q*) in physical-channel *q* for carrier *f* of serving cell *c* shall be set within the bounds if contained in the MCG,

PCMAX\_L,f,*c,*MCG (*q*) ≤ PCMAX,f,*c,*MCG(*q*) ≤ PCMAX\_H,f,*c,*MCG (*q*)

and the corresponding PCMAX\_L,f,*c,*SCG (*q*) for a serving cell contained in the SCG,

PCMAX\_L,f,*c,*SCG (*q*) ≤ PCMAX,f,*c,*SCG(*q*) ≤ PCMAX\_H,f,*c,*SCG (*q*)

where PCMAX\_L,f,c,MCG, PCMAX\_H,f,c,MCG, PCMAX\_L,f,c,SCG and PCMAX\_H,f,c,SCG are the limits for a serving cell *c* as specified in clause 6.2.4 modified as follows:

PCMAX\_L,f,c,MCG = MIN{MIN(PEMAX,c , PEMAX,NR-DC, PNR) – ∆TC,c, (PPowerClass – ΔPPowerClass) – MAX(MAX(MPRc, A-MPRc)+ ΔTIB,c + ∆TC,c +∆TRxSRS, P-MPRc)}

PCMAX\_H,f,c,MCG = MIN{PEMAX,c, PEMAX,NR-DC, PNR, PPowerClass – ΔPPowerClass}

for the MCG and

PCMAX\_L,f,c,SCG = MIN{MIN(PEMAX,c , PEMAX,NR-DC, PNR) – ∆TC,c, (PPowerClass – ΔPPowerClass) – MAX(MAX(MPRc, A-MPRc)+ ΔTIB,c + ∆TC,c +∆TRxSRS, P-MPRc)}

PCMAX\_H,f,c,SCG = MIN{PEMAX,c, PEMAX,NR-DC, PNR, PPowerClass – ΔPPowerClass}

for the SCG, where

- PEMAX,NR-DC is the value given by the field *p-UE-FR1* of the *PhysicalCellGroupConfig* IE for the MCG as defined in [7];

- PNR is the value given by the field *p-NR-FR1* of the *PhysicalCellGroupConfig* IE as defined in [7];

For a UE provided with *NR-DC-PC-mode* = *Semi-static-mode1*,

= MIN{PEMAX, NR-DC, PPowerClass} + 0.3 dB

with PPowerClass set to power class 3 in case the UE indicates a higher power class in any CG. The UE determines the maximum transmission power for the MCG and the SCG using the respective configured maximum power PCMAX,f,*c,*MCGand PCMAX,f,*c,*SCG.

If for synchronous NR-DC operation a UE is provided *NR-DC-PC-mode* = *Semi-static-mode2*, the is determined as above and

- if at least one symbol of slot of the MCG/SCG is indicated as uplink or flexible to a UE by *tdd-UL-DL-ConfigurationCommon* and *tdd*-*UL-DL-ConfigurationDedicated*, if provided, overlaps with a symbol for any ongoing transmission overlapping with slot of the SCG/MCG, the UE determines a maximum power for the transmission on the SCG/MCG overlapping with slot using the configured maximum power PCMAX,f,*c,*SCGor PCMAX,f,*c,*MCG for the SCG or MSG, respectively,

- otherwise (i.e. an ongoing transmission overlapping with slot of the SCG/MCG overlaps with only semi-static downlink symbols within slot of the MCG/SCG), the UE determines amaximum power for the transmission on MCG or the SCG overlapping with slot using the configured maximum power as specified in clause 6.2.4.

If a UE indicates a capability for dynamic power sharing between the MCG and the SCG and is provided with *NR-DC-PC-mode = Dynamic*,

= MIN{PEMAX, NR-DC, PPowerClass}

with PPowerClass set to power class 3 in case the UE indicates a higher power class in any CG. The UE determines the maximum transmission power for the MCG and the SCG using the respective configured maximum power PCMAX,f,*c,*MCGand PCMAX,f,*c,*SCG except

- if UE transmission(s) in slot of the MCG or in slot of the SCG do not overlap in time with any UE transmission(s) on the SCG or the MCG, respectively, the UE determines a maximum transmission power in slot of the MCG or in slot of the SCG using the configured maximum power as specified in clause 6.2.4.

If a UE indicates a capability to determine a total transmission power on the SCG at a first symbol of a transmission occasion on the SCG by determining transmissions on the MCG as specified in clause 7.6.2 of [8], and is provided with *NR-DC-PC-mode = Dynamic*,

= MIN{PEMAX, NR-DC, PPowerClass}

with PPowerClass set to power class 3 in case the UE indicates a higher power class in any CG. The UE determines the maximum transmission power for the MCG and the SCG using the respective configured maximum power PCMAX,f,*c,*MCGand PCMAX,f,*c,*SCG.

The measured total maximum output power PUMAX over both CGs measured over the transmission reference time duration is

PUMAX = 10 log10 (pUMAX,*c,*MCG + pUMAX,*c,*SCG),

where pUMAX,*c,*MSG and pUMAX,*c,*SCG denote the measured output power of serving cells *c* contained in the respective MSG and SCG expressed in linear scale.

The measured total configured maximum output power PUMAX shall be within the following bounds:

PCMAX\_L -TLOW (PCMAX\_L) ≤ PUMAX  ≤ PCMAX\_H + THIGH (PCMAX\_H)

with the tolerances TLOW(PCMAX\_H) and THIGH(PCMAX\_H) for applicable values of PCMAX specified in Table 6.2B.4.1.3-2.

When a subframe *p* on the MSG overlap with a physical-channel *q* on the SCG*,* then for PUMAX evaluation, the subframe *p* on the MCG is takenas reference period TREF and always considered as the reference measurement duration and the following rules are applicable.

TREF and Teval are specified in Table 6.2B.4.1.3-1 when same or different subframe and physical-channel durations are used on the carriers. The PPowerClass shall not be exceeded by the UE during any evaluation period of time.

Table 6.2B.4.1.3-1: PCMAX evaluation window

|  |  |  |
| --- | --- | --- |
| Transmission duration | TREF | Teval |
| Different transmission duration in different CG carriers | MCG subframe | MIN(*Tno\_hopping*, Physical Channel Length) |

For each TREF, the PCMAX\_H is evaluated per Teval and given by the maximum value over the transmission(s) within the Teval as follows:

PCMAX\_H = MAX{PCMAX\_NR-DC\_H(*p,q*), PCMAX\_NR-DC\_H(*p,q+1*), … , PCMAX\_NR-DC\_H(*p,q+n*)}

where PCMAX\_NR-DC\_H entries are the applicable upper limits for each overlapping scheduling unit pairs *(p,q*), (*p, q+1*), up to *(p, q+n*) for each applicable Teval duration, where *q+n* is the last physical-channel on the SCG overlapping with subframe *p* on the MCG, while PCMAX\_L is computed as follows:

PCMAX\_L = MIN{PCMAX\_NR-DC\_L(*p,q*), PCMAX\_NR-DC\_L(*p,q+1*), … , PCMAX\_NR-DC\_L(*p,q+n*)}

where PCMAX\_NR-DC\_L entries are the applicable lower limits for each overlapping scheduling unit pairs *(p,q*), (*p, q+1*) up to *(p, q+n*) for each applicable Teval duration, where *q+n* is the last physical-channel on the SCG overlapping with subframe *p* on the MCG.

For a UE provided with *NR-DC-PC-mode* = *Semi-static-mode1* and configured with pNR,MCG + pNR,SCG ≤ with pNR,MCG and pNR,SCG the values of the PNR for the respective MCG and SCG expressed in linear scale

PCMAX\_NR-DC\_L(*p,q*) = 10 log10 [pCMAX\_L,f,c,MCG (*p*) + pCMAX\_L,f,c,SCG (*q*)]

PCMAX\_NR-DC\_H(*p,q*) = 10 log10 [pCMAX\_H,f,c,MCG (*p*) + pCMAX\_H,f,c,SCG (*q*)]

with pCMAX\_L,f,c,MCG, pCMAX\_H,f,c,MCG, pCMAX\_L,f,c,SCG, and pCMAX\_H,f,c,SCG the values of the respective PCMAX\_L,f,c,MCG, PCMAX\_H,f,c,MCG, PCMAX\_L,f,c,MCG, and PCMAX\_H,f,c,SCG expressed in linear scale, while the measured configured maximum power PUMAX  for each CG shall meet the requirements as specified in subclause 6.2.4 but with bounds for PCMAX,f,*c,*MCG(*p*) and PCMAX,f,*c,*SCG as specified in this subclause.

If for synchronized NR-DC a UE is provided with *NR-DC-PC-mode* = *Semi-static-mode2* and configured with pNR,MCG + pNR,SCG ≤ with pNR,MCG and pNR,SCG the linear-scale values of the PNR for the respective MCG and SCG

PCMAX\_NR-DC\_L(*p,q*) = 10 log10 [pCMAX\_L,f,c,MCG (*p*) + pCMAX\_L,f,c,SCG (*q*)]

PCMAX\_NR-DC\_H(*p,q*) = 10 log10 [pCMAX\_H,f,c,MCG (*p*) + pCMAX\_H,f,c,SCG (*q*)]

while the measured configured maximum power PUMAX for each CG shall meet the requirements specified in Table 6.2.4-2 but with bounds for PCMAX,f,*c,*MCG(*p*) and PCMAX,f,*c,*SCG as specified in this subclause except

- if an ongoing transmission overlapping with physical channel *q* of the SCG or subframe *p* of the MCG overlaps with only semi-static downlink symbols within the respective subframe *p* of the MCG or physical channel *q* of the SCG as indicated to a UE by *tdd-UL-DL-ConfigurationCommon* and *tdd*-*UL-DL-ConfigurationDedicated*, if provided,

then the measured configured maximum power PUMAX for the transmission subframe *p* on the MCG or physical channel *q* on the SCG shall meet the requirements as specified in subclause 6.2.4 and with bounds for PCMAX,f,*c,*MCG(*p*) or PCMAX,f,*c,*SCG as specified in subclause 6.2.4.

For a UE provided with *NR-DC-PC-mode* = *Dynamic*,

PCMAX\_NR-DC\_L(*p,q*) = MIN{10 log10 [pCMAX\_L,f,c,MCG (*p*) + pCMAX\_L,f,c,SCG (*q*)], }

PCMAX\_NR-DC\_H(*p,q*) = MIN{10 log10 [pCMAX\_H,f,c,MCG (*p*) + pCMAX\_H,f,c,SCG (*q*)], }

while the measured configured maximum power PUMAX on the MCG shall meet the requirements as specified in subclause 6.2.4-2 but with bounds for PCMAX,f,*c,*MCG(*p*) as specified in this subclause, and the PUMAX on the SCG shall be within

PCMAX\_L,f,c – MAX{TL,c, T(PCMAX\_L,f,c)} ≤ PUMAX,f,c ≤ PCMAX\_H,f,c + T(PCMAX\_H,f,c).

where

PCMAX\_L,f,c = MIN{PCMAX\_L,f,c,SCG (*p*), 10 log10 ( – pNR,MSG)}

PCMAX\_H,f,c = MIN{PCMAX\_H,f,c,SCG (*p*), 10 log10 ( – pNR,MSG)}

with limits as specified in Table 6.2.4-2 and pNR,MCG the value of the PNR for the MCG expressed in linear scale.

Table 6.2B.4.1.3-2: PCMAX tolerance for NR-DC

|  |  |  |
| --- | --- | --- |
| PCMAX(dBm) | Tolerance  TLOW (PCMAX\_L) (dB) | Tolerance  THIGH (PCMAX\_H) (dB) |
| 23 ≤ PCMAX ≤ 33 | 3.0 | 2.0 |
| 22 ≤ PCMAX < 23 | 5.0 | 2.0 |
| 21 ≤ PCMAX< 22 | 5.0 | 3.0 |
| 20 ≤ PCMAX < 21 | 6.0 | 4.0 |
| 16 ≤ PCMAX < 20 | 5.0 | |
| 11 ≤ PCMAX < 16 | 6.0 | |
| -40 ≤ PCMAX < 11 | 7.0 | |
| NOTE 1: For UEs provided with *NR-DC-PC-mode* = *Semi-static-mode1 or* with *NR-DC-PC-mode* = *Semi-static-mode2*, the upper tolerance Thigh shall be reduced by 0.3 dB for P ≥ 20 dBm. | | |

#### 6.2B.4.2 ΔTIB,c for NR-DC

For inter-band NR-DC with one uplink carrier assigned per NR band, the ΔTIB,c for the corresponding inter-band CA configuration as specified in subclause 6.2A.4.2 applies.

*< text omitted >*

#### 6.3A.4.3 Power control for inter-band CA

No requirements unique to CA operation are defined.

## 6.3B Output power dynamics for NR-DC

## For inter-band NR-DC with one uplink carrier assigned per NR band, the output power dynamics for the corresponding inter-band CA configuration as specified in subclause 6.3A applies.6.3D Output power dynamics for UL MIMO

*< text omitted >*

#### 6.4A.2.3 Transmit modulation quality for inter-band CA

For inter-band carrier aggregation with uplink assigned to two NR bands, the transmit modulation quality requirements shall apply on each component carrier as defined in clause 6.4.2 with all component carriers active: PCC with PRB allocation and SCC without PRB allocation and without CSI reporting and SRS configured.

## 6.4B Transmit signal quality for NR-DC

For inter-band NR-DC with one uplink carrier assigned per NR band, the transmit signal quality for the corresponding inter-band CA configuration as specified in subclause 6.4A applies.

## 6.4D Transmit signal quality for UL MIMO

*< text omitted >*

##### 6.5A.3.2.3 Transmit intermodulation for Inter-band CA

For inter-band carrier aggregation with uplink assigned to two NR bands, the transmit intermodulation requirement is specified in Table 6.5.4-1 which shall apply on each component carrier with both component carriers active.

## 6.5B Output RF spectrum emissions for NR-DC

For inter-band NR-DC with one uplink carrier assigned per NR band, the output RF spectrum emissions for the corresponding inter-band CA configuration as specified in subclause 6.5A applies.

## 6.5D Output RF spectrum emissions for UL MIMO

*< text omitted >*

## 7.3B Reference sensitivity for NR-DC

For inter-band NR-DC configurations, the reference sensitivity for the corresponding inter-band CA configuration as specified in subclause 7.3A applies.

## 7.3C Reference sensitivity for SUL

*< text omitted >*

### 7.4A.3 Maximum input level for Inter-band CA

For inter-band carrier aggregation with one component carrier per operating band and the uplink assigned to one NR band, the maximum input level is defined with the uplink active on the band(s) other than the band whose downlink is being tested. For NR CA configurations including an operating band without uplink band or an operating band with an unpaired DL part (as noted in Table 5.2-1), the requirements for all downlinks shall be met with the single uplink carrier active in each band capable of UL operation. The UE shall meet the requirements specified in clause 7.4 for each component carrier while all downlink carriers are active.

The throughput shall be ≥ 95 % of the maximum throughput of the reference measurement channels as specified in Annexs 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) for each component carrier.

## 7.4B Maximum input level for NR-DC

For inter-band NR-DC configurations, the maximum input level for the corresponding inter-band CA configuration as specified in subclause 7.4A applies.

## 7.4D Maximum input level for UL MIMO

For UE with two transmitter antenna connectors in closed-loop spatial multiplexing, the minimum requirements specified in clause 7.4 shall be met with the UL MIMO configurations described in clause 6.2D.1. For UL MIMO, the parameter PCMAX\_L is defined as the total transmitter power over the two transmit antenna connectors.

*< text omitted >*

### 7.5A.3 Adjacent channel selectivity Inter-band CA

For inter-band carrier aggregation with one component carrier per operating band and the uplink assigned to one NR band, the adjacent channel requirements are defined with the uplink active on the band(s) other than the band whose downlink is being tested. For NR CA configurations including an operating band without uplink operation or an operating band with an unpaired DL part (as noted in Table 5.2-1), the requirements for all downlinks shall be met with the single uplink carrier active in each band capable of UL operation. The UE shall meet the requirements specified in clause 7.5 for each component carrier while all downlink carriers are active.

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).

## 7.5B Adjacent channel selectivity for NR-DC

For inter-band NR-DC configurations, the adjacent channel selectivity for the corresponding inter-band CA configuration as specified in subclause 7.5A applies.

## 7.5D Adjacent channel selectivity for UL MIMO

For UE(s) with two transmitter antenna connectors in closed-loop spatial multiplexing scheme, the minimum requirements specified in clause 7.5 shall be met with the UL MIMO configurations described in clause 6.2D.1. For UL MIMO, the parameter PCMAX\_L is defined as the total transmitter power over the two transmit antenna connectors.

*< text omitted >*

### 7.6C.4 Narrow band blocking for SUL

Narrow band blocking is not specified for SUL band combination.

## 7.6B Blocking characteristics for NR-DC

For inter-band NR-DC configurations, the blocking characterstics for the corresponding inter-band CA configuration as specified in subclause 7.6A applies.

## 7.6D Blocking characteristics for UL MIMO

For UE with two transmitter antenna connectors in closed-loop spatial multiplexing scheme, the minimum requirements specified in clause 7.6 shall be met with the UL MIMO configurations described in clause 6.2D.1. For UL MIMO, the parameter PCMAX\_L is defined as the total transmitter power over the two transmit antenna connectors.

*< text omitted >*

### 7.7A.3 Spurious response for Inter-band CA

For inter-band carrier aggregation with one component carrier per operating band and the uplink assigned to one NR band, the spurious response are defined with the uplink active on the band(s) other than the band whose downlink is being tested. The UE shall meet the requirements specified in clause 7.7 for each component carrier while all downlink carriers are active.

For the UE which supports inter-band CA configuration in Table 7.3A.3.2.1-1, Pinterferer power defined in Table 7.7-2 is increased by the amount given by ΔRIB,c in Table 7.3A.3.2.1-1.

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).

## 7.7B Spurious response for NR-DC

For inter-band NR-DC configurations, the spurious response for the corresponding inter-band CA configuration as specified in subclause 7.7B applies.

## 7.7D Spurious response for UL MIMO

For UE with two transmitter antenna connectors in closed-loop spatial multiplexing scheme, the minimum requirements specified in clause 7.7 shall be met with the UL MIMO configurations described in clause 6.2D.1. For UL MIMO, the parameter PCMAX\_L is defined as the total transmitter power over the two transmit antenna connectors.

*< text omitted >*

#### 7.8A.2.3 Wide band intermodulation for Inter-band CA

For inter-band carrier aggregation with one component carrier per operating band and the uplink assigned to one NR band, the wide band intermodulation requirements are defined with the uplink active on the band(s) other than the band whose downlink is being tested. The UE shall meet the requirements specified in clause 7.8 for each component carrier while all downlink carriers are active.

For the UE which supports inter-band CA configuration in Table 7.3A.3.2.1-1, Pinterferer power defined in Table 7.8.2-1 and 7.8.2-2 is increased by the amount given by ΔRIB,c in Table 7.3A.3.2.1-1.

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).

## 7.8B Intermodulation characteristics for NR-DC

For inter-band NR-DC configurations, the intermodulation characteristics for the corresponding inter-band CA configuration as specified in subclause 7.8A applies.

## 7.8D Intermodulation characteristics for UL MIMO

For UE(s) with two transmitter antenna connectors in closed-loop spatial multiplexing scheme, the minimum requirements in clause 7.8 shall be met with the UL MIMO configurations described in clause 6.2D.1. For UL MIMO, the parameter PCMAX\_L is defined as the total transmitter power over the two transmit antenna connectors.

*< text omitted >*

### 7.9A.3 Spurious emissions for Inter-band CA

For inter-band carrier aggregation including an operating band without uplink band, the UE shall meet the Rx spurious emissions requirements specified in clause 7.9 for each component carrier while all downlink carriers are active.

## 7.9B Spurious emissions for NR-DC

For inter-band NR-DC configurations, the spurious emissions for the corresponding inter-band CA configuration as specified in subclause 7.9A applies.

*< end of changes >*