# 6 Transmitter characteristics

## 6.1 General

Unless otherwise stated the transmitter characteristics are specified at the antenna connector(s) of the UE for the bands operating on frequency range 1 and over the air of the UE for the bands operating on frequency range 2. The requirements for frequency range 1 and frequency range 2 can be verified separately. For the carrier in frequency range 1, requirements can be verified with NR FR2 link disabled. For the carrier in frequency range 2, requirements can be verified in OTA mode with E-UTRA connecting to the network by OTA without calibration.

Unless otherwise stated, requirements for NR transmitter written in TS 38.101-1 [2] and TS 38.101-2 [3] apply and are assumed anchor agnostic. Unless otherwise stated, if UE indicates IE maxNumberSRS-Ports-PerResource = n2 in NR standalone operation mode, the said UE shall meet the NR requirements for either power class 2 or power class 3 in EN-DC within FR1 if UE indicates IE maxNumberSRS-Ports-PerResource = n1 for EN-DC on this NR band. Requirements are verified under conditions where anchor resources do not interfere NR operation.

## 6.2 Void

## 6.2A Transmitter power for CA

### 6.2A.1 UE maximum output power for CA

#### 6.2A.1.1 Inter-band CA between FR1 and FR2

Table 6.2A.1.1-1: Void

For inter-band NR CA in FR1 and FR2 combined, the UE shall meet each transmitter power requirement specified in clause 6.2.1 of TS 38.101-1 [2] and clause 6.2.1 TS 38.101-2 [3] independently.

### 6.2A.2 UE maximum output power reduction for CA

#### 6.2A.2.1 Inter-band CA between FR1 and FR2

For inter-band NR CA between FR1 and FR2, UE maximum output power reduction specified in TS 38.101-1 [2] and TS 38.101-2 [3] apply for each frequency range respectively.

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

For inter-band NR CA between FR1 and FR2, UE additional maximum output power reduction specified in TS 38.101-1 [2] and TS 38.101-2 [3] apply for each frequency range respectively.

### 6.2A.4 Configured output power for CA

#### 6.2A.4.1 Configured output power level

For inter-band NR CA between FR1 and FR2, UE configured output power specified in TS 38.101-1 [2] and TS 38.101-2 [3] apply for each frequency range respectively.

#### 6.2A.4.2 ΔTIB,c for CA

##### 6.2A.4.2.1 ΔTIB,c for Inter-band CA between FR1 and FR2

Unless otherwise stated, ΔTIB,c for NR FR1 band and FR2 band of inter-band CA defined in table 5.5A.1-1 is set to zero.

Table 6.2A.4.2.1-1: Void

## 6.2B Transmitter power for DC

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

#### 6.2B.1.1 Intra-band contiguous EN-DC

The following UE Power Classes define the total maximum output power for any transmission bandwidth(s) of the CG(s) configured.

The maximum output power is measured as the total maximum output power across the UE antenna connector(s). The period of measurement shall be at least one sub frame.

Table 6.2B.1.1-1: Maximum output power for EN-DC (continuous sub-blocks)

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| EN-DC configuration | Power class 2  (dBm) | Tolerance  (dB) | Power class 3  (dBm) | Tolerance  (dB) |
| DC\_(n)71AA |  |  | 23 | +2/-3 |
| DC\_(n)41AA | 26 | +2/-31 | 23 | +2/-31 |
| NOTE 1: If all transmitted resource blocks over all component carriers are confined within FUL\_low and FUL\_low + 4 MHz or/and FUL\_high – 4 MHz and FUL\_high, the maximum output power requirement is relaxed by reducing the lower tolerance limit by 1.5 dB  NOTE 2: Power Class 3 is the default power class unless otherwise stated. | | | | |

If UE supports a different power class than the default UE power class for EN-DC band combination, and the supported power class enables higher maximum output power than that of the default power class:

- if the E-UTRA UL/DL configuration is 0 or 6; or

- if the E-UTRA UL/DL configuration is 1 and special subframe configuration is 0 or 5; or

- if the IE *p-maxUE-FR1-r15* as defined in TS 36.331 [8] is provided and set to the maximum output power of the default power class or lower;

- apply all requirements for the default power class, and set the configured transmitted power as specified in clause 6.2B.4;

- else

- apply all requirements for the supported power class, and set the configured transmitted power class as specified in clause 6.2B.4;

#### 6.2B.1.2 Intra-band non-contiguous EN-DC

Table 6.2B.1.2-1: Maximum output power for EN-DC (non-continuous sub-blocks)

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| EN-DC configuration | Power class 2  (dBm) | Tolerance  (dB) | Power class 3  (dBm) | Tolerance  (dB) |
| DC\_3A\_n3A2 |  |  | 23 | +2/-3 |
| DC\_41A\_n41A | 26 | +2/-31 | 23 | +2/-31 |
| NOTE 1: If all transmitted resource blocks over all component carriers are confined within FUL\_low and FUL\_low + 4 MHz or/and FUL\_high – 4 MHz and FUL\_high, the maximum output power requirement is relaxed by reducing the lower tolerance limit by 1.5 dB  NOTE 2: Only single switched UL is supported in Rel.15  NOTE 3: Power Class 3 is the default power class unless otherwise stated. | | | | |

If UE supports a different power class than the default UE power class for EN-DC band combination, and the supported power class enables higher maximum output power than that of the default power class:

- if the E-UTRA UL/DL configuration is 0 or 6; or

- if the E-UTRA UL/DL configuration is 1 and special subframe configuration is 0 or 5; or

- if the IE *p-maxUE-FR1-r15* as defined in TS 36.331 [8] is provided and set to the maximum output power of the default power class or lower;

- apply all requirements for the default power class, and set the configured transmitted power as specified in clause 6.2B.4;

- else

- apply all requirements for the supported power class, and set the configured transmitted power class as specified in clause 6.2B.4;

#### 6.2B.1.3 Inter-band EN-DC within FR1

For inter-band EN-DC of E-UTRA and NR in FR1, the following UE Power Classes define the maximum output power for any transmission bandwidth within the aggregated channel bandwidth. The maximum output power is measured as the sum of the maximum output power at each UE antenna connector. The period of measurement shall be at least one sub frame (1ms). UE maximum output power shall be measured over all component carriers from different bands. If each band has separate antenna connectors, maximum output power is measured as the sum of maximum output power at each UE antenna connector.

Table 6.2B.1.3-1: Maximum output power for inter-band EN-DC (two bands)

| EN-DC configuration | Power class 3  (dBm) | Tolerance  (dB) |
| --- | --- | --- |
| DC\_1A\_n28A | 23 | +2/-3 |
| DC\_1A\_n40A | 23 | +2/-3 |
| DC\_1A\_n51A | 23 | +2/-3 |
| DC\_1A\_n77A | 23 | +2/-3 |
| DC\_1A\_n78A  DC\_1A\_n84A\_ULSUP-TDM\_n78A | 23 | +2/-3 |
| DC\_1A\_n79A | 23 | +2/-3 |
| DC\_2A\_n5A | 23 | +2/-31 |
| DC\_2A\_n66A | 23 | +2/-31 |
| DC\_2A\_n71A | 23 | +2/-3 |
| DC\_2A\_n78A | 23 | +2/-3 |
| DC\_3A\_n7A | 23 | +2/-31 |
| DC\_3A\_n28A | 23 | +2/-31 |
| DC\_3A\_n40A | 23 | +2/-31 |
| DC\_3A\_n51A | 23 | +2/-31 |
| DC\_3A\_n77A | 23 | +2/-31 |
| DC\_3A\_n78A  DC\_3A\_n80A\_ULSUP-TDM\_n78A, | 23 | +2/-31 |
| DC\_3A\_n79A  DC\_3A\_n80A\_ULSUP-TDM\_n79A, | 23 | +2/-31 |
| DC\_3A\_n82A | 23 | +2/-31 |
| DC\_5A\_n40A | 23 | +2/-31 |
| DC\_5A\_n66A | 23 | +2/-31 |
| DC\_5A\_n78A | 23 | +2/-3 |
| DC\_7A\_n28A | 23 | +2/-31 |
| DC\_7A\_n51A | 23 | +2/-31 |
| DC\_7A\_n78A  DC\_7C\_n78A | 23 | +2/-3 |
| DC\_8A\_n40A | 23 | +2/-31 |
| DC\_8A\_n77A | 23 | +2/-3 |
| DC\_8A\_n78A  DC\_8A\_n81A\_ULSUP-TDM\_n78A, | 23 | +2/-3 |
| DC\_8A\_n79A  DC\_8A\_n81A\_ULSUP-TDM\_n79A, | 23 | +2/-3 |
| DC\_11A\_n77A | 23 | +2/-3 |
| DC\_11A\_n78A | 23 | +2/-3 |
| DC\_11A\_n79A | 23 | +2/-3 |
| DC\_12A\_n5A | 23 | +2/-3 |
| DC\_12A\_n66A | 23 | +2/-3 |
| DC\_18A\_n77A | 23 | +2/-3 |
| DC\_18A\_n78A | 23 | +2/-3 |
| DC\_18A\_n79A | 23 | +2/-3 |
| DC\_19A\_n77A | 23 | +2/-3 |
| DC\_19A\_n78A | 23 | +2/-3 |
| DC\_19A\_n79A | 23 | +2/-3 |
| DC\_20A\_n8A | 23 | +2/-3 |
| DC\_20A\_n28A  DC\_20A\_n83A | 23 | +2/-3 |
| DC\_20A\_n51A | 23 | +2/-3 |
| DC\_20A\_n77A | 23 | +2/-3 |
| DC\_20A\_n78A  DC\_20A\_n82A\_ULSUP-TDM\_n78A, | 23 | +2/-3 |
| DC\_21A\_n77A | 23 | +2/-3 |
| DC\_21A\_n78A | 23 | +2/-3 |
| DC\_21A\_n79A | 23 | +2/-3 |
| DC\_25A\_n41A | 23 | +2/-3 |
| DC\_26A\_n41A | 23 | +2/-3 |
| DC\_26A\_n77A | 23 | +2/-3 |
| DC\_26A\_n78A | 23 | +2/-3 |
| DC\_26A\_n79A | 23 | +2/-3 |
| DC\_28A n51A | 23 | +2/-3 |
| DC\_28A\_n77A | 23 | +2/-3 |
| DC\_28A\_n78A  DC\_28A\_n83A\_ULSUP-TDM\_n78A, | 23 | +2/-3 |
| DC\_28A\_n79A | 23 | +2/-3 |
| DC\_30A\_n5A | 23 | +2/-3 |
| DC\_30A\_n66A | 23 | +2/-3 |
| DC\_38A\_n78A | N/A | N/A |
| DC\_39A\_n78A | 23 | +2/-31 |
| DC\_39A\_n79A | 23 | +2/-31 |
| DC\_40A\_n77A | N/A | N/A |
| DC\_41A\_n77A  DC\_41C\_n77A | 23 | +2/-31 |
| DC\_41A\_n78A  DC\_41C\_n78A | 23 | +2/-31 |
| DC\_41A\_n79A  DC\_41C\_n79A | 23 | +2/-31 |
| DC\_42A\_n51A | 23 | +2/-3 |
| DC\_42A\_n77A | N/A | N/A |
| DC\_42A\_n78A | N/A | N/A |
| DC\_42A\_n79A | N/A | N/A |
| DC\_66A\_n5A | 23 | +2/-31 |
| DC\_66A\_n71A | 23 | +2/-3 |
| DC\_66A\_n78A, DC\_66A\_n86A\_ULSUP-TDM\_n78A, | 23 | +2/-3 |
| NOTE 1: For the transmission bandwidths confined within FUL\_low and FUL\_low + 4 MHz or FUL\_high – 4 MHz and FUL\_high, the maximum output power requirement is relaxed by reducing the lower tolerance limit by 1.5 dB  NOTE 2: PPowerClass, EN-DC is the maximum UE power specified without taking into account the tolerance  NOTE 3: For inter-band EN-DC the maximum power requirement should apply to the total transmitted power over all component carriers (per UE).  NOTE 4: Power Class 3 is the default power class unless otherwise stated. | | |

#### 6.2B.1.3a Inter-band NE-DC within FR1

For inter-band NE-DC of E-UTRA and NR in FR1, the following UE power classes define the maximum output power for any transmission bandwidth within the aggregated channel bandwidth. The maximum output power is measured as the sum of the maximum output power at each UE antenna connector. The period of measurement shall be at least one sub frame (1 ms). UE maximum output power shall be measured over all component carriers from different bands. If each band has separate antenna connectors, maximum output power is measured as the sum of maximum output power at each UE antenna connector.

Table 6.2B.1.3a-1: Maximum output power for inter-band NE-DC (two bands)

| NE-DC configuration | Power class 3  (dBm) | Tolerance  (dB) |
| --- | --- | --- |
| DC\_n1A\_28A | 23 | +2/-3 |

#### 6.2B.1.4 Inter-band EN-DC including FR2

UE maximum output power requirement for E-UTRA single carrier and CA operation specified in clauses 6.2.2 and 6.2.2A of TS 36.101 [4] and for NR single carrier and CA operation specified in clause 6.2.1, 6.2A.1, and 6.2D.1 of TS 38.101-2 [3] apply.

#### 6.2B.1.5 Inter-band EN-DC including both FR1 and FR2

UE maximum output power requirement for E-UTRA single carrier and CA operation specified in clauses 6.2.2 and 6.2.2A of TS 36.101 [4] and for NR single carrier and CA operation specified in clause 6.2.1 of TS 38.101-1 [2] and clause 6.2.1, 6.2A.1, and 6.2D.1 of TS 38.101-2 [3] apply. When uplink is EN-DC mode within FR1 only then UE maximum output power requirement is specified in clause 6.2B.1.3 of this specification.

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

#### 6.2B.2.0 General

The UE maximum output power reduction (MPR) specified in this clause is applicable for UEs configured with EN-DC when NS\_01 is indicated in the MCG and the SCG. The MPR applies subject to indication in the field *modifiedMPRbehavior* for the SCG [2].

#### 6.2B.2.1 Intra-band contiguous EN-DC

##### 6.2B.2.1.1 General

When the UE is configured for intra-band contiguous EN-DC, the UE determines the total allowed maximum output power reduction as specified in this clause.

For UE supporting dynamic power sharing the following:

- for the MCG, MPR*c* in accordance with TS 36.101 [4]

- for the SCG,

MPR'*c* = MPRNR = MAX( MPRsingle,NR, MPRENDC)

- for the total configured transmission power,

MPRtot = PPowerClass,EN-DC – min(PPowerClass,EN-DC ,10\*log10(10^((PPowerClass,E-UTRA - MPRE-UTRA)/10) + 10^((PPowerClass,NR - MPRNR)/10))

where

MPRE-UTRA = MAX(MPRsingle,E-UTRA, MPRENDC )

with

- MPRsingle, E-UTRAis the MPR defined for the E-UTRA transmission in TS 36.101 [4]

- MPRsingle,NR is the MPR defined for the NR transmission in TS 38.101-1 [2]

For UEs not supporting dynamic power sharing the following

- for the MCG,

MPR*c* = MAX(MPRsingle,E-UTRA, MPRENDC )

- for the SCG,

MPR'*c* = MAX( MPRsingle,NR, MPRENDC )

where

- MPRsingle,NR is the MPR defined for the NR transmission in TS 38.101-1 [2]

- MPRsingle,E-UTRA is the MPR defined for the E-UTRA transmission in TS 36.101 [4]

MPRENDC is defined in Clause 6.2B.2.1.2

##### 6.2B.2.1.2 MPR for power class 3 and power class 2

MPR in this clause is applicable for power class 3 and power class 2 UEs indicating IE *dualPA-Architecture* supported with ENDC power class being the same as the E-UTRA and NR power class, otherwise the UE can use as much MPR as needed to fulfil emissions requirements when scheduled with dual uplink transmission. For UEs scheduled with single uplink transmission, MPR in clause 6.2.4 of TS 36.101 [4] and 6.2.2 of TS 38.101-1 [2] apply. For a UE supporting dynamic power sharing for DC\_(n)71AA for which dual simultaneous uplink transmissions are mandatory and A-MPR defined in clause 6.2B.3.1.1 is applied as MPR. The allowed maximum output power reduction applied to transmission on the MCG and the SCG is defined as follows:

MPRENDC = MA

Where MA is defined as follows

MA = 15 ; 0 ≤ B < 0.5

10 ; 0.5 ≤ B < 1.0

8 ; 1.0 ≤ B < 2.0

6 ; 2.0 ≤ B

Where:

For UEs supporting dynamic power sharing,

B = (LCRB\_alloc, E-UTRA \* 12\* SCSE-UTRA + LCRB\_alloc,NR \* 12 \* SCSNR)/1,000,000

For UEs not supporting dynamic power sharing,

For E-UTRA

B = (LCRB\_alloc, E-UTRA \* 12\* SCSE-UTRA + 12 \* SCSNR)/1,000,000

Where SCSNR = 15,000 Hz is assumed in calculation of B.

For NR

B = (12\* SCSE-UTRA + LCRB\_alloc,NR \* 12 \* SCSNR)/1,000,000

Where SCSE-UTRA = 15,000 Hz is assumed in calculation of B.

and MA is reduced by 1 dB for B < 2.

#### 6.2B.2.2 Intra-band non-contiguous EN-DC

##### 6.2B.2.2.1 General

When the UE is configured for intra-band non-contiguous EN-DC, the UE determines the total allowed maximum output power reduction as specified in this clause.

For UE supporting dynamic power sharing the following:

- for the MCG, MPR*c* in accordance with TS 36.101 [4]

- for the SCG,

MPR'*c* = MPRNR = MAX( MPRsingle,NR, MPRENDC)

- for the total configured transmission power,

MPRtot = PPowerClass,EN-DC – min(PPowerClass,EN-DC ,10\*log10(10^((PPowerClass,E-UTRA - MPRE-UTRA)/10) + 10^((PPowerClass,NR - MPRNR)/10))

where

MPRE-UTRA = MAX(MPRsingle,E-UTRA, MPRENDC )

with

- MPRsingle, E-UTRAis the MPR defined for the E-UTRA transmission in TS 36.101 [4]

- MPRsingle,NR is the MPR defined for the NR transmission in TS 38.101-1 [2]

For UEs not supporting dynamic power sharing the following

- for the MCG,

MPR*c* = MAX(MPRsingle,E-UTRA, MPRENDC )

- for the SCG,

MPR'*c* = MAX( MPRsingle,NR, MPRENDC )

where

- MPRsingle,NR is the MPR defined for the NR transmission in TS 38.101-1 [2]

- MPRsingle,E-UTRA is the MPR defined for the E-UTRA transmission in TS 36.101 [4]

MPRENDC is defined in Clause 6.2B.2.2.2

##### 6.2B.2.2.2 MPR for power class 3 and power class 2

MPR in this clause is applicable for power class 3 and power class 2 UEs indicating IE *dualPA-Architecture* supported with ENDC power class being the same as the E-UTRA and NR power class, otherwise the UE can use as much MPR as needed to fulfil emissions requirements when scheduled with dual uplink transmission. For UEs scheduled with single uplink transmission, MPR in clause 6.2.4 of TS 36.101 [4] and 6.2.2 of TS 38.101-1 [2] apply. The allowed maximum output power reduction for IM3 related emissions applied to transmission on the MCG and the SCG is defined as follows:

MPRENDC = MA

Where MA is defined as follows

MA = 18 ; 0 ≤ B < 1.0

17 ; 1.0 ≤ B < 2.0

16 ; 2.0 ≤ B < 5.0

15 ; 5.0 ≤ B

Where:

For UEs supporting dynamic power sharing,

B = (LCRB\_alloc, E-UTRA \* 12\* SCSE-UTRA + LCRB\_alloc,NR \* 12 \* SCSNR)/ 1,000,000

For UEs not supporting dynamic power sharing,

For E-UTRA

B= (LCRB\_alloc, E-UTRA \* 12\* SCSE-UTRA + 12 \* SCSNR)/ 1,000,000

Where SCSNR = 15,000 Hz is assumed in calculation of B.

For NR

B = (12 \* SCSE-UTRA + LCRB\_alloc,NR \* 12 \* SCSNR)/ 1,000,000

Where SCSE-UTRA = 15,000 Hz is assumed in calculation of B.

and MA is reduced by 1 dB for B < 2.

#### 6.2B.2.3 Inter-band EN-DC within FR1

For inter-band EN-DC between E-UTRA and FR1 NR, UE maximum output power reduction specified in TS 36.101 [4] and TS 38.101-1 [2] apply for E-UTRA and NR respectively.

#### 6.2B.2.3a Inter-band NE-DC within FR1

For inter-band NE-DC between E-UTRA and FR1 NR, UE maximum output power reduction specified in TS 36.101 [4] and TS 38.101-1 [2] apply for E-UTRA and NR respectively.

#### 6.2B.2.4 Inter-band EN-DC including FR2

UE maximum output power reduction requirement for E-UTRA single carrier and CA operation specified in clauses 6.2.3 and 6.2.3A of TS 36.101 [4] and for NR single carrier and CA operation specified in clause 6.2.2, 6.2A.2, and 6.2D.2 of TS 38.101-2 [3] apply.

#### 6.2B.2.5 Inter-band EN-DC including both FR1 and FR2

UE maximum output power reduction requirement for E-UTRA single carrier and CA operation specified in clauses 6.2.3 and 6.2.3A of TS 36.101 [4] and for NR single carrier and CA operation specified in clause 6.2.2 of TS 38.101-1 [2] and clause 6.2.2, 6.2A.2, and 6.2D.2 of TS 38.101-2 [3] apply.

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

#### 6.2B.3.1 Intra-band contiguous EN-DC

##### 6.2B.3.1.0 General

For intra-band contiguous EN-DC band combinations with additional requirements the allowed A-MPR is specified in Table 6.2B.3.1.0-1 for UEs configured with EN-DC and combinations of network signalling values indicated in the E-UTRA and NR cell groups.

Unless otherwise stated the A-MPR specified in clause 6.2B.3.1 for intra-band contiguous EN-DC configurations is the total power reduction allowed including MPR.

Table 6.2B.3.1.0-1: Additional maximum power reduction for Intra-band contiguous EN-DC

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| DC configuration | Requirement (clause) | E-UTRA network signalling value | NR network signalling value | A-MPR  (clause) |
| DC\_(n)71AA | 6.5B.2.1.2.1 | NS\_35 | NS\_35 | 6.2B.3.1.13 |
| DC\_(n)41AA1 | 6.5B.2.1.2.2 | NS\_01 or NS\_04 | NS\_04 | 6.2B.3.1.24 |
| NOTE 1: Only applies to UEs that support dual UL transmission for this EN-DC combination.  NOTE 2: The additional emission requirement is indicated when the combination of network signalling values in the two CGs is set (only for UEs configured with EN-DC).  NOTE 3: The A-MPR is applied as MPR if NS\_35 is not signalled.  NOTE 4: Void | | | | |

##### 6.2B.3.1.1 A-MPR for DC\_(n)71AA

For UE supporting dynamic power sharing the following:

- for the MCG, A-MPR*c* in accordance with TS 36.101 [4]

- for the SCG, A-MPR'*c* = A-MPRDC

- for the total configured transmission power, A-MPRtot = A-MPRDC

with A-MPRDC as defined in this clause.

For UEs not supporting dynamic power sharing the following

- for the MCG,

A-MPR*c* = A-MPRE-UTRA

- for the SCG,

A-MPR'*c* = A-MPRNR

with A-MPRE-UTRA and A-MPRNR as defined in this clause.

For DC\_(n)71AA with configured with network signaling values as per Table 6.2B.3.1.0-1 the allowed A-MPR is defined by

- for UE indicating support of dynamicPowerSharing in the *UE-MRDC-Capability* IE

A-MPRDC = CEIL{ MA,DC (A), 0.5}

where A-MPRDC is the total power reduction allowed (dB),

- for OFDM:

MA,DC = 11.00 - 11.67\*A; 0.00 < A ≤ 0.30

8.10 - 2.00\*A; 0.30 < A ≤ 0.80

6.50; 0.80 < A ≤ 1.00

- for DFT-S-OFDM:

MA,DC = 11.00 - 13.33\*A; 0.00 < A ≤ 0.30

8.00 - 3.33\*A; 0.30 < A ≤ 0.60

6.00; 0.60 < A ≤ 1.00

where

with LCRB, E-UTRA and NRB, E-UTRA the number of allocated PRB and transmission bandwidth for MCG, LCRB,NR and NRB,NR the number of allocated PRB and transmission bandwidth for SCG with SCS = 15 kHz.

- for UE not indicating support of dynamicPowerSharing

A-MPRE-UTRA = CEIL{ MA,E-UTRA , 0.5}

A-MPRNR = CEIL{ MA,NR, 0.5}

where A-MPR is the total power reduction allowed per CG with

Where LCRB,NR and NRB,NR the number of allocated PRB and transmission bandwidth for SCG with SCS = 15 kHz.

##### 6.2B.3.1.2 A-MPR for NS\_04

6.2B.3.1.2.0 General

When the UE is configured for B41/n41 intra-band contiguous EN-DC and it receives IE NS\_04, the UE determines the total allowed maximum output power reduction as specified in this clause. The A-MPR for EN-DC defined in this clause is used instead of MPR defined in 6.2B.2.1, not additively, so EN-DC MPR = 0 when NS\_04 is signaled. For UEs scheduled with single uplink transmission, AMPR in clause 6.2.4 of [4] and 6.2.3 of [2] apply.

For UE supporting dynamic power sharing the following:

- for the MCG, A-MPR*c* in accordance with TS 36.101 [4]

- for the SCG,

A-MPR'*c* = A-MPRNR = MAX( A-MPRsingle,NR, A-MPRIM3)

- for the total configured transmission power,

A-MPRtot = PPowerClass,EN-DC – min(PPowerClass,EN-DC ,10\*log10(10^((PPowerClass,E-UTRA - A-MPRE-UTRA)/10) + 10^((PPowerClass,NR - A-MPRNR)/10))

where

A-MPRE-UTRA = MAX( A-MPRsingle,E-UTRA + MPRsingle,E-UTRA, A-MPRIM3 )

with

- A-MPRsingle, E-UTRA is the A-MPR defined for the E-UTRA transmission in TS 36.101 [4]

- A-MPRsingle,NR is the A-MPR defined for the NR transmission in TS 38.101-1 [2]

- MPRsingle,E-UTRA is the MPR defined for the E-UTRA transmission in TS 36.101 [4]

For UEs not supporting dynamic power sharing the following

- for the MCG,

A-MPR*c* = MAX( A-MPRsingle, E-UTRA + MPRsingle,E-UTRA, A-MPRIM3 )

- for the SCG,

A-MPR'*c* = MAX( A-MPRsingle,NR, A-MPRIM3 )

where

- A-MPRsingle, E-UTRAis the A-MPR defined for the E-UTRA transmission in TS 36.101 [4]

- A-MPRsingle,NR is the A-MPR defined for the NR transmission in TS 38.101-1 [2]

- MPRsingle,E-UTRA is the MPR defined for the E-UTRA transmission in TS 36.101 [4]

The UE determines the Channel Configuration Case and the value of A-MPRIM3 as follows:

If FIM3,low\_block,low < 2490.5 MHz

Channel Configuration Case B. A-MPRIM3 defined in Clause 6.2B.3.1.2.2

Else

Channel Configuration Case A. A-MPRIM3 defined in Clause 6.2B.3.1.2.1

where

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

- Flow\_channel,low\_edge is the lowermost frequency of lower transmission bandwidth configuration.

- Fhigh\_channel,high\_edge is the uppermost frequency of upper transmission bandwidth configuration.

Where the transmission bandwidth configuration for NR is the maximum frequency span covering all the configured SCSSpecificCarrier for scenarios that carrier bandwidths with different SCS can be fully overlapped.

6.2B.3.1.2.1 A-MPRIM3 for NS\_04 to meet -13 dBm / 1MHz for 26dBm UE power

A-MPR in this clause is relative to 26 dBm for a power class 2 Cell Group. The same A-MPR is used relative to 23 dBm for a power class 3 Cell Group. For the UE is configured with channel configurations Case A or Case C (defined in Clause 6.2B.3.2.1), the allowed maximum output power reduction for IM3s applied to transmission on the MCG and the SCG with non-contiguous resource allocation is defined as follows:

A-MPRIM3 = MA

Where MA is defined as follows

MA = 15 ; 0 ≤ B < 0.5

10 ; 0.5 ≤ B < 1.0

8 ; 1.0 ≤ B < 2.0

6 ; 2.0 ≤ B

Where:

For UEs supporting dynamic power sharing,

B = (LCRB\_alloc, E-UTRA \* 12\* SCSE-UTRA + LCRB\_alloc,NR \* 12 \* SCSNR)/1,000,000

For UEs not supporting dynamic power sharing,

For E-UTRA

B = (LCRB\_alloc, E-UTRA \* 12\* SCSE-UTRA + 12 \* SCSNR)/1,000,000

Where SCSNR =15,000 Hz is assumed in calculation of B.

For NR

B = (12\* SCSE-UTRA + LCRB\_alloc,NR \* 12 \* SCSNR)/1,000,000

Where SCSE-UTRA = 15,000 Hz is assumed in calculation of B.

and MA is reduced by 1 dB for B < 2.0.

6.2B.3.1.2.2 A-MPR for NS\_04 to meet -25 dBm / 1MHz for 26 dBm UE power

A-MPR in this clause is relative to 26 dBm for a power class 2 Cell Group. The same A-MPR is used relative to 23 dBm for a power class 3 Cell Group. For the UE is configured with channel configurations Case B or Case D (defined in Clause 6.2B.3.2.1), the allowed maximum output power reduction for IM3s applied to transmission on the MCG and the SCG with non-contiguous resource allocation is defined as follows:

A-MPRIM3 = MA

Where MA is defined as follows

MA = 15 ; 0 ≤ B < 1.0

14 ; 1.0 ≤ B < 2.0

13 ; 2.0 ≤ B < 5.0

12 ; 5.0 ≤ B

Where:

For UEs supporting dynamic power sharing,

B = (LCRB\_alloc, E-UTRA \* 12\* SCSE-UTRA + LCRB\_alloc,NR \* 12 \* SCSNR)/ 1,000,000

For UEs not supporting dynamic power sharing,

For E-UTRA

B = (LCRB\_alloc,E-UTRA \* 12\* SCSE-UTRA + 12 \* SCSNR)/1,000,000

Where SCSNR =15,000 Hz is assumed in calculation of B.

For NR

B = (12\* SCSE-UTRA + LCRB\_alloc,NR \* 12 \* SCSNR)/1,000,000

Where SCSE-UTRA = 15,000 Hz is assumed in calculation of B.

and MA is reduced by 1 dB.

#### 6.2B.3.2 Intra-band non-contiguous EN-DC

##### 6.2B.3.2.0 General

For intra-band non-contiguous EN-DC band combinations with additional requirements the A-MPR allowed are specified in Table 6.2B.3.2.0-1 for UEs configured with EN-DC and combinations of network signalling values indicated in the E-UTRA and NR cell group(s). Unless otherwise stated the A-MPR specified in clause 6.2B.3.2 for intra-band non-contiguous EN-DC configurations is the total power reduction allowed including MPR. For UEs scheduled with single uplink transmission, AMPR in clause 6.2.4 of [4] and 6.2.3 of [2] apply.

Table 6.2B.3.2.0-1: Allowed power reduction for intra-band non-contiguous EN-DC

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| DC configuration | Requirement (clause) | E-UTRA network signalling value | NR network signalling value | A-MPR (clause) |
| DC\_41A\_n41A1 | 6.6.3.3.19 and 6.6.2.2.2 of [4] and 6.5.2.3.2 and 6.5.3.3.1 of [2] | NS\_01 or NS\_04 | NS\_04 | 6.2B.3.2.1 |
| NOTE 1: Only applies to UEs that support dual UL transmission for this EN-DC combination.  NOTE 2: The requirement applies when the combination of network signalling values in the two CGs is set (only for UEs configured with EN-DC). | | | | |

##### 6.2B.3.2.1 A-MPR for NS\_04

When the UE is configured for B41/n41 intra-band non-contiguous EN-DC and it receives IE NS\_04, the UE determines the total allowed maximum output power reduction as specified in this clause. The A-MPR for EN-DC defined in this clause is used instead of MPR defined in 6.2B.2.2, not additively, so EN-DC MPR=0 when NS\_04 is signaled.

For UE supporting dynamic power sharing the following:

- for the MCG, A-MPR*c* in accordance with TS 36.101 [4]

- for the SCG,

A-MPR'*c* = A-MPRNR = MAX( A-MPRsingle,NR, A-MPREN-DC)

- for the total configured transmission power,

A-MPRtot = PPowerClass,EN-DC – min(PPowerClass,EN-DC ,10\*log10(10^((PPowerClass,E-UTRA - A-MPRE-UTRA)/10) + 10^((PPowerClass,NR - A-MPRNR)/10))

where

A-MPRE-UTRA = MAX( A-MPRsingle,E-UTRA + MPRsingle,E-UTRA, A-MPREN-DC )

A-MPREN-DC = MAX(A-MPRIM3, A-MPRACLRoverlap )

with

- A-MPRsingle, E-UTRA is the A-MPR defined for the E-UTRA transmission in TS 36.101 [4]

- A-MPRsingle,NR is the A-MPR defined for the NR transmission in TS 38.101-1 [2]

- MPRsingle,E-UTRA is the MPR defined for the E-UTRA transmission in TS 36.101 [4]

For UEs not supporting dynamic power sharing the following

- for the MCG,

A-MPR*c* = MAX( A-MPRsingle, E-UTRA + MPRsingle,E-UTRA, A-MPRIM3, A-MPRACLRoverlap)

- for the SCG,

A-MPR'*c* = MAX( A-MPRsingle,NR, A-MPRIM3, A-MPRACLRoverlap)

where

- A-MPRsingle, E-UTRAis the A-MPR defined for the E-UTRA transmission in TS 36.101 [4]

- A-MPRsingle,NR is the A-MPR defined for the NR transmission in TS 38.101-1 [2]

- MPRsingle,E-UTRA is the MPR defined for the E-UTRA transmission in TS 36.101 [4]

The UE determines the Channel Configuration Case and the value of A-MPRIM3 as follows:

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

Channel Configuration Case C. A-MPRIM3 defined in Clause 6.2B.3.1.2.1

Else

Channel Configuration Case D. A-MPRIM3 defined in Clause 6.2B.3.1.2.2

where

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

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

- Flow\_channel,low\_edge is the lowermost frequency of lower transmission bandwidth configuration.

- Flow\_channel,high\_edge is the uppermost frequency of lower transmission bandwidth configuration.

- Fhigh\_channel,low\_edge is the lowermost frequency of upper transmission bandwidth configuration.

- Fhigh\_channel,high\_edge is the uppermost frequency of upper transmission bandwidth configuration.

- 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 6.6.2.2.2 in [4] and Clause 6.5.2.3.2 in [2] respectively.

Where the transmission bandwidth configuration for NR is the maximum frequency span covering all the configured SCSSpecificCarrier for scenarios that carrier bandwidths with different SCS can be fully overlapped.

The UE determines the value of A-MPRACLRoverlap as specified in Table 6.2B.3.2.1-1:

Table 6.2B.3.2.1-1: A-MPRACLRoverlap

|  |  |
| --- | --- |
| Wgap | A-MPRACLRoverlap |
| < BWchannel,E-UTRA + BWchannel,NR | 4 dB |
| ≥ BWchannel,E-UTRA + BWchannel,NR | 0 dB |
| NOTE 1: Wgap = Fhigh\_channel,low\_edge - Flow\_channel,high\_edge | |

#### 6.2B.3.3 Inter-band EN-DC within FR1

For inter-band EN-DC between E-UTRA and FR1 NR, UE additional maximum output power reduction specified in TS 36.101 [4] and TS 38.101-1 [2] apply for E-UTRA and NR respectively.

Unless specified in Table 6.2B.3.3-1, for inter-band carrier aggregation with uplink assigned to LTE and NR bands, the requirements in [2] clause 6.2.3 apply for NR uplink component carrier and the requirements in [4] clause 6.2.4 apply for LTE uplink component carrier.

Unless otherwise stated, for inter-band EN-DC with uplink assigned to LTE and NR bands and specified in Table 6.2B.3.3-1, the combined requirements and allowed A-MPR are applibale on both LTE and NR bands when LTE and NR component carriers are active. The requirements in Table 6.2B.3.3-1 are specified in terms of an additional spectrum emission requirement. The emission requirements specified in Table 6.2B.3.3-1 also apply for the frequency ranges that are less than FOOB (MHz) from the edge of the channel bandwidth specified in TS 36.101 [4] and TS 38.101-1 [2], respectively.

Table 6.2B.3.3-1: Additional Requirements for inter-band EN-DC (two-bands)

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| NR CA combination | Band | Applied  NS | Requirements  (clause)  (TS 36.101 [4]) | Requirements  (clause)  (TS 38.101-1 [2]) | A-MPR  (table/clause)  (TS 36.101 [4]) | A-MPR  (table/clause)  (TS 38.101-1 [2]) | Note |
| DC\_1\_n28 | 1 | 05 | 6.6.3.3.1 | N/A | Table 6.2.4-1  (NS\_05) | N/A | 2 |
| n28 | 17 | N/A | 6.5.3.3.2 | N/A | N/A |
| DC\_1\_n40 | 1 | 05 | 6.6.3.3.1 | N/A | Table 6.2.4-1  (NS\_05) | N/A |  |
| DC\_1\_n77 | 1 | 05 | 6.6.3.3.1 | N/A | Table 6.2.4-1  (NS\_05) | N/A | 1 |
| n84 | 05 | N/A | 6.5.3.3.4 | N/A | Clause 6.2.3.4 |
| 05U | N/A | 6.5.3.3.4 | N/A | Clause 6.2.3.4 |
| DC\_1\_n78  DC\_1\_n84\_ULSUP-TDM\_n78 | 1 | 05 | 6.6.3.3.1 | N/A | Table 6.2.4-1  (NS\_05) | N/A | 1 |
| n84 | 05 | N/A | 6.5.3.3.4 | N/A | Clause 6.2.3.4 |
| 05U | N/A | 6.5.3.3.4, 6.5.2.4.2 | N/A | Clause 6.2.3.4 |
| DC\_1\_n79 | 1 | 05 | 6.6.3.3.1 | N/A | Table 6.2.4-1  (NS\_05) | N/A | 1 |
| n84 | 05 | N/A | 6.5.3.3.4 | N/A | Clause 6.2.3.4 |
| 05U | N/A | 6.5.3.3.4, 6.5.2.4.2 | N/A | Clause 6.2.3.4 |
| DC\_3\_n1 | n1 | 05 | N/A | 6.5.3.3.4 | N/A | Clause 6.2.3.4 | 1 |
| 05U | N/A | 6.5.3.3.4, 6.5.2.4.2 | N/A | Clause 6.2.3.4 |
| DC\_3\_n28 | n28 | 17 | N/A | 6.5.3.3.2 | N/A | N/A | 2 |
| DC\_19\_n77 | 19 | 08 | 6.6.3.3.3 | N/A | Table 6.2.4-1 (NS\_08) | N/A |  |
| DC\_19\_n78 | 19 | 08 | 6.6.3.3.3 | N/A | Table 6.2.4-1 (NS\_08) | N/A |  |
| DC\_19\_n79 | 19 | 08 | 6.6.3.3.3 | N/A | Table 6.2.4-1 (NS\_08) | N/A |  |
| DC\_21\_n77 | 21 | 09 | 6.6.3.3.4 | N/A | Table 6.2.4-1 (NS\_09) | N/A |  |
| DC\_21\_n78 | 21 | 09 | 6.6.3.3.4 | N/A | Table 6.2.4-1 (NS\_09) | N/A |  |
| DC\_21\_n79 | 21 | 09 | 6.6.3.3.4 | N/A | Table 6.2.4-1 (NS\_09) | N/A |  |
| DC\_28\_n77 | 28 | 17 | 6.6.3.3.10 | N/A | Table 6.2.4-1  (NS\_17) | N/A | 2 |
| DC\_28\_n78 | 28 | 17 | 6.6.3.3.10 | N/A | Table 6.2.4-1  (NS\_17) | N/A | 2 |
| DC\_28\_n79 | 28 | 17 | 6.6.3.3.10 | N/A | Table 6.2.4-1  (NS\_17) | N/A | 2 |
| NOTE 1: NS\_05U, NS\_43U and NS\_100 can be signalled for NR bands that have UTRA services deployed and protected range is specified in clause 6.5.2.4.2 of TS38.101-1[2] and the requirements in clause 6.5.2.4.2 are only appliable to the signalling band.  NOTE 2: Applicable when the assigned NR carrier is confined within 718 MHz and 748 MHz and when the channel bandwidth used is 5 or 10 MHz. | | | | | | | |

#### 6.2B.3.3A Inter-band NE-DC within FR1

Unless specified in Table 6.2B.3.3A-1, for inter-band carrier aggregation with uplink assigned to LTE and NR bands, the requirements in [2] clause 6.2.3 apply for NR uplink component carrier and the requirements in [4] clause 6.2.4 apply for LTE uplink component carrier.

Unless otherwise stated, for inter-band EN-DC with uplink assigned to LTE and NR bands and specified in Table 6.2B.3.3A-1, the combined requirements and allowed A-MPR are applibale on both LTE and NR bands when LTE and NR component carriers are active. The requirements in Table 6.2B.3.3A-1 are specified in terms of an additional spectrum emission requirement. The emission requirements specified in Table 6.2B.3.3A-1 also apply for the frequency ranges that are less than FOOB (MHz) from the edge of the channel bandwidth specified in TS 36.101 [4] and TS 38.101-1 [2], respectively.

Table 6.2B.3.3A-1: Additional Requirements for inter-band NE-DC (two-bands)

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| NR CA combination | Band | Applied  NS | Requirements  (clause)  (TS 36.101 [4]) | Requirements  (clause)  (TS 38.101-1 [2]) | A-MPR  (table/clause)  (TS 36.101 [4]) | A-MPR  (table/clause)  (TS 38.101-1 [2]) | Note |
| DC\_n1\_28 | n1 | 05 | N/A | 6.5.3.3.4 | N/A | Clause 6.2.3.4 | 1, 2 |
| 05U | N/A | 6.5.3.3.4, 6.5.2.4.2 | N/A | Clause 6.2.3.4 |
| 28 | 17 | 6.6.3.3.10 | N/A | Table 6.2.4-1  (NS\_17) | N/A |
| NOTE 1: NS\_05U can be signalled for NR bands that have UTRA services deployed and protected range is specified in clause 6.5.2.4.2 of TS38.101-1[2] and the requirements in clause 6.5.2.4.2 are only appliable to the signalling band.  NOTE 2: Applicable when the assigned NR carrier is confined within 718 MHz and 748 MHz and when the channel bandwidth used is 5 or 10 MHz. | | | | | | | |

#### 6.2B.3.4 Inter-band EN-DC including FR2

UE additional maximum output power reduction requirement for E-UTRA single carrier and CA operation specified in clauses 6.2.4 and 6.2.4A of TS 36.101 [4] and for NR single carrier and CA operation specified in clause 6.2.3, 6.2A.3 and 6.2D.3 of TS 38.101-2 [3] apply.

#### 6.2B.3.5 Inter-band EN-DC including both FR1 and FR2

UE additional maximum output power reduction requirement for E-UTRA single carrier and CA operation specified in clauses 6.2.4 and 6.2.4A of TS 36.101 [4] and for NR single carrier and CA operation specified in clause 6.2.3 of TS 38.101-1 [2] and clause 6.2.3, 6.2A.3, and 6.2D.3 of TS 38.101-2 [3] apply.

### 6.2B.4 Configured output power for DC

#### 6.2B.4.1 Configured output power level

##### 6.2B.4.1.1 Intra-band contiguous EN-DC

The following requirements apply for one component carrier per CG configured for synchronous DC.

For intra-band dual connectivity with one uplink serving cell per CG on E-UTRA and NR respectively, the UE is allowed to set its configured maximum output power PCMAX,*c(i),i* for serving cell *c(i)* of CG *i, i = 1,2*, and its total configured maximum transmission power for EN-DC operation = 10log10() with as specified in clause 7.6 of TS 38.213 [10].

The configured maximum output power PCMAX\_E-UTRA,*c* (*p*) in sub-frame *p* for the configured E-UTRA uplink carrier shall be set within the bounds:

PCMAX\_L\_E-UTRA,*c* (*p*) ≤ PCMAX\_E-UTRA,*c* (*p*) ≤ PCMAX H \_E-UTRA,*c* (*p*)

where PCMAX\_L\_E-UTRA,*c* andPCMAX H \_E-UTRA,*c* are the limits for a serving cell *c* as specified in TS 36.101 [4] clause 6.2.5 modified by PLTE as follows:

PCMAX\_L\_E-UTRA,*c* = MIN {MIN(PEMAX,*c*, PEMAX, EN-DC, PLTE) – tC\_ E-UTRA, *c*, (PPowerClass, EN-DC – ΔPPowerClass,EN-DC ), (PPowerClass,E-UTRA – ΔPPowerClass,E-UTRA) – MAX(MPR*c* + A-MPR*c* + ΔTIB,c + TC\_ E-UTRA, *c* + TProSe, P-MPR*c*)}

PCMAX H \_E-UTRA,*c* = MIN {PEMAX,*c*, PEMAX, EN-DC , PLTE, PPowerClass, EN-DC, PPowerClass,E-UTRA – ΔPPowerClass,E-UTRA}

where

- PEMAX,EN-DC is the value given by the field *p-maxUE-FR1* of the *RRCConnectionReconfiguration-v1530* IE as defined in TS 36.331 [8];

- PLTE is the value given by the field *p-maxEUTRA-r15* of the *RRCConnectionReconfiguration-v1510* IE as defined in TS 36.331 [8] which is the same as PLTE in TS 38.213 [10];

- ∆tC\_EUTRA, c = 1.5 dB when NOTE 2 in Table 6.2.2-1 of TS 36.101 [4] applies; ∆tC\_EUTRA, c = 0 dB otherwise;

and whenever NS\_01 is not indicated within CG 1:

- for a UE indicating support of dynamicPowerSharing, the MPRc and the A-MPR*c* are determined in accordance with the DCI of serving cell *c* of the CG 1 and the specification in clause 6.2.4 of TS 36.101 [4];

- for a UE not indicating support of dynamicPowerSharing, the A-MPR*c* is determined in accordance with clause 6.2B.3.1 with parameters applicable for UEs not indicating support of dynamicPowerSharing and MPR*c* = 0 dB;

and whenever NS\_01 is indicated in CG 1:

- for a UE indicating support of dynamicPowerSharing, the MPR*c* is determined in accordance with the DCI of serving cell *c* of the CG 1 and the specification in clause 6.2.4 of TS 36.101 [4];

- for a UE not indicating support of dynamicPowerSharing, the MPR*c* is determined in accordance with clause 6.2B.2.1 with parameters applicable for UEs not indicating support of dynamicPowerSharing and A-MPR*c* = 0 dB;

The configured maximum output power PCMAX,f,*c,NR* (*q*) in physical channel *q* for the configured NR carrier shall be set within the bounds:

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

where PCMAX\_L,f,*c,NR* andPCMAX\_H,f,*c,NR* are the limits for a serving cell c as specified in clause 6.2.4 of TS 38.101-1 [2] modified as follows:

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

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

where

- PEMAX,EN-DC is the value given by the field *p-maxUE-FR1* of the *RRCConnectionReconfiguration-v1530* IE as defined in TS 36.331 [8];

- PLTE signalled by RRC as *p-MaxEUTRA-r15* in TS 36.331 [8]

- PNR is the value given by the field *p-NR-FR1* of the *PhysicalCellGroupConfig* IE as defined in [9] and signalled by RRC;

- ΔTc\_E-UTRA, *c* = 1.5dB when NOTE 2 in Table 6.2.2-1 in TS 36.101 [4] applies for a serving cell *c*, otherwise TC\_ E-UTRA,*c* = 0dB;

- TC\_NR,*c* = 1.5dB when NOTE 3 in Table 6.2.1-1 in TS 38.101-1 [2] applies for a serving cell *c*, otherwise TC\_NR,*c* = 0dB;

- ΔTIB,c specified in clause 6.2B.4.2.1 for EN-DC, the individual Power Class defined in table 6.2B.1.1 and any other additional power reductions parameters specified in clauses 6.2B.2 and 6.2B.3 for EN-DC are applicable to PCMAX\_E-UTRA,*c* and PCMAX,f,*c,NR* evaluations.

- PPowerClass, EN-DC is defined in clause 6.2B.1.1 for intra-band contiguous EN-DC;

- PPowerClass,NR is the nominal UE power of the power class that the UE supports for the NR band of the EN-DC combination as defined in clause 6.2.1 of 38.101-1 [2];

- PPowerClass,E-UTRA is the nominal UE power of the power class that the UE supports for the E-UTRA band of the EN-DC combination as defined in clause 6.2.2 of 36.101 [4];

- ΔPPowerClass,EN-DC is 3 dB for a power class 2 capable EN-DC UE when LTE UL/DL configuration is 0 or 6; or LTE UL/DL configuration is 1 and special subframe configuration is 0 or 5; ΔPPowerClass,EN-DC = 3 dB when the IE *p-maxUE-FR1* as defined in TS 36.331 [8] is provided and set to the maximum output power of the default power class or lower; otherwise ΔPPowerClass,EN-DC = 0 dB;

and whenever NS\_01 is not indicated within CG 2:

- for a UE indicating support of dynamicPowerSharing, A-MPR*c* = A-MPR'*c* with A-MPR'*c* determined in accordance with clause 6.2B.3.1 and MPR*c* = 0 dB if transmission(s) in subframe *p* on CG 1 overlap in time with physical channel *q* on CG 2;

- for a UE indicating support of dynamicPowerSharing, A-MPR*c* is determined in accordance with TS 38.101-1 [2] if transmission(s) in subframe *p* on CG 1 does not overlap in time with physical channel *q* on CG 2;

- for a UE not indicating support of dynamicPowerSharing, the A-MPR*c* is determined in accordance with clause 6.2B.3.1 with parameters applicable for UEs not indicating support of dynamicPowerSharing and MPR*c* = 0 dB;

and whenever NS\_01 is indicated in CG 2.

- for a UE indicating support of dynamicPowerSharing, MPRc = MPR'c with MPR'c determined in accordance with clause 6.2B.2.1 and A-MPRc = 0 dB if transmission(s) in subframe p on CG 1 overlap in time with physical channel q on CG 2;

- for a UE indicating support of dynamicPowerSharing, MPRc is determined in accordance with TS 38.101-1 [2] if transmission(s) in subframe p on CG 1 does not overlap in time with physical channel q on CG 2;

- for a UE not indicating support of dynamicPowerSharing, the MPRc is determined in accordance with clause 6.2B.2.1 with parameters applicable for UEs not indicating support of dynamicPowerSharing and A‑MPRc = 0 dB;

If the transmissions from NR and E-UTRA do not overlap, then the complete clauses for configured transmitted power for E-UTRA and NR respectively from their own specifications apply with the modifications specified above. The lower value between PPowerClass, EN-DC or PEMAX, EN-DC shall not be exceeded at any time by UE.

If the EN-DC UE is not supporting dynamic power sharing, then the complete clauses for configured transmitted power for E-UTRA and NR respectively from their own specifications TS 36.101 [4] and TS 38.101-1 [2] respectively apply with the modifications specified above.

If the UE does not support dynamic power sharing,

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

For UEs indicating support of dynamicPowerSharing in the *UE-MRDC-Capability* IE the UE can configure the total maximum transmission power within the range

PEN-DC,tot\_L ≤ ≤ PEN-DC,tot\_H

where

PEN-DC,tot\_L (*p,q*) = MIN{ PPowerClass,EN-DC - ΔPPowerClass,EN-DC – MAX{MPRtot, A-MPRtot}, PEMAX,EN-DC}

PEN-DC,tot\_H (*p,q*) = MIN{PPowerClass,EN-DC, PEMAX,EN-DC }

for sub-frame *p* on CG 1 overlapping with physical channel *q* on CG 2 and with MPRtot and A-MPRtot in accordance with 6.2B.2.1 and clause 6.2B.3.1, respectively.

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

PUMAX = 10 log10 [pUMAX,*c,E-UTRA* + pUMAX,*f,c,NR*],

where pUMAX,*c,E-UTRA* and pUMAX,*c,NR* denotes the measured output power of serving cell *c for E-UTRA and NR* respectively, expressed in linear scale.

For UEs indicating support of dynamicPowerSharing, 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\_L) and THIGH(PCMAX\_H) for applicable values of PCMAX\_L and PCMAX\_L specified in Table 6.2B.4.1.1-2.

When an UL subframe transmission *p* from E-UTRA overlap with a physical channel *q* from the NR*,* then for PUMAX evaluation, the E-UTRA subframe *p* 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.4.1.1-1 when same or different subframes and physical channel durations are used in aggregated carriers. PPowerClass ,EN-DC shall not be exceeded by the UE during any evaluation period of time.

Table 6.2B.4.1.1-1: PCMAX evaluation window

|  |  |  |
| --- | --- | --- |
| transmission duration | TREF | Teval |
| Different transmission duration in different RAT carriers | E-UTRA 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\_ EN-DC \_H (*p,q*) , PCMAX\_ EN-DC \_H (*p,q+1*), … , PCMAX\_ EN-DC \_H (*p,q+n*) }

where PCMAX\_ EN-DC \_H 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 NR UL physical channel overlapping with E-UTRA subframe p.

While PCMAX\_L is computed as follows:

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

where PCMAX\_EN-DC\_L 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 NR UL physical channel overlapping with E-UTRA subframe p,

With

PCMAX\_ EN-DC \_H(*p,q*) = MIN {10 log10 [pCMAX H \_E-UTRA,*c* (*p*) + pCMAX H,f,*c,NR* (*q*)], PEMAX, EN-DC ,PPowerClass, EN-DC}

And:

a= 10 log10 [pCMAX\_E-UTRA,*c* (*p*) +pCMAX,f,*c,NR* (*q*) ] > PEN-DC,tot\_L

b= 10 log10 [pCMAX\_E-UTRA,*c* (*p*) +pCMAX,f,*c,NR* (*q*) /X\_scale] > PEN-DC,tot\_L

If a= FALSE and the configured transmission power spectral density between the MCG and SCG differs by less than 6 dB

PCMAX\_ EN-DC \_L(*p,q*) = MIN {10 log10 [pCMAX L \_E-UTRA,*c* (*p*) + pCMAX L,f,*c,,NR* (*q*)], PEMAX, EN-DC ,PPowerClass, EN-DC - ΔPPowerClass,EN-DC }

ELSE If (a=TRUE) AND (b=FALSE) and the configured transmission power spectral density between the MCG and SCG differs by less than 6 dB

PCMAX\_ EN-DC \_L(*p,q*) = MIN {10 log10 [pCMAX L \_E-UTRA,*c* (*p*) + pCMAX L,f,*c,NR* (*q*) /X\_scale ], PEMAX, EN-DC ,PPowerClass, EN-DC - ΔPPowerClass,EN-DC }

ELSE If b= TRUE or the transmission power after power scaling spectral density between the MCG and SCG differs by more than 6 dB

PCMAX\_ EN-DC \_L(*p,q*) = MIN {10 log10 [pCMAX L \_E-UTRA,*c* (*p*) ], PEMAX, EN-DC ,PPowerClass, EN-DC- ΔPPowerClass,EN-DC }

where

- pCMAX H \_E-UTRA,*c* (*p*) is the E-UTRA higher limit of the maximum configured power expressed in linear scale;

- pCMAX H,f,*c,NR* (*q*)is the NR higher limit of the maximum configured power expressed in linear scale;

- pCMAX L \_E-UTRA,*c* (*p*) is the E-UTRA lower limit of the maximum configured power expressed in linear scale;

- pCMAX L,f,*c,NR* (*q*)is the NR lower limit of the maximum configured power expressed in linear scale;

- PPowerClass, EN-DC is defined in clause 6.2B.1.1 for intra-band EN-DC;

- X\_scale is the linear value of X dB which is configured by RRC and can only take values [0 , 6] dB

- pCMAX E-UTRA,c (*p*) is the linear value of PCMAX E-UTRA,c (*p*), the real configured max power for E-UTRA

- pCMAX,f,c *NR*(*q*) is the linear value of PCMAX,f,c,*NR*(*q*), the real configured max power of NR

Table 6.2B.4.1.1-2: PCMAX tolerance for Dual Connectivity E-UTRA-NR

|  |  |  |
| --- | --- | --- |
| 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 | |

If the UE supports dynamic power sharing, and when E-UTRA and NR transmissions overlap and the condition (If (a=TRUE) AND (b=FALSE)) is met, SCG shall be transmitted and the following supplementary minimum requirement apply for the measured SCG power, PUMAX,f,*c,NR* (*q*), under nominal conditions and unless otherwise stated

10log(pCMAX L,f,*c,,NR*(*q*)/X\_scale) – TLOW (10log(pCMAX L,f,*c,,NR*(*q*)/X\_scale) )} ≤ PUMAX,f,*c,NR* (*q*) ≤ 10log(pCMAX H, f,*c,,NR* (*q*)) + THIGH (10log(pCMAX H, f,*c,NR* (*q*))).

with the tolerances TLOW and THIGH for applicable values of PCMAX specified in Table 6.2B.4.1.1-2.

If the UE supports dynamic power sharing, the measured maximum output power in subframe *p* on CG 1, pUMAX,*c,E-UTRA*, shall meet the requirements in clause 6.2.5 in TS 36.101 [4] with the limits PCMAX\_L,*c* and PCMAX\_H,*c* replaced by PCMAX\_L\_E-UTRA,*c* and PCMAX\_H\_E- UTRA,*c* as specified above, respectively.

If the configured transmission power spectral density between the MCG and SCG differs by more than 6 dB, then

PUMAX,f,*c,NR* (*q*) ≤ 10log(pCMAX H, f,*c,,NR* (*q*)) + THIGH (10log(pCMAX H, f,*c,NR* (*q*))).

##### 6.2B.4.1.2 Intra-band non-contiguous EN-DC

The following requirements apply for one component carrier per CG configured for synchronous DC. The CG(s) are indexed by *j* = 1 for MCG and *j* = 2 for SCG.

The configured maximum output power PCMAX\_E-UTRA,*c* (*p*) in sub-frame *p* for the configured E-UTRA uplink carrier shall be set in accordance with clause 6.2B.4.1.1 but where

- for a UE not indicating support of dynamicPowerSharing, the A-MPR*c* determined in accordance with clause 6.2B.3.2 with parameters applicable for UEs not indicating support of dynamicPowerSharing and MPR*c* = 0 dB;

whenever NS\_01 is not indicated within CG 1 while

- for a UE not indicating support of dynamicPowerSharing, the MPR*c* determined in accordance with clause 6.2B.2.2 with parameters applicable for UEs not indicating support of dynamicPowerSharing and A-MPR*c* = 0 dB;

whenever NS\_01 is indicated in CG 1.

The configured maximum output power PCMAX,f,*c,NR* (*q*) in physical channel *q* for the configured NR carrier shall be set in accordance with clause 6.2B.4.1.1 but where

- for a UE indicating support of dynamicPowerSharing, A-MPR*c* = A-MPR'*c* with A-MPR'*c* determined in accordance with clause 6.2B.3.2 and MPR*c* = 0 dB if transmission(s) in subframe *p* on CG 1 overlap in time with physical channel *q* on CG 2;

- for a UE indicating support of dynamicPowerSharing, A-MPR*c* is determined in accordance with TS 38.101-1 [2] if transmission(s) in subframe *p* on CG 1 does not overlap in time with physical channel *q* on CG 2;

- for a UE not indicating support of dynamicPowerSharing, the A-MPR*c* is determined in accordance with clause 6.2B.3.2 with parameters applicable for UEs not indicating support of dynamicPowerSharing and MPR*c* = 0 dB;

whenever NS\_01 is not indicated in CG 2 while

- for a UE indicating support of dynamicPowerSharing, MPR*c* = MPR'*c* with MPR'*c* determined in accordance with clause 6.2B.2.2 and A-MPR*c* = 0 dB if transmission(s) in subframe *p* on CG 1 overlap in time with physical channel *q* on CG 2;

- for a UE indicating support of dynamicPowerSharing, MPR*c* is determined in accordance with TS 38.101-1 [2] if transmission(s) in subframe *p* on CG 1 does not overlap in time with physical channel *q* on CG 2;

- for a UE not indicating support of dynamicPowerSharing, the MPR*c* is determined in accordance with clause 6.2B.2.2 with parameters applicable for UEs not indicating support of dynamicPowerSharing and A-MPR*c* = 0 dB;

whenever NS\_01 is indicated in CG 2.

For UEs indicating support of dynamicPowerSharing in the *UE-MRDC-Capability IE*, the UE can configure the total transmission power in accordance with clause 6.2B.4.1.1 but with Ppowerclass,EN-DC the EN-DC power class of the intra-band non-contiguous band combination configured and A-MPR determined in accordance with clause 6.2B.3.2.

The total maximum output power PUMAX over both CGs is measured in accordance with clause 6.2B.4.1.1 and shall be within the limits specified in clause 6.2B.4.1.1 but with parameters applicable for the non-contiguous band combination configured.

The maximum output power levels pUMAX,c,E-UTRA and pUMAX,f,c,NR for the CGs are measured in accordance with clause 6.2B.4.1.1 and shall be within the limits specified in clause 6.2B.4.1.1 but with parameters applicable for the non-contiguous band combination configured.

##### 6.2B.4.1.3 Inter-band EN-DC within FR1

For inter-band dual connectivity with one uplink serving cell per CG on E-UTRA and NR respectively, the UE is allowed to set its configured maximum output power PCMAX,*c(i),i* for serving cell *c(i)* of CG *i, i = 1,2*, and its total configured maximum transmission power for EN-DC operation, = 10log10() with as specified in clause 7.6 of TS 38.213 [10].

The configured maximum output power PCMAX\_E-UTRA,*c* (*p*) in sub-frame *p* for the configured E-UTRA uplink carrier shall be set within the bounds:

PCMAX\_L\_E-UTRA,*c* (*p*) ≤ PCMAX\_E-UTRA,*c* (*p*) ≤ PCMAX H \_E-UTRA,*c* (*p*)

where PCMAX\_L\_E-UTRA,*c* andPCMAX H \_E-UTRA,*c* are the limits for a serving cell *c* as specified in TS 36.101 [4] clause 6.2.5 modified by PLTE as follows:

PCMAX\_L\_E-UTRA,*c* = MIN { PEMAX, EN-DC , (PPowerClass, EN-DC – ΔPPowerClass,EN-DC ), MIN(PEMAX,*c*, PLTE) – tC\_ E-UTRA, *c*, (PPowerClass,E-UTRA – ΔPPowerClass,E-UTRA) – MAX(MPR*c* + A-MPR*c* + ΔTIB,c + TC\_ E-UTRA, *c* + TProSe, P-MPR*c*)}

PCMAX H \_E-UTRA,*c* = MIN {PEMAX,*c*, PEMAX, EN-DC , (PPowerClass, EN-DC – ΔPPowerClass,EN-DC ), PLTE, PPowerClass,E-UTRA – ΔPPowerClass,E-UTRA}

The configured maximum output power PCMAX,f,*c,NR* (*q*) in physical-channel *q* for the configured NR carrier shall be set within the bounds:

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

where PCMAX\_L,f,*c,NR* andPCMAX\_H,f,*c,NR* are the limits for a serving cell c as specified in clause 6.2.4 of TS 38.101-1 [2] modified as follows:

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

PCMAX\_H,f,*c,NR* = MIN {PEMAX,c, PEMAX, EN-DC , (PPowerClass, EN-DC – ΔPPowerClass,EN-DC ), PNR , PPowerClass,NR – ΔPPowerClass,NR }

where

- PEMAX,EN-DC is the value given by the field *p-maxUE-FR1* of the *RRCConnectionReconfiguration-v1530* IE as defined in TS 36.331 [8];

- PLTE is the value given by the field *p-maxEUTRA-r15* of the *RRCConnectionReconfiguration-v1510* IE as defined in TS 36.331 [8];

- PNR is the value given by the field *p-NR-FR1* of the *PhysicalCellGroupConfig* IE as defined TS 38.331 [9];

- ΔTc\_E-UTRA, *c* = 1.5 dB when NOTE 2 in Table 6.2.2-1 in TS 36.101 [4] applies for a serving cell *c*, otherwise TC\_ E-UTRA,*c* = 0 dB;

- TC\_NR,*c* = 1.5dB when NOTE 3 in Table 6.2.1-1 in TS 38.101-1 [2] applies for a serving cell *c*, otherwise TC\_NR,*c* = 0 dB;

- ΔTIB,c specified in clause 6.2B.4.2.3 for EN-DC, the individual Power Class defined in table 6.2B.1.3 and any other additional power reductions parameters specified in clauses 6.2B.2 and 6.2B.3for EN-DC are applicable to PCMAX\_E-UTRA,*c* and PCMAX,f,*c,NR* evaluations.

- PPowerClass, EN-DC is defined in clause 6.2B.1.3 for inter-band EN-DC;

- PPowerClass,NR is the nominal UE power of the power class that the UE supports for the NR band of the EN-DC combination as defined in clause 6.2.1 of 38.101-1 [2];

- PPowerClass,E-UTRA is the nominal UE power of the power class that the UE supports for the E-UTRA band of the EN-DC combination as defined in clause 6.2.2 of 36.101 [4];

- ∆PPowerClass,EN-DC = 3 dB for a power class 2 capable EN-DC UE when IE p-maxUE-FR1, as defined in TS 38.331 [9], is provided and set to the maximum output power of the default power class or lower; otherwise ∆PPowerClass,EN-DC = 0 dB;

If the transmissions from NR and E-UTRA do not overlap, then the complete clauses for configured transmitted power for E-UTRA and NR respectively from their own specifications apply with the modifications specified above. The lower value between PPowerClass, EN-DC or PEMAX, EN-DC shall not be exceeded at any time by UE.

= 10log10() with the configured maximum transmission power for EN-DC operation as specified in clause 7.6 of TS 38.213 [10].

The total configured maximum transmission power for both synchronous and non-synchronous operation is

= MIN { PEMAX, EN-DC ,PPowerClass, EN-DC – ΔPPowerClass, EN-DC }

If the UE does not support dynamic power sharing,

= MIN { PEMAX, EN-DC ,PPowerClass, EN-DC – ΔPPowerClass, EN-DC } + 0.3 dB

If the EN-DC UE does not support dynamic power sharing, then the complete clauses for configured transmitted power for E-UTRA and NR respectively from their own specifications TS 36.101 [4] and TS 38.101-1 [2] respectively apply with the modifications specified above and applies.

When a UE supporting dynamic sharing is configured for overlapping E-UTRA uplink and NR uplink transmissions, the UE can set its configured maximum output power PCMAX\_E-UTRA,*c* and PCMAX,f,*c,NR* for the configured E-UTRA and NR uplink carriers, respectively, and its configured maximum transmission power for EN-DC operation, , as specified above.

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

PUMAX = 10 log10 [pUMAX,*c,E-UTRA* + pUMAX,*c,NR*],

where pUMAX,*c,E-UTRA* and pUMAX,*c,NR* denotes the measured output power of serving cell *c for E-UTRA and NR* respectively, 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 an UL subframe transmission *p* from E-UTRA overlap with a physical-channel *q* from the NR*,* then for PUMAX evaluation, the E-UTRA subframe *p* 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 in aggregated carriers. PPowerClass ,EN-DC 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 RAT carriers | E-UTRA 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\_ EN-DC \_H (*p,q*) , PCMAX\_ EN-DC \_H (*p,q+1*), … , PCMAX\_ EN-DC \_H (*p,q+n*) }

where PCMAX\_ EN-DC \_H 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 NR UL physical-channel overlapping with E-UTRA subframe p.

While PCMAX\_L is computed as follows:

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

where PCMAX\_EN-DC\_L 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 NR UL physical-channel overlapping with E-UTRA subframe p,

With

PCMAX\_ EN-DC \_H(*p,q*) = MIN {10 log10 [pCMAX H \_E-UTRA,*c* (*p*) + pCMAX H,f,*c,NR* (*q*)], PEMAX, EN-DC ,PPowerClass, EN-DC}

And:

a= 10 log10 [pCMAX\_E-UTRA,*c* (*p*) +pCMAX,f,*c,NR* (*q*) ] >

b= 10 log10 [pCMAX\_E-UTRA,*c* (*p*) +pCMAX,f,*c,NR* (*q*) /X\_scale] >

If a= FALSE

PCMAX\_ EN-DC \_L(*p,q*) = MIN {10 log10 [pCMAX L \_E-UTRA,*c* (*p*) + pCMAX L,f,*c,NR* (*q*)], PEMAX, EN-DC ,PPowerClass, EN-DC}

ELSE If (a=TRUE) AND (b=FALSE)

PCMAX\_ EN-DC \_L(*p,q*) = MIN {10 log10 [pCMAX L \_E-UTRA,*c* (*p*) + pCMAX L,f,*c,NR* (*q*) /X\_scale ], PEMAX, EN-DC ,PPowerClass, EN-DC}

ELSE If b= TRUE

PCMAX\_ EN-DC \_L(*p,q*) = MIN {10 log10 [pCMAX L \_E-UTRA,*c* (*p*) ], PEMAX, EN-DC ,PPowerClass, EN-DC}

where

- pCMAX H \_E-UTRA,*c* (*p*) is the E-UTRA higher limit of the maximum configured power expressed in linear scale;

- pCMAX H,f,*c,NR* (*q*) is the NR higher limit of the maximum configured power expressed in linear scale;

- pCMAX L \_E-UTRA,*c* (*p*) is the E-UTRA lower limit of the maximum configured power expressed in linear scale;

- pCMAX L,f,*c,NR* (*q*) is the NR lower limit of the maximum configured power expressed in linear scale;

- PPowerClass, EN-DC is defined in clause 6.2B.1.3-1 for inter-band EN-DC;

- X\_scale is the linear value of X dB which is configured by RRC and can only take values [0 , 6]

- pCMAX\_ E-UTRA,c (p) is the linear value of PCMAX\_ E-UTRA,c (p), the real configured max power for E-UTRA

- pCMAX,f,c,NR (q) is the linear value of PCMAX,f,c,NR (q), the real configured max power of NR

Table 6.2B.4.1.3-2: PCMAX tolerance for Dual Connectivity E-UTRA-NR

|  |  |  |
| --- | --- | --- |
| 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 not indicating support of dynamic power sharing, the upper tolerance Thigh shall be reduced by 0.3 dB for P ≥ 20 dBm. | | |

When E-UTRA and NR transmissions overlap and the condition (If (a=TRUE) AND (b=FALSE)) is met, SCG shall be transmitted and the following supplementary minimum requirement apply for the measured SCG power, PUMAX,f,*c,NR* (*q*), under nominal conditions.

10log(pCMAX L,f,*c,NR* (*q*)/X\_scale) – TLOW (10log(pCMAX L,f,*c,NR* (*q*)/X\_scale) )} ≤ PUMAX,f,*c,NR* (*q*) ≤ 10log(pCMAX H, f,*c,NR* (*q*)) + THIGH (10log(pCMAX H, f,*c,NR* (*q*))).

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

##### 6.2B.4.1.3a Inter-band NE-DC within FR1

For inter-band dual connectivity with one uplink serving cell per CG on E-UTRA and NR respectively, the UE is allowed to set its configured maximum output power PCMAX,*c(i),i* for serving cell *c(i)* of CG *i, i = 1,2*, and its total configured maximum transmission power for NE-DC operation, = 10log10() with as specified in clause 7.6.1A of TS 38.213 [10].

The configured maximum output power PCMAX\_E-UTRA,*c* (*p*) in sub-frame *p* for the configured E-UTRA uplink carrier shall be set within the bounds:

PCMAX\_L\_E-UTRA,*c* (*p*) ≤ PCMAX\_E-UTRA,*c* (*p*) ≤ PCMAX H \_E-UTRA,*c* (*p*)

where PCMAX\_L\_E-UTRA,*c* andPCMAX H \_E-UTRA,*c* are the limits for a serving cell *c* as specified in TS 36.101 [4] clause 6.2.5 modified by PLTE as follows:

PCMAX\_L\_E-UTRA,*c* = MIN { PEMAX, NE-DC , (PPowerClass, NE-DC – ΔPPowerClass,NE-DC ), MIN(PEMAX,*c*, PLTE) – tC\_ E-UTRA, *c*, (PPowerClass,E-UTRA – ΔPPowerClass,E-UTRA) – MAX(MPR*c* + A-MPR*c* + ΔTIB,c + TC\_ E-UTRA, *c* + TProSe, P-MPR*c*)}

PCMAX H \_E-UTRA,*c* = MIN {PEMAX,*c*, PEMAX, NE-DC , (PPowerClass, NE-DC – ΔPPowerClass,NE-DC ), PLTE, PPowerClass,E-UTRA – ΔPPowerClass,E-UTRA}

with exception that

- if no symbol of slot of the NR that is indicated as uplink or flexible by *TDD-UL-DL-ConfigurationCommon* or *TDD*-*UL-DL-ConfigDedicated* overlaps with subframe of the E-UTRA; or



- if NR slot(s) that is indicated as downlink by *TDD-UL-DL-ConfigurationCommon* or *TDD*-*UL-DL-ConfigDedicated* does not overlap with subframe of the E-UTRA; then



PCMAX\_L\_E-UTRA,*c* = MIN { PEMAX, NE-DC , (PPowerClass, NE-DC – ΔPPowerClass,NE-DC ), PEMAX,*c* – tC\_ E-UTRA, *c*, (PPowerClass,E-UTRA – ΔPPowerClass,E-UTRA) – MAX(MPR*c* + A-MPR*c* + ΔTIB,c + TC\_ E-UTRA, *c* + TProSe, P-MPR*c*)}

PCMAX H \_E-UTRA,*c* = MIN {PEMAX,*c*, PEMAX, NE-DC , (PPowerClass, NE-DC – ΔPPowerClass,NE-DC ), PPowerClass,E-UTRA – ΔPPowerClass,E-UTRA}

The configured maximum output power PCMAX,f,*c,NR* (*q*) in physical-channel *q* for the configured NR carrier shall be set within the bounds:

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

where PCMAX\_L,f,*c,NR* andPCMAX\_H,f,*c,NR* are the limits for a serving cell c as specified in clause 6.2.4 of TS 38.101-1 [2] modified by PNR as follows:

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

PCMAX\_H,f,*c,NR* = MIN {PEMAX,c, PEMAX, NE-DC , (PPowerClass, NE-DC – ΔPPowerClass,NE-DC ), PNR , PPowerClass,NR – ΔPPowerClass,NR }

- PEMAX,NE-DC signalled by RRC as *p-UE-FR1* in TS 38.331 [9];

- PLTE signalled by RRC as *p-MaxEUTRA* in TS 36.331 [8];

- PNR signalled by RRC as *p-NR-FR1* defined in TS 38.331 [9];

- ΔTc\_E-UTRA, *c* = 1.5dB when NOTE 2 in Table 6.2.2-1 in TS 36.101 [4] applies for a serving cell *c*, otherwise TC\_ E-UTRA,*c* = 0dB;

- TC\_NR,*c* = 1.5dB when NOTE 3 in Table 6.2.1-1 in TS 38.101-1 [2] applies for a serving cell *c*, otherwise TC\_NR,*c* = 0dB;

- ΔTIB,c specified in clause 6.2B.4.2.3 for NE-DC, the individual Power Class defined in table 6.2B.1.3a and any other additional power reductions parameters specified in clauses 6.2B.2.3a for NE-DC are applicable to PCMAX\_E-UTRA,*c* and PCMAX,f,*c,NR* evaluations.

- PPowerClass, NE-DC is defined in clause 6.2B.1.3a for inter-band NE-DC;

- PPowerClass,NR is the nominal UE power of the power class that the UE supports for the NR band of the NE-DC combination as defined in clause 6.2.1 of 38.101-1 [2];

- PPowerClass,E-UTRA is the nominal UE power of the power class that the UE supports for the E-UTRA band of the NE-DC combination as defined in clause 6.2.2 of 36.101 [4];

- ΔPPowerClass,NE-DC = 3 dB for a power class 2 capable NE-DC UE when the IE *p-UE-FR1* as defined in TS 38.331 [9] is provided and set to the maximum output power of the default power class or lower; otherwise ΔPPowerClass,NE-DC = 0 dB;

If the transmissions from NR and E-UTRA do not overlap, then the complete clauses for configured transmitted power for E-UTRA and NR respectively from their own specifications apply with the modifications specified above. The lower value between PPowerClass, NE-DC or PEMAX, NE-DC shall not be exceeded at any time by UE.

= 10log10() with the configured maximum transmission power for NE-DC operation as specified in clause 7.6 of TS 38.213 [10].

The total configured maximum transmission power for both synchronous and non-synchronous operation is

= MIN { PEMAX, NE-DC ,PPowerClass, NE-DC – ΔPPowerClass, NE-DC }

If the UE does not support dynamic power sharing,

= MIN { PEMAX, NE-DC ,PPowerClass, NE-DC – ΔPPowerClass, NE-DC } + 0.3 dB

If the NE-DC UE does not support dynamic power sharing, then the complete clauses for configured transmitted power for E-UTRA and NR respectively from their own specifications TS 36.101 [4] and TS 38.101-1 [2] respectively apply with the modifications specified above and applies.

When a UE supporting dynamic sharing is configured for overlapping E-UTRA uplink and NR uplink transmissions, the UE can set its configured maximum output power PCMAX\_E-UTRA,*c* and PCMAX,f,*c,NR* for the configured E-UTRA and NR uplink carriers, respectively, and its configured maximum transmission power for NE-DC operation, , as specified above.

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

PUMAX = 10 log10 [pUMAX,*c,E-UTRA* + pUMAX,*c,NR*],

where pUMAX,*c,E-UTRA* and pUMAX,*c,NR* denotes the measured output power of serving cell *c for E-UTRA and NR* respectively, 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\_L) and THIGH(PCMAX\_H) for applicable values of PCMAX specified in Table 6.2B.4.1.3a-2.

When an UL subframe transmission *p* from E-UTRA overlap with a physical-channel *q* from the NR*,* then for PUMAX evaluation, the E-UTRA subframe *p* 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.4.1.3a-1 when same or different subframe and physical-channel durations are used in aggregated carriers. PPowerClass ,NE-DC shall not be exceeded by the UE during any evaluation period of time.

**Table 6.2B.4.1.3a-1: PCMAX evaluation window**

|  |  |  |
| --- | --- | --- |
| transmission duration | TREF | Teval |
| Different transmission duration in different RAT carriers | LTE 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\_ NE-DC \_H (*p,q*) , PCMAX\_ NE-DC \_H (*p,q+1*), … , PCMAX\_ NE-DC \_H (*p,q+n*) }

where PCMAX\_ NE-DC \_H 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 NR UL physical-channel overlapping with LTE subframe p.

While PCMAX\_L is computed as follows:

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

where PCMAX\_NE-DC\_L 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 NR UL physical-channel overlapping with LTE subframe p,

With

PCMAX\_ NE-DC \_H(*p,q*) = MIN {10 log10 [pCMAX H \_E-UTRA,*c* (*p*) + pCMAX H,f,*c,NR* (*q*)], PEMAX, NE-DC ,PPowerClass, NE-DC}

And:

a = 10 log10 [pCMAX\_E-UTRA,*c* (*p*) +pCMAX,f,*c,NR* (*q*) ] >

If a = TRUE

PCMAX\_ NE-DC \_L(*p,q*) = MIN {10 log10 [pCMAX L \_E-UTRA,*c* (*p*) ], PEMAX, NE-DC ,PPowerClass, NE-DC}

Else

PCMAX\_ NE-DC \_L(*p,q*) = MIN {10 log10 [pCMAX L \_E-UTRA,*c* (*p*) + pCMAX L,f,*c,NR* (*q*)], PEMAX, NE-DC ,PPowerClass, NE-DC}

where

- pCMAX H \_E-UTRA,*c* (*p*) is the E-UTRA higher limit of the maximum configured power expressed in linear scale;

- pCMAX H,f,*c,NR* (*q*) is the NR higher limit of the maximum configured power expressed in linear scale;

- pCMAX L \_E-UTRA,*c* (*p*) is the E-UTRA lower limit of the maximum configured power expressed in linear scale;

- pCMAX\_L,f,*c,NR* (*q*) is the NR lower limit of the maximum configured power expressed in linear scale;

- PPowerClass, NE-DC is defined in clause 6.2B.1.3a for inter-band NE-DC;

- pCMAX\_ E-UTRA,c (p) is the linear value of PCMAX\_ E-UTRA,c (p), the real configured max power for E-UTRA

- pCMAX,f,c,NR (q) is the linear value of PCMAX,f,c,NR (q), the real configured max power of NR

**Table 6.2B.4.1.3a-2: PCMAX tolerance for Dual Connectivity E-UTRA-NR**

|  |  |  |
| --- | --- | --- |
| 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 not indicating support of dynamic power sharing, the upper tolerance Thigh shall be reduced by 0.3 dB for P ≥ 20 dBm. | | |

When E-UTRA and NR transmissions overlap and the condition a = TRUE, PUMAX,f,*c,NR* (*q*) for MCG, under nominal conditions, shall meet

PUMAX,f,*c,NR* (*q*) ≤ 10log(pCMAX H, f,*c,,NR* *c* (*q*)) + THIGH (10log(pCMAX H, f,*c,,NR* *c* (*q*))).

with the tolerances TLOW and THIGH for applicable values of PCMAX specified in Table 6.2B.4a.1.3-2.

When LTE and NR transmissions overlap and the condition a = FALSE), then PUMAX, under nominal conditions, shall be within the following bounds:

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

where PCMAX\_L, PCMAX\_H, and PUMAX are specified above with the tolerances TLOW and THIGH specified in Table 6.2B.4a.1.3-2 for applicable values of PCMAX\_L and PCMAX\_H.

##### 6.2B.4.1.4 Inter-band EN-DC including FR2

For inter-band dual connectivity with one uplink serving cell per CG on E-UTRA and NR respectively, with NR configured in FR2, the UE is allowed to set its configured maximum output power PCMAX,c(i),i for serving cell c(i) of CG i, i = 1,2.

The UE maximum configured power PCMAX,c(i), on E-UTRA for the subframe i shall be set according to clause 6.2.5 from TS 36.101 [4]. Applicable inter-band ΔTIB,c parameters shall be used according to the clauses 6.2B.4.2.4 or 6.2B.4.2.5.

The UE maximum configured power PCMAX,c(j), on NR for the slot j shall be set according to subclase 6.2.4 from TS 38.101-2 [3].

For the configured power measurements TS 36.101 [4] clause 6.2.5 and TS 38.101-2 [3] clause 6.2.4 are applicable.

##### 6.2B.4.1.5 Inter-band EN-DC including both FR1 and FR2

For inter-band dual connectivity with one uplink serving cell per CG on E-UTRA and NR respectively, with both CGs configured in FR1, the requirements specified in clause 6.2B.4.1.3 apply.

For inter-band dual connectivity with one uplink serving cell per CG on E-UTRA and NR respectively, with NR configured in FR2, the requirements specified in clause 6.2B.4.1.4 apply.

For inter-band dual connectivity with one uplink serving cell in first CG on E-UTRA and two uplink serving cells in second CG on NR FR1 and NR FR2 respectively, the UE is allowed to set its configured maximum output power PCMAX,c(i),i for serving cell c(i) , i = 1,2,3 with i=1 for E-UTRA, i=2 for NR FR1 and i=3 for NR FR2.

– For serving cell on FR2, the requirements specified in clause 6.2.4 in TS 38.101-2 [3] apply to the UE maximum configured power PCMAX,c(3),3 and the measured maximum configured power.

– For remaining inter-band dual connectivity involving CG1 and CG2, the requirements specified in clause 6.2B.4.1.3 apply.

#### 6.2B.4.2 ΔTIB,c for DC

##### 6.2B.4.2.0 General

For the UE which supports inter-band EN-DC or NE-DC configuration, ΔTIB,c in Tables below applies where unless otherwise stated, the same ΔTIB,c is applicable to NR band(s) part for DC configurations which have the same NR operating band combination. Unless otherwise stated, ΔTIB,c is set to zero.

Unless ΔTIB,c is specified for the NE-DC configuration, the specified ΔTIB,c for the EN-DC configuration including same bands as the corresponding NE-DC configuration is applicable for the NE-DC configuration.

##### 6.2B.4.2.1 Intra-band contiguous EN-DC

ΔTIB,c is not applicable for intra-band contiguous EN-DC.

##### 6.2B.4.2.2 Intra-band non-contiguous EN-DC

ΔTIB,c is not applicable for intra-band non-contiguous EN-DC.

##### 6.2B.4.2.3 Inter-band EN-DC within FR1

###### 6.2B.4.2.3.1 ΔTIB,c for EN-DC two bands

Table 6.2B.4.2.3.1-1: ΔTIB,c due to EN-DC(two bands)

| Inter-band EN-DC configuration | E-UTRA or NR Band | ΔTIB,c (dB) |
| --- | --- | --- |
| DC\_1\_n28 | 1 | 0.3 |
| n28 | 0.6 |
| DC\_1\_n40 | 1 | 0.5 |
| n40 | 0.5 |
| DC\_1\_n51 | 1 | 0.6 |
| n51 | 0.6 |
| DC\_1\_n77 | 1 | 0.6 |
| n77 | 0.8 |
| DC\_1\_n78 | 1 | 0.3 |
| n78 | 0.8 |
| DC\_2\_n5 | 2 | 0.3 |
| n5 | 0.3 |
| DC\_2\_n66 | 2 | 0.5 |
| n66 | 0.5 |
| DC\_2\_n71 | 2 | 0.3 |
| n71 | 0.3 |
| DC\_2\_n78 | 2 | 0.6 |
| n78 | 0.8 |
| DC\_3\_n7 | 3 | 0.5 |
| n7 | 0.5 |
| DC\_3\_n28 | 3 | 0.3 |
| n28 | 0.3 |
| DC\_3\_n40 | 3 | 0.5 |
| n40 | 0.5 |
| DC\_3\_n51 | 3 | 0.3 |
| n51 | 0.3 |
| DC\_3\_n77 | 3 | 0.6 |
| n77 | 0.8 |
| DC\_3\_n78 | 3 | 0.6 |
| n78 | 0.8 |
| DC\_5\_n40 | 5 | 0.3 |
| n40 | 0.3 |
| DC\_5\_n66 | 5 | 0.3 |
| n66 | 0.3 |
| DC\_5\_n78 | 5 | 0.6 |
| n78 | 0.8 |
| DC\_7\_n28 | 7 | 0.3 |
| n28 | 0.3 |
| DC\_7\_n51 | 7 | 0.3 |
| n51 | 0.3 |
| DC\_7\_n78  DC\_7-7\_n78 | 7 | 0.5 |
| n78 | 0.8 |
| DC\_8\_n40 | 8 | 0.3 |
| n40 | 0.3 |
| DC\_8\_n77 | 8 | 0.6 |
| n77 | 0.8 |
| DC\_8\_n78 | 8 | 0.6 |
| n78 | 0.8 |
| DC\_11\_n77 | 11 | 0.4 |
| n77 | 0.8 |
| DC\_11\_n78 | 11 | 0.4 |
| n78 | 0.8 |
| DC\_12\_n5 | 12 | 0.4 |
| n5 | 0.8 |
| DC\_12\_n66 | 12 | 0.8 |
| n66 | 0.3 |
| DC\_18\_n77 | 18 | 0.3 |
| n77 | 0.8 |
| DC\_18\_n78 | 18 | 0.3 |
| n78 | 0.8 |
| DC\_19\_n77 | 19 | 0.3 |
| n77 | 0.8 |
| DC\_19\_n78 | 19 | 0.3 |
| n78 | 0.8 |
| DC\_20\_n8 | 20 | 0.4 |
| n8 | 0.4 |
| DC\_20\_n28 | 20 | 0.5 |
| n28 | 0.5 |
| DC\_20\_n51 | 20 | 0.5 |
| n51 | 0.5 |
| DC\_20\_n77 | 20 | 0.6 |
| n77 | 0.8 |
| DC\_20\_n78 | 20 | 0.6 |
| n78 | 0.8 |
| DC\_21\_n77 | 21 | 0.4 |
| n77 | 0.8 |
| DC\_21\_n78 | 21 | 0.4 |
| n78 | 0.8 |
| DC\_25\_n41 | 25 | 0.5 |
| n41 | 0.41 |
| 0.92 |
| DC\_26\_n41 | 26 | 0.3 |
| n41 | 0.3 |
| DC\_26\_n77 | 26 | 0.3 |
| n77 | 0.8 |
| DC\_26\_n78 | 26 | 0.3 |
| n78 | 0.8 |
| DC\_28\_n51 | 28 | 0.5 |
| n51 | 0.5 |
| DC\_28\_n77 | 28 | 0.5 |
| n77 | 0.8 |
| DC\_28\_n78 | 28 | 0.5 |
| n78 | 0.8 |
| DC\_30\_n5 | 30 | 0.3 |
| n5 | 0.3 |
| DC\_30\_n66 | 30 | 0.5 |
| n66 | 0.8 |
| DC\_38\_n78 | n78 | 0.5 |
| DC\_39\_n78 | 39 | 0.3 |
| n78 | 0.8 |
| DC\_39\_n79 | 39 | 0.3 |
| n79 | 0.8 |
| DC\_40\_n77 | n77 | 0.5 |
| DC\_41\_n77 | 41 | 0.3 |
| n77 | 0.8 |
| DC\_41\_n78 | 41 | 0.3 |
| n78 | 0.8 |
| DC\_41\_n79 | 41 | 0.3 |
| n79 | 0.8 |
| DC\_42\_n51 | 42 | 0.6 |
| n51 | 0.8 |
| DC\_66\_n5 | 66 | 0.3 |
| n5 | 0.3 |
| DC\_66\_n71 | 66 | 0.3 |
| n71 | 0.3 |
| DC\_66\_n78 | 66 | 0.6 |
| n78 | 0.8 |
| NOTE 1: The requirement is applied for UE transmitting on the frequency range of 2545-2690 MHz.  NOTE 2: The requirement is applied for UE transmitting on the frequency range of 2496-2545 MHz. | | |

6.2B.4.2.3.2 ΔTIB,c for EN-DC three bands

Table 6.2B.4.2.3.2-1: ΔTIB,c due to EN-DC (three bands)

| Inter-band EN-DC configuration | E-UTRA or NR Band | ΔTIB,c (dB) |
| --- | --- | --- |
| DC\_1-3\_n28 | 1 | 0.3 |
| 3 | 0.3 |
| n28 | 0.6 |
| DC\_1-3\_n77 | 1 | 0.6 |
| 3 | 0.6 |
| n77 | 0.8 |
| DC\_1-3\_n78 | 1 | 0.6 |
| 3 | 0.6 |
| n78 | 0.8 |
| DC\_1-3\_n79 | 1 | 0.3 |
| 3 | 0.3 |
| DC\_1-5\_n78 | 1 | 0.3 |
| 5 | 0.6 |
| n78 | 0.8 |
| DC\_1-7\_n28 | 1 | 0.5 |
| 7 | 0.6 |
| n28 | 0.6 |
| DC\_1-7\_n78  DC\_1-7-7\_n78 | 1 | 0.6 |
| 7 | 0.6 |
| n78 | 0.8 |
| DC\_1-8\_n78 | 1 | 0.3 |
| 8 | 0.6 |
| n78 | 0.8 |
| DC\_1-18\_n77 | 1 | 0.3 |
| 18 | 0.3 |
| n77 | 0.8 |
| DC\_1-18\_n78 | 1 | 0.3 |
| 18 | 0.3 |
| n78 | 0.8 |
| DC\_1-19\_n77 | 1 | 0.3 |
| 19 | 0.3 |
| n77 | 0.8 |
| DC\_1-19\_n78 | 1 | 0.3 |
| 19 | 0.3 |
| n78 | 0.8 |
| DC\_1-19\_n79 | 1 | 0.3 |
| 19 | 0.3 |
| DC\_1-20\_n28 | 1 | 0.3 |
| 20 | 0.6 |
| n28 | 0.6 |
| DC\_1-20\_n78 | 1 | 0.3 |
| 20 | 0.3 |
| n78 | 0.8 |
| DC\_1-21\_n77 | 1 | 0.3 |
| 21 | 0.3 |
| n77 | 0.8 |
| DC\_1-21\_n78 | 1 | 0.6 |
| 21 | 0.4 |
| n78 | 0.8 |
| DC\_1-21\_n79 | 1 | 0.3 |
| 21 | 0.3 |
| DC\_1-28\_n77 | 1 | 0.3 |
| 28 | 0.6 |
| n77 | 0.8 |
| DC\_1-28\_n78  DC\_1\_n28-n78 | 1 | 0.3 |
| 28 or n28 | 0.6 |
| n78 | 0.8 |
| DC\_1\_n28-n79 | 1 | 0.3 |
| n28 | 0.3 |
| DC\_1-41\_n77 | 1 | 0.5 |
| 41 | 0.5 |
| n77 | 0.8 |
| DC\_1-41\_n78 | 1 | 0.5 |
| 41 | 0.5 |
| n78 | 0.8 |
| DC\_1-41\_n79 | 1 | 0.5 |
| 41 | 0.5 |
| DC\_1-42\_n77 | 1 | 0.6 |
| 42 | 0.8 |
| n77 | 0.8 |
| DC\_1-42\_n78 | 1 | 0.3 |
| 42 | 0.8 |
| n78 | 0.8 |
| DC\_1-42\_n79 | 1 | 0.3 |
| 42 | 0.8 |
| DC\_1\_n77-n79 | 1 | 0.6 |
| n77 | 0.8 |
| DC\_1\_SUL\_n78-n84 | 1 | 0.3 |
| n78 | 0.8 |
| n84 | 0.3 |
| DC\_1\_n78-n79 | 1 | 0.3 |
| n78 | 0.8 |
| n79 | 0.5 |
| DC\_2-5\_n66 | 2 | 0.5 |
| 5 | 0.3 |
| n66 | 0.5 |
| DC\_2-30\_n66 | 2 | 0.5 |
| 30 | 0.3 |
| n66 | 0.5 |
| DC\_2-66\_n71 | 2 | 0.5 |
| 66 | 0.5 |
| n71 | 0.3 |
| DC\_2-(n)71 | 2 | 0.3 |
| 71 | 0.3 |
| n71 |
| DC\_3\_n3-n77 | 3 | 0.6 |
| n3 | 0.6 |
| n77 | 0.8 |
| DC\_3\_n3-n78 | 3 | 0.6 |
| n3 | 0.6 |
| n78 | 0.8 |
| DC\_3-5\_n78 | 3 | 0.6 |
| 5 | 0.6 |
| n78 | 0.8 |
| DC\_3-7\_n28 | 3 | 0.5 |
| 7 | 0.5 |
| n28 | 0.3 |
| DC\_3-7\_n78, DC\_3-7-7\_n78 | 3 | 0.6 |
| 7 | 0.6 |
| n78 | 0.8 |
| DC\_3-8\_n78 | 3 | 0.6 |
| 8 | 0.6 |
| n78 | 0.8 |
| DC\_3-19\_n77 | 3 | 0.6 |
| 19 | 0.3 |
| n77 | 0.8 |
| DC\_3-19\_n78 | 3 | 0.6 |
| 19 | 0.3 |
| n78 | 0.8 |
| DC\_3-19\_n79 | 3 | 0.3 |
| 19 | 0.3 |
| DC\_3-20\_n28 | 3 | 0.3 |
| 20 | 0.5 |
| n28 | 0.5 |
| DC\_3-20\_n78 | 3 | 0.5 |
| 20 | 0.3 |
| n78 | 0.8 |
| DC\_3-21\_n77 | 3 | 0.8 |
| 21 | 0.9 |
| n77 | 0.8 |
| DC\_3-21\_n78 | 3 | 0.8 |
| 21 | 0.9 |
| n78 | 0.8 |
| DC\_3-21\_n79 | 3 | 0.8 |
| 21 | 0.9 |
| DC\_3-28\_n78 | 3 | 0.5 |
| 28 | 0.3 |
| n78 | 0.8 |
| DC\_3\_n28-n78 | 3 | 0.5 |
| n28 | 0.3 |
| n78 | 0.8 |
| DC\_3-38\_n78 | 3 | 0.6 |
| n78 | 0.8 |
| DC\_3-41\_n78 | 3 | 0.6 |
| 41 | 0.31 |
| 0.82 |
| n78 | 0.8 |
| DC\_3-42\_n77 | 3 | 0.6 |
| 42 | 0.8 |
| n77 | 0.8 |
| DC\_3-42\_n78 | 3 | 0.6 |
| 42 | 0.8 |
| n78 | 0.8 |
| DC\_3-42\_n79 | 3 | 0.6 |
| 42 | 0.8 |
| DC\_3\_n77-n79 | 3 | 0.6 |
| n77 | 0.8 |
| DC\_3\_n78-n79 | 3 | 0.6 |
| n78 | 0.8 |
| n79 | 0.5 |
| DC\_3\_SUL\_n78-n80 | 3 | 0.6 |
| n78 | 0.8 |
| n80 | 0.6 |
| DC\_3\_SUL\_n78-n82 | 3 | 0.5 |
| n78 | 0.8 |
| n82 | 0.3 |
| DC\_5-7\_n78, DC\_5-7-7\_n78 | 5 | 0.6 |
| 7 | 0.6 |
| n78 | 0.8 |
| DC\_5-30\_n66 | 5 | 0.3 |
| 30 | 0.3 |
| n66 | 0.5 |
| DC\_7-20\_n28 | 7 | 0.3 |
| 20 | 0.6 |
| n28 | 0.6 |
| DC\_7-20\_n78 | 7 | 0.3 |
| 20 | 0.3 |
| n78 | 0.8 |
| DC\_7-28\_n78 | 7 | 0.3 |
| 28 | 0.3 |
| n78 | 0.8 |
| DC\_7\_n28-n78 | 7 | 0.3 |
| n28 | 0.3 |
| n78 | 0.8 |
| DC\_7-46\_n78 | 7 | 0.5 |
| n78 | 0.8 |
| DC\_8\_SUL\_n78- n81 | 8 | 0.6 |
| n78 | 0.8 |
| n81 | 0.6 |
| DC\_18-28\_n77 | 18 | 0.5 |
| 28 | 0.5 |
| n77 | 0.8 |
| DC\_18-28\_n78 | 18 | 0.5 |
| 28 | 0.5 |
| n78 | 0.8 |
| DC\_18-28\_n79 | 18 | 0.5 |
| 28 | 0.5 |
| DC\_19-21\_n77 | 19 | 0.3 |
| 21 | 0.4 |
| n77 | 0.8 |
| DC\_19-21\_n78 | 19 | 0.3 |
| 21 | 0.4 |
| n78 | 0.8 |
| DC\_19-21\_n79 | 19 | 0.3 |
| 21 | 0.4 |
| DC\_19-42\_n77 | 19 | 0.3 |
| 42 | 0.8 |
| n77 | 0.8 |
| DC\_19-42\_n78 | 19 | 0.3 |
| 42 | 0.8 |
| n78 | 0.8 |
| DC\_19-42\_n79 | 19 | 0.3 |
| 42 | 0.8 |
| DC\_19\_n77-n79 | 19 | 0.3 |
| n77 | 0.8 |
| DC\_19\_n78-n79 | 19 | 0.3 |
| n78 | 0.8 |
| n79 | 0.5 |
| DC\_20\_n8-n75 | 20 | 0.4 |
| n8 | 0.4 |
| DC\_20\_n28-n75 | 20 | 0.5 |
| n28 | 0.7 |
| DC\_20\_n28-n78 | 20 | 0.6 |
| n28 | 0.6 |
| n78 | 0.8 |
| DC\_20\_n75-n78 | 20 | 0.5 |
| n78 | 0.8 |
| DC\_20\_n76-n78 | 20 | 0.5 |
| n78 | 0.8 |
| DC\_20\_SUL\_n78-n82 | 20 | 0.6 |
| n78 | 0.8 |
| n82 | 0.6 |
| DC\_20\_SUL\_n78-n83 | 20 | 0.8 |
| n78 | 0.8 |
| n83 | 0.8 |
| DC\_21-42\_n77 | 21 | 0.4 |
| 42 | 0.8 |
| n77 | 0.8 |
| DC\_21-42\_n78 | 21 | 0.4 |
| 42 | 0.8 |
| n78 | 0.8 |
| DC\_21-42\_n79 | 21 | 0.4 |
| 42 | 0.8 |
| DC\_21\_n77-n79 | 21 | 0.4 |
| n77 | 0.8 |
| DC\_21\_n78-n79 | 21 | 0.4 |
| n78 | 0.8 |
| n79 | 0.5 |
| DC\_28-42\_n77 | 28 | 0.5 |
| 42 | 0.8 |
| n77 | 0.8 |
| DC\_28-42\_n78 | 28 | 0.5 |
| 42 | 0.8 |
| n78 | 0.8 |
| DC\_28-42\_n79 | 28 | 0.5 |
| 42 | 0.8 |
| DC\_28\_SUL\_n78-n83 | 28 | 0.5 |
| n78 | 0.8 |
| n83 | 0.5 |
| DC\_41-42\_n77 | 41 | 0.5 |
| 42 | 0.8 |
| n77 | 0.8 |
| DC\_41-42\_n78 | 41 | 0.5 |
| 42 | 0.8 |
| n78 | 0.8 |
| DC\_41-42\_n79 | 41 | 0.3 |
| 42 | 0.8 |
| DC\_66\_(n)71 | 66 | 0.3 |
| 71 | 0.3 |
| n71 | 0.3 |
| DC\_66\_SUL\_n78-n86 | 66 | 0.6 |
| n78 | 0.8 |
| n86 | 0.6 |
| NOTE 1: The requirement is applied for UE transmitting on the frequency range of 2545-2690 MHz.  NOTE 2: The requirement is applied for UE transmitting on the frequency range of 2496-2545 MHz. | | |

6.2B.4.2.3.3 ΔTIB,c for EN-DC four bands

Table 6.2B.4.2.3.3-1: ΔTIB,c due to EN-DC(four bands)

| Inter-band EN-DC configuration | E-UTRA or NR Band | ΔTIB,c (dB) |
| --- | --- | --- |
| DC\_1-3-5\_n78 | 1 | 0.6 |
| 3 | 0.6 |
| 5 | 0.3 |
| n78 | 0.8 |
| DC\_1-3-7\_n28 | 1 | 0.6 |
| 3 | 0.6 |
| 7 | 0.6 |
| n28 | 0.6 |
| DC\_1-3-7\_n78  DC\_1-3-7-7\_n78 | 1 | 0.7 |
| 3 | 0.7 |
| 7 | 0.7 |
| n78 | 0.8 |
| DC\_1-3-8\_n78 | 1 | 0.6 |
| 3 | 0.6 |
| 8 | 0.6 |
| n78 | 0.8 |
| DC\_1-3-19\_n78 | 1 | 0.6 |
| 3 | 0.6 |
| 19 | 0.3 |
| n78 | 0.8 |
| DC\_1-3-19\_n79 | 1 | 0.3 |
| 3 | 0.3 |
| 19 | 0.3 |
| DC\_1-3-20\_n28 | 1 | 0.3 |
| 3 | 0.3 |
| 20 | 0.6 |
| n28 | 0.6 |
| DC\_1-3-20\_n78 | 1 | 0.6 |
| 3 | 0.6 |
| 20 | 0.3 |
| n78 | 0.8 |
| DC\_1-3-21\_n77 | 1 | 0.6 |
| 3 | 0.8 |
| 21 | 0.9 |
| n77 | 0.8 |
| DC\_1-3-21\_n78 | 1 | 0.6 |
| 3 | 0.8 |
| 21 | 0.9 |
| n78 | 0.8 |
| DC\_1-3-21\_n79 | 1 | 0.3 |
| 3 | 0.8 |
| 21 | 0.9 |
| DC\_1-3-28\_n77 | 1 | 0.6 |
| 3 | 0.6 |
| 28 | 0.6 |
| n77 | 0.8 |
| DC\_1-3-28\_n78  DC\_1-3\_n28-n78 | 1 | 0.6 |
| 3 | 0.6 |
| 28 or n28 | 0.6 |
| n78 | 0.8 |
| DC\_1-3-28\_n79 | 1 | 0.6 |
| 3 | 0.6 |
| 28 | 0.6 |
| DC\_1-3-42\_n77 | 1 | 0.6 |
| 3 | 0.6 |
| 42 | 0.8 |
| n77 | 0.8 |
| DC\_1-3-42\_n78 | 1 | 0.6 |
| 3 | 0.6 |
| 42 | 0.8 |
| n78 | 0.8 |
| DC\_1-3-42\_n79 | 1 | 0.6 |
| 3 | 0.6 |
| 42 | 0.8 |
| DC\_1-5-7\_n78  DC\_1-5-7-7\_n78 | 1 | 0.6 |
| 5 | 0.6 |
| 7 | 0.6 |
| n78 | 0.8 |
| DC\_1-7-20\_n28 | 1 | 0.5 |
| 7 | 0.6 |
| 20 | 0.6 |
| n28 | 0.6 |
| DC\_1-7-20\_n78 | 1 | 0.6 |
| 7 | 0.7 |
| 20 | 0.4 |
| n78 | 0.8 |
| DC\_1-7\_n28-n78 | 1 | 0.6 |
| 7 | 0.6 |
| n28 | 0.6 |
| n78 | 0.8 |
| DC\_1-18-28\_n77 | 1 | 0.3 |
| 18 | 0.5 |
| 28 | 0.5 |
| n77 | 0.8 |
| DC\_1-18-28\_n78 | 1 | 0.3 |
| 18 | 0.5 |
| 28 | 0.5 |
| n78 | 0.8 |
| DC\_1-18-28\_n79 | 1 | 0.3 |
| 18 | 0.5 |
| 28 | 0.5 |
| DC\_1-19-42\_n77 | 1 | 0.6 |
| 19 | 0.3 |
| 42 | 0.8 |
| n77 | 0.8 |
| DC\_1-19-42\_n78 | 1 | 0.3 |
| 19 | 0.3 |
| 42 | 0.8 |
| n78 | 0.8 |
| DC\_1-19-42\_n79 | 1 | 0.3 |
| 19 | 0.3 |
| 42 | 0.8 |
| DC\_1-20\_n28-n78 | 1 | 0.3 |
| 20 | 0.6 |
| n28 | 0.6 |
| n78 | 0.8 |
| DC\_1-21-28\_n77 | 1 | 0.6 |
| 21 | 0.4 |
| 28 | 0.6 |
| n77 | 0.8 |
| DC\_1-21-28\_n78 | 1 | 0.3 |
| 21 | 0.4 |
| 28 | 0.6 |
| n78 | 0.8 |
| DC\_1-21-28\_n79 | 1 | 0.3 |
| 21 | 0.4 |
| 28 | 0.6 |
| DC\_1-21-42\_n77 | 1 | 0.6 |
| 21 | 0.4 |
| 42 | 0.8 |
| n77 | 0.8 |
| DC\_1-21-42\_n78 | 1 | 0.3 |
| 21 | 0.4 |
| 42 | 0.8 |
| n78 | 0.8 |
| DC\_1-21-42\_n79 | 1 | 0.3 |
| 21 | 0.4 |
| 42 | 0.8 |
| DC\_1-28-42\_n77 | 1 | 0.6 |
| 28 | 0.6 |
| 42 | 0.8 |
| n77 | 0.8 |
| DC\_1-28-42\_n78 | 1 | 0.3 |
| 28 | 0.6 |
| 42 | 0.8 |
| n78 | 0.8 |
| DC\_1-28-42\_n79 | 1 | 0.3 |
| 28 | 0.6 |
| 42 | 0.8 |
| DC\_1-41-42\_n77 | 1 | 0.5 |
| 41 | 0.5 |
| 42 | 0.8 |
| n77 | 0.8 |
| DC\_1-41-42\_n78 | 1 | 0.5 |
| 41 | 0.5 |
| 42 | 0.8 |
| n78 | 0.8 |
| DC\_1-41-42\_n79 | 1 | 0.5 |
| 41 | 0.5 |
| 42 | 0.8 |
| DC\_2-66-(n)71 | 2 | 0.5 |
| 66 | 0.5 |
| 71 | 0.3 |
| n71 |
| DC\_3-5-7\_n78, DC\_3-5-7-7\_n78 | 3 | 0.6 |
| 5 | 0.6 |
| 7 | 0.6 |
| n78 | 0.8 |
| DC\_3-7-20\_n28 | 3 | 0.5 |
| 7 | 0.5 |
| 20 | 0.6 |
| n28 | 0.5 |
| DC\_3-7-20\_n78 | 3 | 0.6 |
| 7 | 0.6 |
| 20 | 0.3 |
| n78 | 0.8 |
| DC\_3-7-28\_n78 | 3 | 0.6 |
| 7 | 0.6 |
| 28 | 0.6 |
| n78 | 0.8 |
| DC\_3-7\_n28-n78 | 3 | 0.6 |
| 7 | 0.6 |
| n28 | 0.6 |
| n78 | 0.8 |
| DC\_3-19-21\_n77 | 3 | 0.8 |
| 19 | 0.3 |
| 21 | 0.9 |
| n77 | 0.8 |
| DC\_3-19-21\_n78 | 3 | 0.8 |
| 19 | 0.3 |
| 21 | 0.9 |
| n78 | 0.8 |
| DC\_3-19-21\_n79 | 3 | 0.8 |
| 19 | 0.3 |
| 21 | 0.9 |
| DC\_3-19-42\_n77 | 3 | 0.6 |
| 19 | 0.3 |
| 42 | 0.8 |
| n77 | 0.8 |
| DC\_3-19-42\_n78 | 3 | 0.6 |
| 19 | 0.3 |
| 42 | 0.8 |
| n78 | 0.8 |
| DC\_3-19-42\_n79 | 3 | 0.6 |
| 19 | 0.3 |
| 42 | 0.8 |
| DC\_3-20\_n28-n78 | 3 | 0.6 |
| 20 | 0.6 |
| n28 | 0.6 |
| n78 | 0.8 |
| DC\_3-21-42\_n77 | 3 | 0.8 |
| 21 | 0.9 |
| 42 | 0.8 |
| n77 | 0.8 |
| DC\_3-21-42\_n78 | 3 | 0.8 |
| 21 | 0.9 |
| 42 | 0.8 |
| n78 | 0.8 |
| DC\_3-21-42\_n79 | 3 | 0.8 |
| 21 | 0.9 |
| 42 | 0.8 |
| DC\_3-28-42\_n77 | 3 | 0.6 |
| 28 | 0.5 |
| 42 | 0.8 |
| n77 | 0.8 |
| DC\_3-28-42\_n78 | 3 | 0.6 |
| 28 | 0.5 |
| 42 | 0.8 |
| n78 | 0.8 |
| DC\_3-28-42\_n79 | 3 | 0.6 |
| 28 | 0.5 |
| 42 | 0.8 |
| DC\_7-20\_n28-n78 | 7 | 0.3 |
| 20 | 0.6 |
| n28 | 0.6 |
| n78 | 0.8 |
| DC\_19-21-42\_n77 | 19 | 0.3 |
| 21 | 0.4 |
| 42 | 0.8 |
| n77 | 0.8 |
| DC\_19-21-42\_n78 | 19 | 0.3 |
| 21 | 0.4 |
| 42 | 0.8 |
| n78 | 0.8 |
| DC\_19-21-42\_n79 | 19 | 0.3 |
| 21 | 0.4 |
| 42 | 0.8 |
| DC\_21-28-42\_n77 | 21 | 0.4 |
| 28 | 0.5 |
| 42 | 0.8 |
| n77 | 0.8 |
| DC\_21-28-42\_n78 | 21 | 0.4 |
| 28 | 0.5 |
| 42 | 0.8 |
| n78 | 0.8 |
| DC\_21-28-42\_n79 | 21 | 0.4 |
| 28 | 0.5 |
| 42 | 0.8 |

6.2B.4.2.3.4 ΔTIB,c for EN-DC five bands

Table 6.2B.4.2.3.4-1: ΔTIB,c due to EN-DC (five bands)

| Inter-band EN-DC configuration | E-UTRA or NR Band | ΔTIB,c (dB) |
| --- | --- | --- |
| DC\_1-3-5-7\_n78,  DC\_1-3-5-7-7\_n78 | 1 | 0.6 |
| 3 | 0.6 |
| 5 | 0.6 |
| 7 | 0.6 |
| n78 | 0.8 |
| DC\_1-3-7-20\_n28 | 1 | 0.6 |
| 3 | 0.6 |
| 7 | 0.6 |
| 20 | 0.6 |
| n28 | 0.6 |
| DC\_1-3-7-20\_n78 | 1 | 0.6 |
| 3 | 0.6 |
| 7 | 0.6 |
| 20 | 0.6 |
| n78 | 0.6 |
| DC\_1-3-7\_n28-n78 | 1 | 0.7 |
| 3 | 0.7 |
| 7 | 0.7 |
| n28 | 0.6 |
| n78 | 0.8 |
| DC\_1-3-19-21\_n77 | 1 | 0.6 |
| 3 | 0.8 |
| 19 | 0.3 |
| 21 | 0.9 |
| n77 | 0.8 |
| DC\_1-3-19-21\_n78 | 1 | 0.6 |
| 3 | 0.8 |
| 19 | 0.3 |
| 21 | 0.9 |
| n78 | 0.8 |
| DC\_1-3-19-21\_n79 | 1 | 0.3 |
| 3 | 0.8 |
| 19 | 0.3 |
| 21 | 0.9 |
| DC\_1-3-19-42\_n77 | 1 | 0.6 |
| 3 | 0.6 |
| 19 | 0.3 |
| 42 | 0.8 |
| n77 | 0.8 |
| DC\_1-3-19-42\_n78 | 1 | 0.6 |
| 3 | 0.6 |
| 19 | 0.3 |
| 42 | 0.8 |
| n78 | 0.8 |
| DC\_1-3-19-42\_n79 | 1 | 0.6 |
| 3 | 0.6 |
| 19 | 0.3 |
| 42 | 0.8 |
| DC\_1-3-20\_n28-n78 | 1 | 0.6 |
| 3 | 0.6 |
| 20 | 0.6 |
| n28 | 0.6 |
| n78 | 0.8 |
| DC\_1-3-21-42\_n77 | 1 | 0.6 |
| 3 | 0.8 |
| 21 | 0.9 |
| 42 | 0.8 |
| n77 | 0.6 |
| DC\_1-3-21-42\_n78 | 1 | 0.6 |
| 3 | 0.8 |
| 21 | 0.9 |
| 42 | 0.8 |
| n78 | 0.6 |
| DC\_1-3-21-42\_n79 | 1 | 0.6 |
| 3 | 0.8 |
| 21 | 0.9 |
| 42 | 0.8 |
| DC\_1-3-28-42\_n77 | 1 | 0.6 |
| 3 | 0.6 |
| 28 | 0.6 |
| 42 | 0.8 |
| n77 | 0.8 |
| DC\_1-3-28-42\_n78 | 1 | 0.6 |
| 3 | 0.6 |
| 28 | 0.6 |
| 42 | 0.8 |
| n78 | 0.8 |
| DC\_1-3-28-42\_n79 | 1 | 0.6 |
| 3 | 0.6 |
| 28 | 0.6 |
| 42 | 0.8 |
| DC\_1-7-20\_n28-n78 | 1 | 0.6 |
| 7 | 0.7 |
| 20 | 0.6 |
| n28 | 0.6 |
| n78 | 0.8 |
| DC\_1-19-21-42\_n77 | 1 | 0.3 |
| 19 | 0.3 |
| 21 | 0.4 |
| 42 | 0.8 |
| n77 | 0.8 |
| DC\_1-19-21-42\_n78 | 1 | 0.3 |
| 19 | 0.3 |
| 21 | 0.4 |
| 42 | 0.8 |
| n78 | 0.8 |
| DC\_1-19-21-42\_n79 | 1 | 0.3 |
| 19 | 0.3 |
| 21 | 0.4 |
| 42 | 0.8 |
| DC\_1-21-28-42\_n77 | 1 | 0.6 |
| 21 | 0.4 |
| 28 | 0.6 |
| 42 | 0.8 |
| n77 | 0.8 |
| DC\_1-21-28-42\_n78 | 1 | 0.3 |
| 21 | 0.4 |
| 28 | 0.6 |
| 42 | 0.8 |
| n78 | 0.8 |
| DC\_1-21-28-42\_n79 | 1 | 0.3 |
| 21 | 0.4 |
| 28 | 0.6 |
| 42 | 0.8 |
| DC\_3-7-20\_n28-n78 | 3 | 0.6 |
| 7 | 0.6 |
| 20 | 0.6 |
| n28 | 0.6 |
| n78 | 0.8 |

###### 6.2B.4.2.3.5 ΔTIB,c for EN-DC six bands

Table 6.2B.4.2.3.5-1: ΔTIB,c due to EN-DC (six bands)

|  |  |  |
| --- | --- | --- |
| Inter-band EN-DC configuration | E-UTRA or NR Band | ΔTIB,c (dB) |
| DC\_1-3-7-20\_n28-n78 | 1 | 0.7 |
| 3 | 0.7 |
| 7 | 0.7 |
| 20 | 0.6 |
| n28 | 0.6 |
| n78 | 0.8 |

##### 6.2B.4.2.3a Inter-band NE-DC within FR1

Unless ΔTIB,c is specified in this clause, the value of ΔTIB,c for the correspondingly specified EN-DC configuration in clause 6.2B.4.2.3 is applicable.

##### 6.2B.4.2.4 Inter-band EN-DC including FR2

###### 6.2B.4.2.4.1 ΔTIB,c for EN-DC two bands

Unless otherwise stated, ΔTIB,c for E-UTRA and FR2 NR bands of inter-band EN-DC combinations defined in table 5.5B.5.1-1 is set to zero.

Table 6.2B.4.2.4.1-1: Void

###### 6.2B.4.2.4.2 ΔTIB,c for EN-DC three bands

Unless otherwise stated, ΔTIB,c for FR2 NR bands is set to zero, and ΔTIB,c for constituent E-UTRA bands for inter-band EN-DC defined in table 5.5B.5.2-1 is the same as those for the corresponding E-UTRA CA configuration specified in TS 36.101 [4], without the FR2 NR bands.

Table 6.2B.4.2.4.2-1: Void

###### 6.2B.4.2.4.3 ΔTIB,c for EN-DC four bands

Unless otherwise stated, ΔTIB,c for FR2 NR bands is set to zero, and ΔTIB,c for constituent E-UTRA bands for inter-band EN-DC defined in table 5.5B.5.3-1 is the same as those for the corresponding E-UTRA CA configuration specified in TS 36.101 [4], without the FR2 NR bands.

Table 6.2B.4.2.4.3-1: Void

###### 6.2B.4.2.4.4 ΔTIB,c for EN-DC five bands

Unless otherwise stated, ΔTIB,c for FR2 NR bands is set to zero, and ΔTIB,c for constituent E-UTRA bands for inter-band EN-DC defined in table 5.5B.5.4-1 is the same as those for the corresponding E-UTRA CA configuration specified in TS 36.101 [4], without the FR2 NR bands.

Table 6.2B.4.2.4.4-1: Void

###### 6.2B.4.2.4.5 Void

##### 6.2B.4.2.5 Inter-band EN-DC including both FR1 and FR2

###### 6.2B.4.2.5.1 ΔTIB,c for EN-DC three bands

Unless otherwise stated, for inter-band EN-DC configurations defined in table 5.5B.6.2-1, ΔTIB,c for constituent FR2 NR bands is set to zero, and ΔTIB,c for constituent E-UTRA and FR1 NR bands is the same as those for the corresponding inter band EN-DC configuration without the FR2 bands specified in 6.2B.4.2.3.

Table 6.2B.4.2.5.1-1: Void

###### 6.2B.4.2.5.2 ΔTIB,c for EN-DC four bands

Unless otherwise stated, for inter-band EN-DC configurations defined in table 5.5B.6.3-1, ΔTIB,c for constituent FR2 NR bands is set to zero, and ΔTIB,c for constituent E-UTRA and FR1 NR bands is the same as those for the corresponding inter band EN-DC configuration without the FR2 bands specified in 6.2B.4.2.3.

###### 6.2B.4.2.5.3 ΔTIB,c for EN-DC five bands

Unless otherwise stated, for inter-band EN-DC configurations defined in table 5.5B.6.4-1, ΔTIB,c for constituent FR2 NR bands is set to zero, and ΔTIB,c for constituent E-UTRA and FR1 NR bands is the same as those for the corresponding inter band EN-DC configuration without the FR2 bands specified in 6.2B.4.2.3.

###### 6.2B.4.2.5.4 ΔTIB,c for EN-DC six bands

Unless otherwise stated, for inter-band EN-DC configurations defined in table 5.5B.6.5-1, ΔTIB,c for constituent FR2 NR bands is set to zero, and ΔTIB,c for constituent E-UTRA and FR1 NR bands is the same as those for the corresponding inter band EN-DC configuration without the FR2 bands specified in 6.2B.4.2.3.

### 6.2B.5 Configured output power for NR-DC

#### 6.2B.5.1 Configured output power level

##### 6.2B.5.1.1 Inter-band NR-DC between FR1 and FR2

For synchronous inter-band NR-DC [12] with MCG in FR1 and SCG in FR2 combined with one uplink serving cell per CG, the UE is allowed to set its configured maximum output power PCMAX,*c(i),i* for serving cell *c(i)* of CG *i, i = 1,2* as specified in clause 6.2.4 of TS 38.101-1 [2] and clause 6.2.4 TS 38.101-2 [3] independently.

## 6.3 Output power dynamics

Output power dynamics for EN-DC operations in FR1 and FR2 as specified in TS 38.101-1 [2] and TS 38.101-2 [3], respectively. E-UTRA as specified in TS 36.101 [4]. For intra-band contiguous EN-DC operation in FR1, minimum output power requirements specified in clause 6.3.1 of TS 38.101-1 [2] and clause 6.3.2 of TS 36.101 [4] shall only apply when the power of all NR and E-UTRA carriers are set to minimum value. Similarly, OFF power requirements specified in clause 6.3.2 of TS 38.101-1 [2] and clause 6.3.3 of TS 36.101 [4] shall only apply when the power of all NR and E-UTRA carriers are OFF. The OFF power condition in transmit ON/OFF time mask requirements specified in clause 6.3.3 of TS 38.101-1 [2] and clause 6.3.4 of TS 36.101 [4] is applicable only when all NR and E-UTRA carriers are OFF. If both E-UTRA and NR transition between ON and OFF states simultaneously, the longer transient time shall apply to both. If either E-UTRA or NR is OFF and the other carrier transitions from OFF to ON, then the transiet time associated with that carrier applies.

## 6.3A Output power dynamics for CA

For inter-band NR CA between FR1 and FR2, output power dynamics as specified in TS 38.101-1 [2] and TS 38.101-2 [3] apply for FR1 and FR2 respectively.

6.3B Output power dynamics for DC

### 6.3B.0 General

The E-UTRA and NR switching time mask defines the observation period between E-UTRA subframe and NR slot/mini-slot boundary. Both E-UTRA subframe and NR slot/mini-slot have ON power transmissions. The ON power is defined as the mean power over the symbol duration excluding any transient period. For E-UTRA subframe or NR slot/mini-slot having OFF power transmission, the general time mask for E-UTRA or NR shall apply.

For inter-band EN-DC, output power dynamics requirement for E-UTRA single carrier and CA operation specified in clauses 6.3 and 6.3A of TS 36.101 [4] and for NR single carrier and CA operation specified in clause 6.3 and 6.3A of TS 38.101-1 [2] and for NR single carrier, CA operation and UL-MIMO specified in clause 6.3, 6.3A and 6.3D of TS 38.101-2 [3] apply.

### 6.3B.1 Output power dynamics for EN-DC with UL sharing from UE perspective

#### 6.3B.1.1 E-UTRA and NR switching time mask for TDM based UL sharing from UE perspective

The E-UTRA and NR switching time mask is applicable for non-simultaneous transmissions between E-UTRA and NR in TDM based UL sharing from the UE perspective in the same channel, which is shared by E-UTRA and NR .

For UEs reporting E-UTRA and NR switching time capability of type 1 with switching time < 0.5 us for TDM based UL sharing from UE perspective within FR1 time masks in Figure 6.3B.1.1-1 and Figure 6.3B.1.1-2 shall apply. For UEs reporting E-UTRA and NR switching time capability of type 2 with switching time < 20 us for TDM based UL sharing from UE perspective within FR1, time masks in Figure 6.3B.1.1-3 and Figure 6.3B.1.1-4 shall apply.



Figure 6.3B.1.1-1: E-UTRA to NR switching time mask for type 1 for TDM based UL sharing from UE perspective within FR1



Figure 6.3B.1.1-2: NR to E-UTRA switching time mask for type 1 for TDM based UL sharing from UE perspective within FR1



Figure 6.3B.1.1-3: E-UTRA to NR switching time mask for type 2 for TDM based UL sharing from UE perspective within FR1



Figure 6.3B.1.1-4: NR to E-UTRA switching time mask for type 2 for TDM based UL sharing from UE perspective within FR1

### 6.3B.1a Output power dynamics for NE-DC with UL sharing from UE perspective

The E-UTRA and NR switching time mask is applicable for non-simultaneous transmissions between E-UTRA and NR in TDM based UL sharing from the UE perspective in the same channel, which is shared by E-UTRA and NR. Unless otherwise specified, the 6.3B.1.1 clauses for NE-DC are applicable.

### 6.3B.2 Output power dynamics for intra-band EN-DC without dual PA capability

For intra-band contiguous EN-DC configurations DC\_(n)41 and DC\_(n)71, and all intra-band non-contiguous EN-DC configurations without dual PA capability, maximum UL switching time is defined as 120 us and DL reception interruption is allowed during UL switching. Time masks in Figure 6.3B.2-1 and Figure 6.3B.2-2 shall apply. Unless otherwise stated, for other intra-band contiguous EN-DC configurations, the switching time in 6.3B.1.1 applies.



Figure 6.3B.2-1: E-UTRA to NR switching time mask for intra-band EN-DC without dual PA capability when single UL is allowed



Figure 6.3B.2-2: NR to E-UTRA switching time mask for intra-band EN-DC without dual PA capability when single UL is allowed

### 6.3B.3 Output power dynamics for intra-band EN-DC with dual PA capability

For both intra-band contiguous and non-contiguous EN-DC with dual PA capability, time masks in Figure 6.3B.3-1 and Figure 6.3B.3-2 shall apply.



Figure 6.3B.3-1: E-UTRA to NR switching time mask for intra-band EN-DC with dual PA capability



Figure 6.3B.3-2: NR to E-UTRA switching time mask for intra-band EN-DC with dual PA capability

## 6.4 Void

## 6.4A Transmit signal quality for CA

### 6.4A.1 Frequency error for CA

For inter-band NR CA between FR1 and FR2, frequency error as specified in TS 38.101-1 [2] and TS 38.101-2 [3] apply for FR1 and FR2 respectively.

### 6.4A.2 Transmit modulation quality for CA

For inter-band NR CA between FR1 and FR2, transmit modulation quality as specified in TS 38.101-1 [2] and TS 38.101-2 [3] apply for FR1 and FR2 respectively.

## 6.4B Transmit signal quality for DC

6.4B.1 Frequency error for DC

6.4B.1.1 Frequency error for Intra-band contiguous EN-DC

For intra-band contiguous EN-DC, the requirement shall apply on each component carrier as defined in clause 6.5.1 in TS 36.101 [4] and in clause 6.4.1 in TS 38.101-1 [2], respectively.

6.4B.1.2 Frequency error for Intra-band non-contiguous EN-DC

For intra-band non-contiguous EN-DC, the requirement shall apply on each component carrier as defined in clause 6.5.1 in TS 36.101 [4] and in clause 6.4.1 in TS 38.101-1 [2], respectively.

6.4B.1.3 Frequency error for inter-band EN-DC within FR1

For inter-band EN-DC with uplink assigned to one E-UTRA band and one NR band, the requirements shall apply on each component carrier as defined in clause 6.5.1 in TS 36.101 [4] and in clause 6.4.1 in TS 38.101-1 [2], respectively, with all component carriers active. If multiple component carriers are assigned to one E-UTRA band, the requirements in clauses 6.5.1A in TS 36.101 [4] apply for those component carriers.

6.4B.1.3a Frequency error for inter-band NE-DC within FR1

For inter-band NE-DC with uplink assigned to one E-UTRA band and one NR band, the requirements shall apply on each component carrier as defined in clause 6.5.1 in TS 36.101 [4] and in clause 6.4.1 in TS 38.101-1 [2], respectively, with all component carriers active. If multiple component carriers are assigned to one E-UTRA band, the requirements in clauses 6.5.1A in TS 36.101 [4] apply for those component carriers, and if multiple component carriers are assigned to one NR band, the requirements in clauses 6.4A.1 in TS 38.101-1 [2] apply for those component carriers.

6.4B.1.4 Frequency error for inter-band EN-DC including FR2

Frequency error requirement for E-UTRA single carrier and CA operation specified in clauses 6.5.1 and 6.5.1A of TS 36.101 [4] and for NR single carrier, CA operation and UL-MIMO specified in clause 6.4.1, 6.4A.1 and 6.4D.1 of TS 38.101-2 [3] apply.

6.4B.1.5 Frequency error for inter-band EN-DC including both FR1 and FR2

Frequency error requirement for E-UTRA single carrier and CA operation specified in clauses 6.5.1 and 6.5.1A of TS 36.101 [4] and for NR single carrier and CA operation specified in clause 6.4.1 and 6.4A.1 of TS 38.101-1 [2] and for NR single carrier, CA operation and UL-MIMO specified in clause 6.4.1, 6.4A.1 and 6.4D.1 of TS 38.101-2 [3] apply.

### 6.4B.2 Transmit modulation quality for DC

#### 6.4B.2.1 Transmit modulation quality for Intra-band contiguous EN-DC

##### 6.4B.2.1.1 Error Vector Magnitude

For the intra-band contiguous EN-DC with one component carrier per CG the EVM requirement applies with PRB allocation in one of the CG and the other CG unallocated.

The EVM requirements for each CG are according to clause 6.5.2 of TS 36.101 [4] for the MCG and 6.4.2 of TS 38.101-1 [2] for the SCG with EN-DC configured.

##### 6.4B.2.1.2 Carrier leakage

The carrier leakage requirements for each CG are according to clause 6.5.2 of TS 36.101 [4] for the MCG and 6.4.2 of TS 38.101-1 [2] for the SCG with EN-DC configured.

##### 6.4B.2.1.3 In-band emissions

For the MCG the in-band emission requirments in Table 6.5.2A.3.1-1 and 6.5.2A.3.1-2 in TS 36.101 [4] apply within the aggregated transmission bandwidth configuration of the EN-DC bandwidth with the carriers of both CGs active and one single contiguous PRB allocation of bandwidth *LCRB* within the MCG at the edge of the said aggregated transmission bandwidth configuration.

For the SCG the in-band emission requirements in Table 6.4.2.3-1 in TS 38.101-1 [2] apply within the aggregated transmission bandwidth configuration of the EN-DC bandwidth with the carriers of both CGs active and one single contiguous PRB allocation of bandwidth *LCRB* within the SCG at the edge of the aggregated transmission bandwidth configuration.

#### 6.4B.2.2 Transmit modulation quality for Intra-band non-contiguous EN-DC

##### 6.4B.2.2.1 Error Vector Magnitude

For the intra-band non-contiguous EN-DC with one component carrier per CG the EVM requirement applies with PRB allocation in one of the CG and the other CG unallocated.

The EVM requirements for each CG are according to clause 6.5.2 of TS 36.101 [4] for the MCG and 6.4.2 of TS 38.101-1 [2] for the SCG with EN-DC configured.

##### 6.4B.2.2.2 Carrier leakage

The carrier leakage requirements for each CG are according to clause 6.5.2 of TS 36.101 [4] for the MCG and 6.4.2 of TS 38.101-1 [2] for the SCG with EN-DC configured and PRB allocation only in the CG being measured.

##### 6.4B.2.2.3 In-band emissions

For the MCG the in-band emission requirements in Table 6.5.2A.3.1-1 and 6.5.2A.3.1-2 in TS 36.101 [4] apply within the transmission bandwidth configuration of the MCG with the carriers of both CGs active and one single contiguous PRB allocation of bandwidth *LCRB* within the MCG at the edge of the transmission bandwidth configuration.

For the SCG the in-band emission requirements in Table 6.4.2.3-1 in TS 38.101-1 [2] apply within the transmission bandwidth configuration of the SCG with the carriers of both CGs active and one single contiguous PRB allocation of bandwidth *LCRB* within the SCG at the edge of the transmission bandwidth configuration.

6.4B.2.3 Transmit modulation quality for Inter-band EN-DC within FR1

For inter-band EN-DC with uplink assigned to one E-UTRA band and one NR band, the requirements shall apply on each component carrier as defined in clause 6.5.2 in TS 36.101 [4] and in clause 6.4.2 in TS 38.101-1 [2], respectively, with all component carriers active, applies with PRB allocation in one of the CG and the other CG unallocated. If multiple component carriers are assigned to one E-UTRA band, the requirements in subclauses 6.5.2A in TS 36.101 [4] apply for those component carriers.

#### 6.4B.2.3a Transmit modulation quality for Inter-band NE-DC within FR1

For inter-band NE-DC with uplink assigned to one E-UTRA band and one NR band, the requirements shall apply on each component carrier as defined in clause 6.5.2 in TS 36.101 [4] and in clause 6.4.2 in TS 38.101-1 [2], respectively, with all component carriers active, applies with PRB allocation in one of the CG and the other CG unallocated. If multiple component carriers are assigned to one E-UTRA band, the requirements in subclauses 6.5.2A in TS 36.101 [4] apply for those component carriers, and if multiple component carriers are assigned to one NR band, the requirements in subclauses 6.4A.2 in TS 38.101-1 [2] apply for those component carriers.

#### 6.4B.2.4 Transmit modulation quality for Inter-band EN-DC including FR2

Transmit modulation quality requirement for E-UTRA single carrier and CA operation specified in clauses 6.5.2 and 6.5.2A of TS 36.101 [4] and for NR single carrier, CA operation and UL-MIMO specified in clause 6.4.2, 6.4A.2 and 6.4D.2 of TS 38.101-2 [3] apply.

#### 6.4B.2.5 Transmit modulation quality for inter-band EN-DC including both FR1 and FR2

Transmit modulation quality requirement for E-UTRA single carrier and CA operation specified in clauses 6.5.2 and 6.5.2A of TS 36.101 [4] and for NR single carrier and CA operation specified in clause 6.4.2 and 6.4A.2 of TS 38.101-1 [2] and for NR single carrier, CA operation and UL-MIMO specified in clause 6.4.2, 6.4A.2 and 6.4D.2 of TS 38.101-2 [3] apply.

## 6.5 Void

## 6.5A Output RF spectrum emissions for CA

### 6.5A.1 Occupied bandwidth for CA

For inter-band NR CA between FR1 and FR2, occupied bandwidth specified in TS 38.101-1 [2] and TS 38.101-2 [3] apply for each frequency range respectively.

### 6.5A.2 Out-of-band emissions for CA

For inter-band NR CA between FR1 and FR2, out-of-band emissions specified in TS 38.101-1 [2] and TS 38.101-2 [3] apply for each frequency range respectively.

### 6.5A.3 Spurious emissions for CA

#### 6.5A.3.1 Inter-band CA between FR1 and FR2

Unless otherwise stated, for inter-band CA between FR1 and FR2, spurious emission and UE co-existence requirements specified in TS 38.101-1 [2] and TS 38.101-2 [3] apply for each component carrier respectively.

Table 6.5A.3.1-1: Void

### 6.5A.4 Transmit intermodulation for CA

For inter-band NR CA between FR1 and FR2, transmit intermodulation specified in TS 38.101-1 [2] apply for each component carrier for NR FR1.

## 6.5B Output RF spectrum emissions for DC

### 6.5B.1 Occupied bandwidth for EN-DC

6.5B.1.1 Intra-band contiguous EN-DC

For intra-band contiguous EN-DC the occupied bandwidth is a measure of the bandwidth containing 99% of the total integrated power of the transmitted spectrum. The OBW shall be less than the aggregated channel bandwidth for EN-DC, denoted as ENBW in clause 5.3B.

6.5B.1.2 Intra-band non-contiguous EN-DC

For intra-band non-contiguous EN-DC, occupied bandwidth requirement for E-UTRA single carrier and CA operation specified in clauses 6.6.1 and 6.6.1A of TS 36.101 [4] and for NR single carrier specified in clause 6.5.1 of TS 38.101-1 [2] apply.6.5B.1.3 Inter-band EN-DC within FR1

Occupied bandwidth requirement for E-UTRA single carrier and CA operation specified in clauses 6.6.1 and 6.6.1A of TS 36.101 [4] and for NR single carrier specified in clause 6.5.1 of TS 38.101-1 [2] apply.

#### 6.5B.1.4 Inter-band EN-DC including FR2

Occupied bandwidth requirement for E-UTRA single carrier and CA operation specified in clauses 6.6.1 and 6.6.1A of TS 36.101 [4] and for NR single carrier, CA operation and UL-MIMO specified in clause 6.5.1, 6.5A.1 and 6.5D.1 of TS 38.101-2 [3] apply.

#### 6.5B.1.5 Inter-band EN-DC including both FR1 and FR2

Occupied bandwidth requirement for E-UTRA single carrier and CA operation specified in clauses 6.6.1 and 6.6.1A of TS 36.101 [4] and for NR single carrier and CA operation specified in clause 6.5.1 and 6.5A.1 of TS 38.101-1 [2] and for NR single carrier, CA operation and UL-MIMO specified in clause 6.5.1, 6.5A.1 and 6.5D.1 of TS 38.101-2 [3] apply.

### 6.5B.2 Out-of-band emissions for DC

#### 6.5B.2.1 Intra-band contiguous EN-DC

The out of band emissions are unwanted emissions immediately outside the EN-DC aggregated channel bandwidth resulting from the modulation process and non-linearity in the transmitter but excluding spurious emissions. This out of band emission limit is specified in terms of a spectrum emission mask and an adjacent channel leakage power ratio.

Unless otherwise stated, the OOBE limits specified for the DC combination in this clause supercede any OOBE requirements specified for each sub-block in the respective TS 36.101 [4] and TS 38.101-1 [2].

The requirements apply to the sum of transmissions across all antenna connectors.

##### 6.5B.2.1.1 Spectrum emissions mask

The spectrum emission mask of the UE applies to frequencies (ΔfOOB) starting from the ± edge of the EN-DC aggregated channel bandwidth. For frequencies offset greater than ΔfOOB as specified in Table 6.5B.2.1.1-1 the spurious requirements in clause 6.5B.3 are applicable.

The general spectrum emission for intra-band contiguous EN-DC is specified in Table 6.5B.2.1.1-1.

The power of any UE emission shall not exceed the levels specified in Table 6.5B.2.1.1-1 for the specified EN-DC aggregated channel bandwidth.

Table 6.5B.2.1.1-1. General spectrum emission mask for intra-band contiguous EN-DC

|  |  |  |
| --- | --- | --- |
| ΔfOOB  **(MHz)** | **Spectrum emission limit (dBm)** | **Measurement bandwidth** |
| ± 0 - 1 | Max(Round(10\*log(0.15/ENBW)),-24) | 30 kHz |
| ± 1 - 5 | -10 | 1 MHz |
| ± 5 - ENBW | -13 | 1 MHz |
| ± ENBW – (ENBW+5) | -25 | 1 MHz |
| NOTE: ENBW refers to the aggregated channel bandwidth in MHz as defined in clause 5.3B. | | |

##### 6.5B.2.1.2 Additional spectrum emissions mask

###### 6.5B.2.1.2.1 Requirements for network signalled value "NS\_35"

When NS\_35 is indicated in the MCG and NS\_35 is indicated in the SCG, the requirements in Table 6.5B.2.1.2.1-1 apply in the frequency ranges immediately adjacent and outside the aggregated sub-blocks of the EN-DC configuration for DC\_(n)71AA.

Table 6.5B.2.1.2.1-1: Additional requirements

|  |  |  |  |
| --- | --- | --- | --- |
| ΔfOOB  (MHz) | Frequency offset of measurement filter centre frequency, f\_offset | Minimum requirement  (dBm) | Measurement bandwidth |
| 0 MHz ≤ Δf < 0.1 MHz | 0.015 MHz ≤ f\_offset < 0.085 MHz | -13 | 30 kHz |
| 0.1 MHz ≤ Δf < ENBW | 0.15 MHz ≤ f\_offset < ENBW – 0.05 MHz | -13 | 100 kHz |
| ENBW ≤ Δf < ENBW + 5 MHz | ENBW+0.5 MHz ≤ f\_offset < ENBW + 4.5 MHz | -25 | 1 MHz |
| NOTE 1: ENBW is the aggregated bandwidth of an E-UTRA sub-block and an adjacent NR sub-block; there is no frequency separation between the said sub-blocks. The sub-block bandwidths include any internal guard bands. | | | |

###### 6.5B.2.1.2.2 Requirements for network signalled value "NS\_04"

Additional spectrum emission requirements are signalled by the network to indicate that the UE shall meet an additional requirement for a specific deployment scenario as part of the cell handover/broadcast message.

The Band 41/n41 SEM transition point from -13 dBm/MHz to -25 dBm/MHz is based on the emission bandwidth. The emission bandwidth is defined as the width of the signal between two points, one below the carrier center frequency and one above the carrier center frequency, outside of which all emissions are attenuated at least 26 dB below the transmitter power. Since the 26 dB emission bandwidth is implementation dependent, the transmission bandwidths occupied by RBs is used for the SEM. The emission bandwidth for E-UTRA carriers is document in TS 36.101 [4], and the emission bandwidth for NR carriers is documented in TS 38.101-1 [2]. The total emission bandwidth for contiguous intra-band EN-DC is the sum of the emission bandwidth for each CC plus the guard band between contiguous CCs.

When "NS\_04" is indicated in the cell, the power of any UE emission shall not exceed the levels specified in Table 6.5B.2.1.2.2-1.

Table 6.5B.2.1.2.2-1: DC\_(n)41 SEM with NS\_04

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | | Spectrum emission limit (dBm) / measurement bandwidth  for each ENBW | | | | | | | | |
| ΔfOOB MHz | | 15  MHz | | 20  MHz | | 40  MHz | | 50  MHz | > 50  MHz | Measurement bandwidth |
| ± 0 - 1 | -10 | | -10 | | -10 | |  | | | 2 % ENBW |
|  | |  | |  | | -10 | | | 1 MHz |
| ± 1 - 5 | -10 | | | | | | | | | 1 MHz |
| ± 5 - X | -13 | | | | | | | | |
| ± X - (ENBW + 5 MHz) | -25 | | | | | | | | |
| NOTE: X is defined as the sum of the emission bandwidth of the component carriers plus the guard band between contiguous CCs. | | | | | | | | | | |

##### 6.5B.2.1.3 Adjacent channel leakage ratio

For EN-DC operation with an E-UTRA sub-block immediately adjacent to an NR sub-block, the ACLR is defined as the ratio of the filtered mean power centred on the aggregated sub-block bandwidth ENBW to the filtered mean power centred on an adjacent bandwidth of the same size ENBW at nominal channel spacing. The UE shall meet the ACLR minimum requirement EN-DCACLR specified in Table 6.5B.2.1.3-1 with ENBW the sum of the sub-block bandwidths.

The assigned channel power and adjacent channel power are measured with rectangular filters with measurement bandwidths specified in 6.5B.2.1.3-1.

Table 6.5B.2.1.3-1: ACLR for intra-band EN-DC (contiguous sub-blocks)

|  |  |  |
| --- | --- | --- |
| Parameter | Unit | Value |
| EN-DCACLR for PC3 | dBc | 30 |
| EN-DCACLR for PC2 | dBc | 31 |
| Measurement bandwidth of EN-DC channel |  | 1.00\*ENBW |
| Measurement bandwidth of adjacent channel |  | 0.95\*ENBW |
| Frequency offset of adjacent channel |  | ENBW  /  -ENBW |
| NOTE 1: ENBW is the aggregated bandwidth in MHz as defined in clause 5.3B.  NOTE 2: The frequency offset is that in between the centre frequencies of the measurement filters | | |

#### 6.5B.2.2 Intra-band non-contiguous EN-DC

##### 6.5B.2.2.1 Spectrum emissions mask

The spectral emission mask for intra-band non-contiguous EN-DC is a composite of the emission mask for each CC with the level set to the maximum value from each mask for each frequency outside of the transmission bandwidth of either carrier. A composite spectrum emission mask is a combination of individual CC spectrum emissions masks. Where two masks overlap the most relaxed limit is used. Composite spectrum emission mask applies to frequencies up to ± ΔfOOB starting from the edges of the sub-blocks. If for some frequency an individual CC spectrum emission mask overlaps with the bandwidth of another CC then the emission mask does not apply for that frequency.

##### 6.5B.2.2.2 Additional spectrum emissions mask

When additional spectrum emission mask or masks apply, the additional SEM(s) shall be used to calculate the composite SEM described in 6.5B.2.2.1.

##### 6.5B.2.2.3 Adjacent channel leakage ratio

For intra-band non-contiguous EN-DC, the EN-DC Adjacent Channel Leakage power Ratio (EN-DCACLR) is the ratio of the sum of the filtered mean powers centred on the assigned E-UTRA and NR sub-block frequencies to the filtered mean power centred on an adjacent channel frequency at nominal channel spacing. In case the sub-block gap bandwidth Wgap is smaller than a E-UTRA or NR sub-block bandwidth, no EN-DCACLR requirement is set for the corresponding sub-block for the gap. The assigned EN-DC sub-block power and adjacent channel power are measured with rectangular filters with measurement bandwidths specified in TS 36.101 [4] for the E-UTRA sub-block, and TS 38.101-1 [2] for the NR sub-block. If the measured adjacent channel power is greater than –50dBm then the EN-DCACLR shall be higher than the value specified in for E-UTRAACLR and NRACLR.

#### 6.5B.2.3 Inter-band EN-DC within FR1

Unless otherewise stated, the OOBE requirements specified in clause 6.6.2.1 of TS 36.101 [4], sub- clause 6.6.2 of TS 36.101 [4] and clause 6.5.2 of TS 38.101-1 [2] apply for each component carrier.

#### 6.5B.2.3a Inter-band NE-DC within FR1

Unless otherwise stated, the OOBE requirements specified in clause 6.6.2.1 of TS 36.101 [4], sub- clause 6.6.2 of TS 36.101 [4] and clause 6.5.2 of TS 38.101-1 [2] apply for each component carrier.

#### 6.5B.2.4 Inter-band EN-DC including FR2

Unless otherewise stated, out-of-band emissions requirement for E-UTRA single carrier and CA operation specified in clauses 6.6.2 of TS 36.101 [4] and for NR single carrier, CA operation and UL-MIMO specified in clause 6.5.2, 6.5A.2 and 6.5D.2 of TS 38.101-2 [3] apply.

#### 6.5B.2.5 Inter-band EN-DC including both FR1 and FR2

Unless otherewise stated, out-of-band emissions requirement for E-UTRA single carrier and CA operation specified in clauses 6.6.2 of TS 36.101 [4] and for NR single carrier and CA operation specified in clause 6.5.2 and 6.5A.2 of TS 38.101-1 [2] and for NR single carrier, CA operation and UL-MIMO specified in clause 6.5.2, 6.5A.2 and 6.5D.2 of TS 38.101-2 [3] apply.

### 6.5B.3 Spurious emissions for DC

#### 6.5B.3.1 Intra-band contiguous EN-DC

##### 6.5B.3.1.1 General spurious emissions

The general spurious emissions requirements specified in clause 6.6.3.1 of TS 36.101 [4] and clause 6.5.3.1 of TS 38.101-1 [2] apply beyond any frequencies for which the out-of-band emissions requirements in clause 6.5B.2.1apply.

##### 6.5B.3.1.2 Spurious emission band UE co-existence

The requirements in Table 6.5B.3.1.2-1 apply on each component carrier with all component carriers are active.

Table 6.5B.3.1.2-1: Requirements for intra-band contiguous EN-DC

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| EN-DC Configuration | Spurious emission | | | | | | |
| Protected band | Frequency range (MHz) | | | Maximum Level (dBm) | MBW (MHz) | NOTE |
| DC\_(n)71 | E-UTRA Band 4, 5, 12, 13, 14, 17, 24, 26, 30, 48, 66 | FDL\_low | - | FDL\_high | -50 | 1 |  |
| E-UTRA Band 2, 25, 41, 70 | FDL\_low | - | FDL\_high | -50 | 1 | 2 |
| E-UTRA Band 29 | FDL\_low | -- | FDL\_high | -38 | 1 | 3 |
| E-UTRA Band 71 | FDL\_low | - | FDL\_high | -50 | 1 | 3 |
| DC\_(n)41 | E-UTRA Band 1, 2, 3, 4, 5, 8, 10, 11, 12, 13 , 14, 17, 18, 19, 21, 24, 25, 26, 27, 28, 29, 30, 34, 39, 42, 44, 45, 48, 50, 51, 66, 70, 71, 73, 74  NR Band n77, n78 and n79 | FDL\_low | - | FDL\_high | -50 | 1 |  |
| Frequency range | 1884.5 | - | 1915.7 | -41 | 0.3 | 4 |
| NR Band n79 | FDL\_low | - | FDL\_high | -50 | 1 | 2 |
| NOTE1:FDL\_low and FDL\_high refer to each frequency band specified in Table 5.5-1 in 3GPP TS 36.101 [4] or in Table 5.2-1 in 3GPP TS 38.101-1 [2].  NOTE 2:As exceptions, measurements with a level up to the applicable requirements defined in Table 6.6.3.1-2 in 3GPP TS 36.101 [4] and Table 6.5.3.1-2 in 3GPP TS 38.101-1 [2] are permitted for each assigned 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 180 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 3:These requirements also apply for the frequency ranges that are less than FOOB (MHz) in Table 6.6.3.1-1, Table 6.6.3.1A-1 in 3GPP TS 36.101 [4] or in Table 6.5.3.1-1 in 3GPP TS 38.101-1 [2] from the edge of the channel bandwidth.  NOTE 4:Applicable when co-existence with PHS system operating in 1884.5 - 1915.7 MHz. | | | | | | | |

NOTE: To simplify the above Table, E-UTRA band numbers are listed for bands which are specified only for E-UTRA operation or both E-UTRA and NR operation. NR band numbers are listed for bands which are specified only for NR operation.

#### 6.5B.3.2 Intra-band non-contiguous EN-DC

##### 6.5B.3.2.1 General spurious emissions

The general spurious emissions requirements specified in clause 6.6.3.1 of TS 36.101 [4] and clause 6.5.3.1 of TS 38.101-1 [2] apply beyond any frequencies for which the out-of-band emissions requirements in clause 6.5B.2.2 apply. If for some frequency an individual CC spurious emission requirement overlaps with the general spectrum emission mask or the bandwidth of another CC then it does not apply.

##### 6.5B.3.2.2 Spurious emission band UE co-existence

The requirements in Table 6.5B.3.2.2-1 apply with all component carriers are active.

Table 6.5B.3.2.2-1: Requirements for intra-band non-contiguous EN-DC

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| EN-DC Configuration | Spurious emission | | | | | |
| Protected band | Frequency range (MHz) | | | Maximum Level (dBm) | MBW (MHz) |
| DC\_41\_n41 | E-UTRA Band 1, 2, 3, 4, 5, 8, 10, 11, 12, 13 , 14, 17, 18, 19, 21, 24, 25, 26, 27, 28, 29, 34, 39, 42, 44, 45, 48, 50, 51, 66, 70, 71, 73, 74  NR Band n77, n78 and n79 | FDL\_low | - | FDL\_high | -50 | 1 |
| Frequency range | 1884.5 | - | 1915.7 | -41 | 0.3 |
| E-UTRA Band 30 | FDL\_low | - | FDL\_high | -40 | 1 |
| NOTE1:FDL\_low and FDL\_high refer to each frequency band specified in Table 5.5-1 in 3GPP TS 36.101 [4] or in Table 5.2-1 in 3GPP TS 38.101-1 [2].  NOTE 2:As exceptions, measurements with a level up to the applicable requirements defined in Table 6.6.3.1-2 in 3GPP TS 36.101 [4] and Table 6.5.3.1-2 in 3GPP TS 38.101-1 [2] are permitted for each assigned 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 (2MHz + N x LCRB x 180kHz), 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  NOTE3:Applicable when co-existence with PHS system operating in 1884.5 - 1915.7 MHz. | | | | | | |

NOTE: To simplify the above Table, E-UTRA band numbers are listed for bands which are specified only for E-UTRA operation or both E-UTRA and NR operation. NR band numbers are listed for bands which are specified only for NR operation.

#### 6.5B.3.3 Inter-band EN-DC within FR1

6.5B.3.3.1 General spurious emissions

The general spurious emissions requirements specified in clause 6.6.3.1 of TS 36.101 [4], clause 6.5.3.1 of TS 38.101-1 [2] and TS 38.101-2 [3] apply for each component carrier. For the case of inter-band EN-DC with a single carrier per cell group, the general spurious emissions requirements also apply with both downlink carrier and both both uplink carriers active. Limits on configured maximum output power for the uplink according to clause 6.2B.4 apply.

NOTE: The general spurious emission requirements with both uplink carriers active are allowed to be verified for only a single inter-band EN-DC configuration per NR band. Furthermore, the requirements are allowed to be verified by measuring spurious emissions at the specific frequencies where second and third order intermodulation products generated by the two transmitted carriers can occur.

Table 6.5B.3.3.1-1: (Void)

##### 6.5B.3.3.2 Spurious emission band UE co-existence

This clause specifies the requirements for the specified EN-DC, for coexistence with protected bands. The requirements in Table 6.5B.3.3.2-1 apply on each component carrier with all component carriers are active.

NOTE: For inter-band EN-DC with uplink assigned to one LTE band and one NR band the requirements in Table 6.5B.3.3.2-1 could be verified by measuring spurious emissions at the specific frequencies where second and third order intermodulation products generated by the two transmitted carriers can occur.

Table 6.5B.3.3.2-1: Requirements

| EN-DC Configuration | Spurious emission | | | | | | |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Protected band | Frequency range (MHz) | | | Maximum Level (dBm) | MBW (MHz) | NOTE |
| DC\_1\_n28 | E-UTRA Band 5, 7, 8, 18, 19, 20, 26, 27, 31, 38, 40, 41, 72, 73  NR band n79 | FDL\_low | - | FDL\_high | -50 | 1 |  |
| E-UTRA Band 1, 22, 32, 42, 43, 50, 51, 52, 65, 74, 75, 76  NR band n77, n78 | FDL\_low | - | FDL\_high | -50 | 1 | 2 |
| E-UTRA band 3, 34 | FDL\_low | - | FDL\_high | -50 | 1 | 5 |
| E-UTRA Band 11, 21 | FDL\_low | - | FDL\_high | -50 | 1 | 9, 11 |
| E-UTRA Band 1, 65 | FDL\_low | - | FDL\_high | -50 | 1 | 9, 10 |
| Frequency range | 470 | - | 694 | -42 | 8 | 5, 17 |
| Frequency range | 470 | - | 710 | -26.2 | 6 | 14 |
| Frequency range | 758 | - | 773 | -32 | 1 | 5 |
| Frequency range | 773 | - | 803 | -50 | 1 |  |
| Frequency range | 662 | - | 694 | -26.2 | 6 | 5 |
| Frequency range | 1880 | - | 1895 | -40 | 1 | 5,16 |
| Frequency range | 1895 | - | 1915 | -15.5 | 5 | 5, 7, 16 |
| Frequency range | 1915 | - | 1920 | +1.6 | 5 | 5, 7, 16 |
| DC\_1\_n40 | Band 1, 5, 7, 8, 11, 18, 19, 20, 21, 22, 26, 27, 28, 31, 32, 38, 41, 42, 43, 44, 45, 50, 51, 52, 65, 67, 68, 69, 72, 73, 74, 75, 76  NR band n78 | FDL\_low | - | FDL\_high | -50 | 1 |  |
| Band 3, 34 | FDL\_low | - | FDL\_high | -50 | 1 | 5 |
| NR band n77, n79 | FDL\_low | - | FDL\_high | -50 | 1 | 2 |
| Frequency range | 1880 |  | 1895 | -40 | 1 | 5, 16 |
| Frequency range | 1895 |  | 1915 | -15.5 | 5 | 5, 7, 16 |
| Frequency range | 1915 |  | 1920 | +1.6 | 5 | 5, 7, 16 |
| Frequency range | 1884.5 | - | 1915.7 | -41 | 0.3 | 3 |
| DC\_1\_n51 | E-UTRA Band 7, 12, 13, 17, 20, 22, 27, 28, 29, 31, 38, 44, 48, 67, 68, 69, 72, 73 | FDL\_low | - | FDL\_high | -50 | 1 |  |
| E-UTRA Band 3, 34 | FDL\_low | - | FDL\_high | -50 | 1 | 5, 2 |
| Frequency range | 1880 | - | 1895 | -40 | 1 | 5, 16 |
| Frequency range | 1895 | - | 1915 | -15.5 | 5 | 5, 7, 16 |
| Frequency range | 1915 | - | 1920 | +1.6 | 5 | 5, 7, 16 |
| E-UTRA Band 5, 6, 8, 26, 30, 40, 41, 42, 43, 46  NR Band n77, n78, n79, | FDL\_low | - | FDL\_high | -50 | 1 | 2 |
| DC\_1\_n77 | E-UTRA Band 1, 3, 5, 7, 8, 11, 18, 19, 20, 21, 26, 28, 34, 40, 41, 65, 74 | FDL\_low | - | FDL\_high | -50 | 1 |  |
| Frequency range | 1880 | - | 1895 | -40 | 1 | 5, 8 |
| Frequency range | 1895 | - | 1915 | -15.5 | 5 | 5, 7, 8 |
| Frequency range | 1915 | - | 1920 | +1.6 | 5 | 5, 7, 8 |
| DC\_1\_n78  DC\_1\_n84\_ULSUP-TDM\_n78 | E-UTRA Band 1, 3, 5, 7, 8, 11, 18, 19, 20, 21, 26, 28, 34, 40, 41, 65, 74 | FDL\_low | - | FDL\_high | -50 | 1 |  |
| Frequency range | 1880 | - | 1895 | -40 | 1 | 5, 8 |
| Frequency range | 1895 | - | 1915 | -15.5 | 5 | 5, 7, 8 |
| Frequency range | 1915 | - | 1920 | +1.6 | 5 | 5, 7, 8 |
| DC\_1\_n79 | E-UTRA Band 1, 3, 5, 7, 8, 11, 18, 19, 21, 26, 28, 34, 40, 41, 42, 65, 74 | FDL\_low | - | FDL\_high | -50 | 1 |  |
| Frequency range | 1880 | - | 1895 | -40 | 1 | 5, 8 |
| Frequency range | 1895 | - | 1915 | -15.5 | 5 | 5, 7, 8 |
| Frequency range | 1915 | - | 1920 | +1.6 | 5 | 5, 7, 8 |
| DC\_2\_n5 | E-UTRA Band 4, 5, 12, 13, 14, 17, 24, 26, 28, 29, 30, 42, 50, 51, 66, 70, 71, 74, 85 | FDL\_low | - | FDL\_high | -50 | 1 |  |
| E-UTRA Band 2, 25 | FDL\_low | - | FDL\_high | -50 | 1 | 2 |
| E-UTRA Band 41, 43, 48, 53 | FDL\_low | - | FDL\_high | -50 | 1 | 2 |
| DC\_2\_n66 | E-UTRA Band 4, 5, 12, 13, 14, 17, 24, 26, 27, 28, 29, 30, 41, 50, 51, 66, 70, 71, 74, 85 | FDL\_low | - | FDL\_high | -50 | 1 |  |
| E-UTRA Band 2, 25 | FDL\_low | - | FDL\_high | -50 | 1 | 5 |
| E-UTRA Band 42, 48 | FDL\_low | - | FDL\_high | -50 | 1 | 2 |
| DC\_2\_n71 | E-UTRA Band 4, 5, 12, 13, 14, 17, 24, 26, 29, 30, 66 | FDL\_low | - | FDL\_high | -50 | 1 |  |
| E-UTRA Band 2, 25, 41, 48, 70 | FDL\_low | - | FDL\_high | -50 | 1 | 2 |
| E-UTRA Band 71 | FDL\_low | - | FDL\_high | -50 | 1 | 5 |
| DC\_2\_n78 | E-UTRA Band 4, 5, 12, 13, 14, 17, 24, 26, 27, 28, 29, 30, 41, 50, 51, 66, 70, 71, 74, 85 | FDL\_low | - | FDL\_high | -50 | 1 |  |
| E-UTRA Band 2, 25 | FDL\_low | - | FDL\_high | -50 | 1 | 2 |
| DC\_3\_n7 | E-UTRA Band 1, 5, 7, 8, 20, 26, 27, 28, 31, 32, 33, 34, 40, 43, 44, 50, 51, 65, 67, 72, 74, 75, 76 | FDL\_low | - | FDL\_high | -50 | 1 |  |
| E-UTRA band 3 | FDL\_low | - | FDL\_high | -50 | 1 | 5 |
| E-UTRA band 22, 42 | FDL\_low | - | FDL\_high | -50 | 1 | 2 |
| Frequency range | 2570 | - | 2575 | +1.6 | 5 | 5, 6, 7 |
| Frequency range | 2575 | - | 2595 | -15.5 | 5 | 5, 6, 7 |
| Frequency range | 2595 | - | 2620 | -40 | 1 | 5, 6 |
| DC\_3\_n28 | E-UTRA Band 1, 42, 43, 50, 51, 65, 74, 75, 76  NR band n77, n78, n79 | FDL\_low | - | FDL\_high | -50 | 1 | 2 |
| E-UTRA band 1 | FDL\_low | - | FDL\_high | -50 | 1 | 9, 11 |
| E-UTRA band 3 | FDL\_low | - | FDL\_high | -50 | 1 | 5 |
| E-UTRA Band 5, 7, 8, 18, 19, 20, 26, 27, 31, 34, 38, 40, 41, 72 | FDL\_low | - | FDL\_high | -50 | 1 |  |
| E-UTRA Band 11, 21 | FDL\_low | - | FDL\_high | -50 | 1 | 9, 10 |
| Frequency range | 1884.5 | - | 1915.7 | -41 | 0.3 | 13 |
| Frequency range | 470 | - | 710 | -26.2 | 6 | 14 |
| Frequency range | 758 | - | 773 | -32 | 1 | 5 |
| Frequency range | 773 | - | 803 | -50 | 1 |  |
| Frequency range | 1884.5 | - | 1915.7 | -41 | 0.3 | 3, 9 |
| DC\_3\_n40 | E-UTRA Band 1, 5, 7, 8, 11, 18, 19, 20, 21, 26, 27, 28, 31, 32, 33, 34, 38, 39, 41, 43, 44. 45, 50, 51, 65, 67, 68, 69, 72, 73, 74, 75, 76 | FDL\_low | - | FDL\_high | -50 | 1 |  |
| E-UTRA Band 3 | FDL\_low | - | FDL\_high | -50 | 1 | 5 |
| E-UTRA Band 22, 42, 52  NR band n77, n78, n79 | FDL\_low | - | FDL\_high | -50 | 1 | 2 |
| Frequency range | 1884.5 | - | 1915.7 | -41 | 0.3 | 3 |
| DC\_3\_n51 | E-UTRA Band 7, 8, 12, 13, 17, 20, 27, 28, 31, 33, 38, 67, 68, 69, 72, 73 | FDL\_low | - | FDL\_high | -50 | 1 |  |
| E-UTRA Band 3 | FDL\_low | - | FDL\_high | -50 | 1 | 5 |
| E-UTRA Band 1, 5, 6, 22, 26, 30, 34, 36, 40, 41, 42, 43, 44, 46, 48, 65, 71 | FDL\_low | - | FDL\_high | -50 | 1 | 2 |
| DC\_3\_n77 | E-UTRA Band 1, 3, 5, 7, 8, 11, 18, 19, 20, 21, 26, 28, 34, 39, 40, 41, 65, 74 | FDL\_low | - | FDL\_high | -50 | 1 |  |
| Frequency range | 1884.5 | - | 1915.7 | -41 | 0.3 | 3 |
| DC\_3\_n78  DC\_3\_n80\_ULSUP-TDM\_n78, | E-UTRA Band 1, 3, 5, 7, 8, 11, 18, 19, 20, 21, 26, 28, 34, 39, 40, 41, 65, 74 | FDL\_low | - | FDL\_high | -50 | 1 |  |
| Frequency range | 1884.5 | - | 1915.7 | -41 | 0.3 | 3 |
| DC\_3\_n79 DC\_3\_n80\_ULSUP-TDM\_n79, | E-UTRA Band 1, 3, 5, 8, 11, 18, 19, 21, 28, 34, 39, 40, 41, 65, 74 | FDL\_low | - | FDL\_high | -50 | 1 |  |
| E-UTRA Band 42 | FDL\_low | - | FDL\_high | -50 | 1 | 2 |
| Frequency range | 1884.5 | - | 1915.7 | -41 | 0.3 | 3 |
| DC\_3\_n82 | E-UTRA Band 1, 3 7, 8, 20 31, 32, 33, 34, 40, 43, 50, 51, 65, 67, 68, 72,74, 75, 76 | FDL\_low | - | FDL\_high | -50 | 1 |  |
| E-UTRA Band 22, 38, 42, 69 | FDL\_low | - | FDL\_high | -50 | 1 | 2 |
| DC\_5\_n40 | E-UTRA Band 1, 3, 5, 7, 8, 11, 18, 19, 21, 28, 31, 34, 38, 42, 43, 45, 65, 73, 74 | FDL\_low | - | FDL\_high | -50 | 1 |  |
| E-UTRA Band 26 | 859 | - | 869 | -27 | 1 |  |
| E-UTRA Band 41, 52  NR band n77, n78, n79 | FDL\_low | - | FDL\_high | -50 | 1 | 2 |
| Frequency range | 1884.5 | - | 1915.7 | -41 | 0.3 | 3 |
| DC\_5\_n66 | E-UTRA Band 1, 2, 3, 4, 5, 6, 7, 8, 12, 13, 14, 17, 24, 25, 28, 29, 30, 34, 38, 40, 43, 45, 50, 51, 65, 66, 70, 71, 85 | FDL\_low | - | FDL\_high | -50 | 1 |  |
| E-UTRA Band 26 | 859 | - | 869 | -27 | 1 |  |
| E-UTRA Band 41, 42, 48, 52 | FDL\_low | - | FDL\_high | -50 | 1 | 2 |
| DC\_5\_n78 | E-UTRA Band 1, 2, 3, 4, 5, 7, 8, 12, 13, 14, 17, 24, 25, 28, 29, 30, 31, 34, 38, 40, 45, 65, 66, 70 | FDL\_low | - | FDL\_high | -50 | 1 |  |
| E-UTRA Band 26 | 859 | - | 869 | -27 | 1 |  |
| E-UTRA Band 41 | FDL\_low | - | FDL\_high | -50 | 1 | 7, 2 |
| DC\_7\_n28 | E-UTRA Band 2, 3, 5, 7, 8, 20, 26, 27, 31, 34, 40, 72 | FDL\_low | - | FDL\_high | -50 | 1 |  |
| E-UTRA Band 1, 4, 42, 43, 50, 51, 65, 66, 74, 75, 76  NR band n78 | FDL\_low | - | FDL\_high | -50 | 1 | 2 |
| E-UTRA band 1 | FDL\_low | - | FDL\_high | -50 | 1 | 9, 10 |
| Frequency range | 758 | - | 773 | -32 | 1 | 5 |
| Frequency range | 773 | - | 803 | -50 | 1 |  |
| Frequency range | 2570 | - | 2575 | +1.6 | 5 | 5, 6, 7 |
| Frequency range | 2575 | - | 2595 | -15.5 | 5 | 5, 6, 7 |
| Frequency range | 2595 | - | 2620 | -40 | 1 | 5, 6 |
| DC\_7\_n51 | E-UTRA Band 2, 3, 5, 8, 26, 30, 31, 32, 33, 34, 40, 48, 72 | FDL\_low | - | FDL\_high | -50 | 1 |  |
| Frequency range | 2570 | - | 2575 | +1.6 | 5 | 5, 7, 16 |
| Frequency range | 2575 | - | 2595 | -15.5 | 5 | 5, 7, 16 |
| Frequency range | 2595 | - | 2620 | -40 | 1 | 5 |
| E-UTRA Band 1, 4, 12, 13, 14, 17, 20, 22, 23, 27, 28, 29, 42, 43, 44, 46, 65, 66, 67, 68  NR Band n77, n78, n79, | FDL\_low | - | FDL\_high | -50 | 1 | 2 |
| DC\_7\_n78 | E-UTRA Band 1, 2, 3, 4, 5, 7, 8, 11, 18, 19, 20, 21, 26, 27, 28, 31, 32, 33, 34, 40, 50, 51, 65, 66, 67, 68, 72, 74, 75, 76 | FDL\_low | - | FDL\_high | -50 | 1 |  |
| Frequency range | 2570 | - | 2575 | +1.6 | 5 | 5, 6, 7 |
| Frequency range | 2575 | - | 2595 | -15.5 | 5 | 5, 6, 7 |
| Frequency range | 2595 | - | 2620 | -40 | 1 | 5, 6 |
| DC\_8\_n40 | E-UTRA Band 1, 5, 11, 18, 19, 20, 21, 26, 28, 31, 32, 33, 34, 38, 39,, 45, 50, 51, 65, 67, 68, 69, 72, 73, 74, 75, 76 | FDL\_low | - | FDL\_high | -50 | 1 |  |
| E-UTRA Band 3, 7, 22, 41, 42, 43, 52  NR band n77, n78, n79 | FDL\_low | - | FDL\_high | -50 | 1 | 2 |
| E-UTRA Band 8 | FDL\_low | - | FDL\_high | -50 | 1 | 5 |
| Frequency range | 1884.5 | - | 1915.7 | -41 | 0.3 | 3 |
| DC\_8\_n77 | E-UTRA Band 1, 20, 28, 31, 32, 33, 34, 38, 39, 40, 44, 45, 50, 51, 65, 67, 68, 69, 72, 73, 74, 75, 76 | FDL\_low | - | FDL\_high | -50 | 1 |  |
| E-UTRA band 3, 7, 41 | FDL\_low | - | FDL\_high | -50 | 1 | 2 |
| E-UTRA Band 8 | FDL\_low | - | FDL\_high | -50 | 1 | 5 |
| E-UTRA Band 11, 21 | FDL\_low | - | FDL\_high | -50 | 1 | 12 |
| Frequency range | 860 | - | 890 | -40 | 1 | 5, 12 |
| Frequency range | 1884.5 | - | 1915.7 | -41 | 0.3 | 3, 12 |
| DC\_8\_n78  DC\_8\_n81\_ULSUP-TDM\_n78, | E-UTRA Band 1, 20, 28, 34, 39, 40, 65, 74 | FDL\_low | - | FDL\_high | -50 | 1 |  |
| E-UTRA Band 3, 7, 41 | FDL\_low | - | FDL\_high | -50 | 1 | 2 |
| E-UTRA Band 8 | FDL\_low | - | FDL\_high | -50 | 1 | 5 |
| E-UTRA Band 11, 21 | FDL\_low | - | FDL\_high | -50 | 1 | 12 |
| Frequency range | 860 | - | 890 | -40 | 1 | 5, 12 |
| Frequency range | 1884.5 | - | 1915.7 | -41 | 0.3 | 3, 12 |
| DC\_8\_n79  DC\_8\_n81\_ULSUP-TDM\_n79, | E-UTRA Band 1, 8, 28, 34, 39, 40, 65, 74 | FDL\_low | - | FDL\_high | -50 | 1 |  |
| E-UTRA Band 3,41,42 | FDL\_low | - | FDL\_high | -50 | 1 | 2 |
| E-UTRA Band 11, 21 | FDL\_low | - | FDL\_high | -50 | 1 | 12 |
| Frequency range | 860 | - | 890 | -40 | 1 | 5, 12 |
| Frequency range | 1884.5 | - | 1915.7 | -41 | 0.3 | 3 |
| DC\_11\_n77 | E-UTRA Band 1, 3, 18, 19, 28, 34, 40, 65 | FDL\_low | - | FDL\_high | -50 | 1 |  |
| Frequency range | 945 | - | 960 | -50 | 1 |  |
| Frequency range | 1884.5 | - | 1915.7 | -41 | 0.3 | 3 |
| Frequency range | 2545 | - | 2575 | -50 | 1 |  |
| Frequency range | 2595 | - | 2645 | -50 | 1 |  |
| DC\_11\_n78 | E-UTRA Band 1, 3, 18, 19, 28, 34, 40, 65 | FDL\_low | - | FDL\_high | -50 | 1 |  |
| Frequency range | 945 | - | 960 | -50 | 1 |  |
| Frequency range | 1884.5 | - | 1915.7 | -41 | 0.3 | 3 |
| Frequency range | 2545 | - | 2575 | -50 | 1 |  |
| Frequency range | 2595 | - | 2645 | -50 | 1 |  |
| DC\_11\_n79 | E-UTRA Band 1, 3, 18, 19, 28, 34, 40, 42, 65 | FDL\_low | - | FDL\_high | -50 | 1 |  |
| Frequency range | 945 | - | 960 | -50 | 1 |  |
| Frequency range | 1884.5 | - | 1915.7 | -41 | 0.3 | 3 |
| Frequency range | 2545 | - | 2575 | -50 | 1 |  |
| Frequency range | 2595 | - | 2645 | -50 | 1 |  |
| DC\_12\_n5 | E-UTRA Band 2, 5, 13, 14, 17, 24, 25, 26, 30, 43, 71, 74 | FDL\_low | - | FDL\_high | -50 | 1 |  |
| E-UTRA Bands 4, 41, 42, 48, 50, 51, 66, 70 | FDL\_low | - | FDL\_high | -50 | 1 | 2 |
| E-UTRA Band 12, 85 | FDL\_low | - | FDL\_high | -50 | 1 |  |
| DC\_12\_n66 | E-UTRA Band 2, 5, 13, 14, 17, 25, 26, 27, 30, 41, 53, 71, 74 | FDL\_low | - | FDL\_high | -50 | 1 |  |
| E-UTRA Band 4, 48, 50, 51, 66, 70 | FDL\_low | - | FDL\_high | -50 | 1 | 2 |
| E-UTRA Band 12, 85 | FDL\_low | - | FDL\_high | -50 | 1 | 5 |
| DC\_18\_n77 | E-UTRA Band 1, 3, 11, 21, 28, 34, 40, 65, 74 | FDL\_low | - | FDL\_high | -50 | 1 |  |
| Frequency range | 945 | - | 960 | -50 | 1 |  |
| Frequency range | 1884.5 | - | 1915.7 | -41 | 0.3 | 3 |
| Frequency range | 2545 | - | 2575 | -50 | 1 |  |
| Frequency range | 2595 | - | 2645 | -50 | 1 |  |
| DC\_18\_n78 | E-UTRA Band 1, 3, 11, 21, 28, 34, 40, 65, 74 | FDL\_low | - | FDL\_high | -50 | 1 |  |
| Frequency range | 945 | - | 960 | -50 | 1 |  |
| Frequency range | 1884.5 | - | 1915.7 | -41 | 0.3 | 3 |
| Frequency range | 2545 | - | 2575 | -50 | 1 |  |
| Frequency range | 2595 | - | 2645 | -50 | 1 |  |
| DC\_18\_n79 | E-UTRA Band 1, 3, 11, 21, 28, 34, 40, 42, 65, 74 | FDL\_low | - | FDL\_high | -50 | 1 |  |
| Frequency range | 945 | - | 960 | -50 | 1 |  |
| Frequency range | 1884.5 | - | 1915.7 | -41 | 0.3 | 3 |
| Frequency range | 2545 | - | 2575 | -50 | 1 |  |
| Frequency range | 2595 | - | 2645 | -50 | 1 |  |
| DC\_19\_n77 | E-UTRA Band 1, 3, 11, 21, 28, 34, 40, 65, 74 | FDL\_low | - | FDL\_high | -50 | 1 |  |
| Frequency range | 945 | - | 960 | -50 | 1 |  |
| Frequency range | 1884.5 | - | 1915.7 | -41 | 0.3 | 3 |
| Frequency range | 2545 | - | 2575 | -50 | 1 |  |
| Frequency range | 2595 | - | 2645 | -50 | 1 |  |
| DC\_19\_n78 | E-UTRA Band 1, 3, 11, 21, 28, 34, 40, 65, 74 | FDL\_low | - | FDL\_high | -50 | 1 |  |
| Frequency range | 945 | - | 960 | -50 | 1 |  |
| Frequency range | 1884.5 | - | 1915.7 | -41 | 0.3 | 3 |
| Frequency range | 2545 | - | 2575 | -50 | 1 |  |
| Frequency range | 2595 | - | 2645 | -50 | 1 |  |
| DC\_19\_n79 | E-UTRA Band 1, 3, 11, 21, 28, 34, 40, 42, 65, 74 | FDL\_low | - | FDL\_high | -50 | 1 |  |
| Frequency range | 945 | - | 960 | -50 | 1 |  |
| Frequency range | 1884.5 | - | 1915.7 | -41 | 0.3 | 3 |
| Frequency range | 2545 | - | 2575 | -50 | 1 |  |
| Frequency range | 2595 | - | 2645 | -50 | 1 |  |
| DC\_20\_n8 | E-UTRA Band 1, 28, 31, 32, 34, 65, 75, 76 | FDL\_low | - | FDL\_high | -50 | 1 |  |
| E-UTRA Band 3, 7, 22, 38, 42, 43  NR Band n78 | FDL\_low | - | FDL\_high | -50 | 1 | 2 |
| DC\_20\_n28  DC\_20\_n83 | E-UTRA Band 3, 7, 8, 31, 34 | FDL\_low | - | FDL\_high | -50 | 1 |  |
| E-UTRA Band 1, 22, 32, 38, 42, 43, 65, 75, 76,  NR Band n78 | FDL\_low | - | FDL\_high | -50 | 1 | 2 |
| DC\_20\_n51 | E-UTRA Band 1, 3, 4, 8, 17, 22, 28, 29, 31, 40, 43, 48, 65, 66, 68, 72 | FDL\_low | - | FDL\_high | -50 | 1 |  |
| E-UTRA Band 20 | FDL\_low | - | FDL\_high | -50 | 1 | 5 |
| Frequency range | 758 | - | 788 | -50 | 1 |  |
| E-UTRA Band 2, 7, 25, 32, 33, 34, 35, 36, 37, 38, 39, 41, 42, 46, 69, 70  NR Band n77, n78, n79, | FDL\_low | - | FDL\_high | -50 | 1 | 2 |
| DC\_20\_n77 | E-UTRA Band 1, 3, 7, 8, 31, 32, 33, 34, 40, 50, 51, 65, 67, 68, 72, 74, 75, 76 | FDL\_low | - | FDL\_high | -50 | 1 |  |
| E-UTRA Band 20 | FDL\_low | - | FDL\_high | -50 | 1 | 5 |
| E-UTRA Band 38, 69 | FDL\_low | - | FDL\_high | -50 | 1 | 2 |
| DC\_20\_n78,  DC\_20\_n82\_ULSUP-TDM\_n78, | E-UTRA Band 1, 3, 7, 8, 31, 32, 33, 34, 40, 50, 51, 65, 67, 68, 72, 74, 75, 76 | FDL\_low | - | FDL\_high | -50 | 1 |  |
| E-UTRA Band 20 | FDL\_low | - | FDL\_high | -50 | 1 | 5 |
| E-UTRA Band 38, 69 | FDL\_low | - | FDL\_high | -50 | 1 | 2 |
| DC\_21\_n77 | E-UTRA Band 1, 3, 18, 19, 21, 28, 34, 40, 65 | FDL\_low | - | FDL\_high | -50 | 1 |  |
| Frequency range | 945 | - | 960 | -50 | 1 |  |
| Frequency range | 1884.5 | - | 1915.7 | -41 | 0.3 | 3 |
| Frequency range | 2545 | - | 2575 | -50 | 1 |  |
| Frequency range | 2595 | - | 2645 | -50 | 1 |  |
| DC\_21\_n78 | E-UTRA Band 1, 3, 18, 19, 21, 28, 34, 40, 65 | FDL\_low | - | FDL\_high | -50 | 1 |  |
| Frequency range | 945 | - | 960 | -50 | 1 |  |
| Frequency range | 1884.5 | - | 1915.7 | -41 | 0.3 | 3 |
| Frequency range | 2545 | - | 2575 | -50 | 1 |  |
| Frequency range | 2595 | - | 2645 | -50 | 1 |  |
| DC\_21\_n79 | E-UTRA Band 1, 3, 18, 19, 21, 28, 34, 40, 42, 65 | FDL\_low | - | FDL\_high | -50 | 1 |  |
| Frequency range | 945 | - | 960 | -50 | 1 |  |
| Frequency range | 1884.5 | - | 1915.7 | -41 | 0.3 | 3 |
| Frequency range | 2545 | - | 2575 | -50 | 1 |  |
| Frequency range | 2595 | - | 2645 | -50 | 1 |  |
| DC\_25\_n41 | E-UTRA Band 4, 5, 12, 13 , 14, 17, 24, 26, 27, 28, 29, 30, 42, 45, 66, 70, 71 | FDL\_low | - | FDL\_high | -50 | 1 |  |
| E-UTRA Band 48 | FDL\_low | - | FDL\_high | -50 | 1 | 2 |
| E-UTRA/NR Band 2, 25 | FDL\_low | - | FDL\_high | -50 | 1 | 5 |
| DC\_26\_n41 | E-UTRA Band 1, 2, 3, 4, 5, 11, 12, 13 , 14, 17, 18, 19, 21, 24, 25, 26, 29, 30, 31, 34, 39, 42, 43, 48, 50, 51, 65, 66, 70, 71, 74 | FDL\_low | - | FDL\_high | -50 | 1 |  |
| Frequency range | 1884.5 |  | 1915.7 | -41 | 0.3 | 3 |
| Frequency range | 703 | - | 799 | -50 | 1 |  |
| Frequency range | 799 | - | 803 | -40 | 1 | 5 |
| Frequency range | 945 | - | 960 | -50 | 1 |  |
| DC\_26\_n77 | E-UTRA Band 1, 3, 5, 11, 18, 19, 21, 26, 34, 39, 40, 65, 74 | FDL\_low | - | FDL\_high | -50 | 1 |  |
| E-UTRA Band 41 | FDL\_low | - | FDL\_high | -50 | 1 | 2 |
| Frequency range | 703 | - | 799 | -50 | 1 |  |
| Frequency range | 799 | - | 803 | -40 | 1 | 5 |
| Frequency range | 945 | - | 960 | -50 | 1 |  |
| Frequency range | 1884.5 | - | 1915.7 | -41 | 0.3 | 3 |
| Frequency range | 2545 | - | 2575 | -50 | 1 | 2 |
| Frequency range | 2595 | - | 2645 | -50 | 1 |  |
| DC\_26\_n78 | E-UTRA Band 1, 3, 5, 11, 18, 19, 21, 26, 34, 39, 40, 65, 74 | FDL\_low | - | FDL\_high | -50 | 1 |  |
| E-UTRA Band 41 | FDL\_low | - | FDL\_high | -50 | 1 | 2 |
| Frequency range | 703 | - | 799 | -50 | 1 |  |
| Frequency range | 799 | - | 803 | -40 | 1 | 5 |
| Frequency range | 945 | - | 960 | -50 | 1 |  |
| Frequency range | 1884.5 | - | 1915.7 | -41 | 0.3 | 3 |
| Frequency range | 2545 | - | 2575 | -50 | 1 | 2 |
| Frequency range | 2595 | - | 2645 | -50 | 1 |  |
| DC\_26\_n79 | E-UTRA Band 1, 3, 5, 11, 18, 19, 21, 26, 34, 39, 40, 42, 65, 74 | FDL\_low | - | FDL\_high | -50 | 1 |  |
| E-UTRA Band 41 | FDL\_low | - | FDL\_high | -50 | 1 | 2 |
| Frequency range | 703 | - | 799 | -50 | 1 |  |
| Frequency range | 799 | - | 803 | -40 | 1 | 5 |
| Frequency range | 945 | - | 960 | -50 | 1 |  |
| Frequency range | 1884.5 | - | 1915.7 | -41 | 0.3 | 3 |
| Frequency range | 2545 | - | 2575 | -50 | 1 | 2 |
| Frequency range | 2595 | - | 2645 | -50 | 1 |  |
| DC\_28\_n51 | E-UTRA Band 2, 3, 5, 7, 8, 25, 26, 31, 34, 38, 40, 41, 72 | FDL\_low | - | FDL\_high | -50 | 1 |  |
| E-UTRA Band 4, 20, 22, 24, 32, 42, 43, 45, 46, 65, 66, 71, 73  NR band n78, n79 | FDL\_low | - | FDL\_high | -50 | 1 | 2 |
| E-UTRA Band 1 | FDL\_low | - | FDL\_high | -50 | 1 | 2, 9, 10 |
| Frequency range | 470 | - | 694 | -42 | 8 | 5, 17 |
| Frequency range | 470 | - | 710 | -26.2 | 6 | 14 |
| Frequency range | 662 | - | 694 | -26.2 | 6 | 5 |
| Frequency range | 758 | - | 773 | -32 | 1 | 5 |
| Frequency range | 773 | - | 803 | -50 | 1 |  |
| DC\_28\_n77 | E-UTRA Band 3, 5, 7, 8, 18, 19, 20, 26, 34, 39, 40, 41 | FDL\_low | - | FDL\_high | -50 | 1 |  |
| E-UTRA Band 1, 65, 74 | FDL\_low | - | FDL\_high | -50 | 1 | 2 |
| E-UTRA Band 1 | FDL\_low | - | FDL\_high | -50 | 1 | 9, 11 |
| E-UTRA Band 11, 21 | FDL\_low | - | FDL\_high | -50 | 1 | 9, 10 |
| Frequency range | 758 | - | 773 | -32 | 1 |  |
| Frequency range | 773 | - | 803 | -50 | 1 |  |
| Frequency range | 1884.5 | - | 1915.7 | -41 | 0.3 | 3, 9 |
| DC\_28\_n78  DC\_28\_n83\_ULSUP-TDM\_n78, | E-UTRA Band 3, 5, 7, 8, 18, 19, 20, 26, 34, 39, 40, 41 | FDL\_low | - | FDL\_high | -50 | 1 |  |
| E-UTRA Band 1, 65, 74 | FDL\_low | - | FDL\_high | -50 | 1 | 2 |
| E-UTRA Band 1 | FDL\_low | - | FDL\_high | -50 | 1 | 9, 11 |
| E-UTRA Band 11, 21 | FDL\_low | - | FDL\_high | -50 | 1 | 9, 10 |
| Frequency range | 758 | - | 773 | -32 | 1 |  |
| Frequency range | 773 | - | 803 | -50 | 1 |  |
| Frequency range | 1884.5 | - | 1915.7 | -41 | 0.3 | 3, 9 |
| DC\_28\_n79 | E-UTRA Band 3, 5, 8, 18, 19, 34, 39, 40, 41 | FDL\_low | - | FDL\_high | -50 | 1 |  |
| E-UTRA Band 1, 42, 65, 74 | FDL\_low | - | FDL\_high | -50 | 1 | 2 |
| E-UTRA Band 1 | FDL\_low | - | FDL\_high | -50 | 1 | 9, 11 |
| E-UTRA Band 11, 21 | FDL\_low | - | FDL\_high | -50 | 1 | 9, 10 |
| Frequency range | 758 | - | 773 | -32 | 1 |  |
| Frequency range | 773 | - | 803 | -50 | 1 |  |
| Frequency range | 1884.5 | - | 1915.7 | -41 | 0.3 | 3, 9 |
| DC\_30\_n5 | E-UTRA Band 2, 4, 5, 7, 12, 13, 14, 17, 24, 25, 26, 29, 30, 38, 48, 66, 70, 71, 85 | FDL\_low | - | FDL\_high | -50 | 1 |  |
| E-UTRA Band 41, 53, | FDL\_low | - | FDL\_high | -50 | 1 | 2 |
| DC\_30\_n66 | E-UTRA Band 2, 4, 5, 12, 13, 14, 17, 24, 25, 26, 27, 29, 30, 38, 41, 66, 70, 71 | FDL\_low | - | FDL\_high | -50 | 1 |  |
| E-UTRA Band 48 | FDL\_low | - | FDL\_high | -50 | 1 | 2 |
| DC\_38\_n78 | N/A | | | | | | |
| DC\_39\_n78 | E-UTRA Band 1, 8, 28, 34, 40, 41, 44, 45 | FDL\_low | - | FDL\_high | -50 | 1 |  |
| Frequency range | 1805 | - | 1855 | -40 | 1 | 18 |
| Frequency range | 1855 | - | 1880 | -15.5 | 5 | 18 |
| DC\_39\_n79 | E-UTRA Band 1, 8, 28, 34, 40, 41, 44, 45 | FDL\_low | - | FDL\_high | -50 | 1 |  |
| Frequency range | 1805 | - | 1855 | -40 | 1 | 18 |
| Frequency range | 1855 | - | 1880 | -15.5 | 5 | 18 |
| DC\_40\_n77 | N/A | | | | | | |
| DC\_41\_n77 | E-UTRA Band 1, 3, 5, 8, 11, 18, 19, 21, 26, 28, 33, 34, 39, 40, 44, 45, 73, 74 | FDL\_low | - | FDL\_high | -50 | 1 |  |
| Frequency range | 1884.5 |  | 1915.7 | -41 | 0.3 | 3 |
| DC\_41\_n78 | E-UTRA Band 1, 3, 5, 8, 11, 18, 19, 21, 26, 28, 34, 39, 40, 44, 45, 74 | FDL\_low | - | FDL\_high | -50 | 1 |  |
| Frequency range | 1884.5 | - | 1915.7 | -41 | 0.3 | 3 |
| DC\_41\_n79 | E-UTRA Band 1, 3, 5, 8, 11, 18, 19, 21, 26, 28, 34, 40, 42, 44, 45, 65, 74 | FDL\_low | - | FDL\_high | -50 | 1 |  |
| Frequency range | 1884.5 | - | 1915.7 | -41 | 0.3 | 3 |
| DC\_42\_n51 | E-UTRA Band 3, 8, 20, 25, 30, 31, 34, 39, 41, 73 | FDL\_low | - | FDL\_high | -50 | 1 |  |
| E-UTRA Band 1, 2, 4, 5, 6, 7, 12, 13, 14, 17, 23, 24, 26, 27, 28, 29, 32, 38, 40, 44, 46, 65, 66, 67, 68, 70, 71 | FDL\_low | - | FDL\_high | -50 | 1 | 2 |
| DC\_42\_n77 | N/A | | | | | | |
| DC\_42\_n78 | N/A | | | | | | |
| DC\_42\_n79 | N/A | | | | | | |
| DC\_66\_n5 | E-UTRA Band 1, 2, 3, 4, 5, 6, 7, 8, 12, 13, 14, 17, 24, 25, 26, 28, 29, 30, 34, 38, 40, 43, 45, 50, 51, 65, 66, 70, 71, 85 | FDL\_low | - | FDL\_high | -50 | 1 |  |
| E-UTRA Band 41, 42, 48, 52 | FDL\_low | - | FDL\_high | -50 | 1 | 2 |
| DC\_66\_n71 | E-UTRA Band 4, 5, 13, 14, 17, 24, 26, 27, 29, 30, 43,50, 51, 66, 74 | FDL\_low | - | FDL\_high | -50 | 1 |  |
| E-UTRA Band 2, 7, 22, 25, 41, 42, 48, 70 | FDL\_low | - | FDL\_high | -50 | 1 | 2 |
| E-UTRA Band 71 | FDL\_low | - | FDL\_high | -50 | 1 | 5 |
| DC\_66\_n78,  DC\_66\_n86\_ULSUP-TDM\_n78, | E-UTRA Band 1, 3, 5, 7, 8, 20, 26, 28, 34, 39, 40, 41, 65 | FDL\_low | - | FDL\_high | -50 | 1 |  |
| NOTE 1: FDL\_low and FDL\_high refer to each frequency band specified in Table 5.5-1 in 3GPP TS 36.101 [4] or in Table 5.2-1 in 3GPP TS 38.101-1 [2].  NOTE 2: As exceptions, measurements with a level up to the applicable requirements defined in Table 6.6.3.1-2 in 3GPP TS 36.101 [4] and Table 6.5.3.1-2 in 3GPP TS 38.101-1 [2] are permitted for each assigned 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 180 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 3: Applicable when co-existence with PHS system operating in 1884.5 - 1915.7 MHz  NOTE 4: Void  NOTE 5: These requirements also apply for the frequency ranges that are less than FOOB (MHz) in Table 6.6.3.1-1, Table 6.6.3.1A-1 in 3GPP TS 36.101 [4] or in Table 6.5.3.1-1 in 3GPP TS 38.101-1 [2] from the edge of the channel bandwidth.  NOTE 6: This requirement is applicable for any channel bandwidths within the range 2500 - 2570 MHz with the following restriction: for carriers of 15 MHz bandwidth when carrier centre frequency is within the range 2560.5 - 2562.5 MHz and for carriers of 20 MHz bandwidth when carrier centre frequency is within the range 2552 - 2560 MHz the requirement is applicable only for an uplink transmission bandwidth less than or equal to 54 RB.  NOTE 7: For these adjacent bands, the emission limit could imply risk of harmful interference to UE(s) operating in the protected operating band.  NOTE 8: This requirement is applicable for any channel bandwidths within the range 1920 - 1980 MHz with the following restriction: for carriers of 15 MHz bandwidth when carrier centre frequency is within the range 1927.5 - 1929.5 MHz and for carriers of 20 MHz bandwidth when carrier centre frequency is within the range 1930 - 1938 MHz the requirement is applicable only for an uplink  NOTE 9: Applicable when the assigned E-UTRA or NR carrier is confined within 718 MHz and 748 MHz and when the channel bandwidth used is 5 or 10 MHz.  NOTE 10: As exceptions, measurements with a level up to the applicable requirement of -38 dBm/MHz is permitted for each assigned E-UTRA carrier used in the measurement due to 2nd harmonic spurious emissions. An exception is allowed if there is at least one individual RB within the transmission bandwidth (see Figure 5.6-1) for which the 2nd harmonic totally or partially overlaps the measurement bandwidth (MBW).  NOTE 11: As exceptions, measurements with a level up to the applicable requirement of -36 dBm/MHz is permitted for each assigned E-UTRA carrier used in the measurement due to 3rd harmonic spurious emissions. An exception is allowed if there is at least one individual RB within the transmission bandwidth (see Figure 5.6-1) for which the 3rd harmonic totally or partially overlaps the measurement bandwidth (MBW).  NOTE 12: This requirement is applicable only for the following cases: A: for carriers of 5 MHz channel bandwidth when carrier centre frequency (Fc) is within the range 902.5 MHz ≤ Fc < 907.5 MHz with an uplink transmission bandwidth less than or equal to 20 RB; B: for carriers of 5 MHz channel bandwidth when carrier centre frequency (Fc) is within the range 907.5 MHz ≤ Fc ≤ 912.5 MHz without any restriction on uplink transmission bandwidth; C: for carriers of 10 MHz channel bandwidth when carrier centre frequency (Fc) is Fc = 910 MHz with an uplink transmission bandwidth less than or equal to 32 RB with RBstart > 3.  NOTE 13: Void  NOTE 14: This requirement is applicable for 5 and 10 MHz E-UTRA or NR channel bandwidth allocated within 718-728MHz. For carriers of 10 MHz bandwidth, this requirement applies for an uplink transmission bandwidth less than or equal to 30 RB with RBstart > 1 and RBstart < 48.  NOTE 15: Void  NOTE 16: This requirement is applicable for any channel bandwidths within the range 1920 - 1980 MHz with the following restriction: for carriers of 15 MHz bandwidth when carrier centre frequency is within the range 1927.5 - 1929.5 MHz and for carriers of 20 MHz bandwidth when carrier centre frequency is within the range 1930 - 1938 MHz the requirement is applicable only for an uplink transmission bandwidth less than or equal to 54 RB.  NOTE 17: This requirement is applicable in the case of a 10 MHz E-UTRA or NR carrier confined within 703 MHz and 733 MHz, otherwise the requirement of -25 dBm with a measurement bandwidth of 8 MHz applies.  NOTE 18: This requirement is only applicable for E-UTRA carriers with bandwidth confined within 1885 - 1920 MHz (requirement for carriers with at least 1RB confined within 1880 - 1885 MHz is not specified). This requirement applies for an uplink transmission bandwidth less than or equal to 54 RB for E-UTRA carriers of 15 MHz bandwidth when carrier center frequency is within the range 1892.5 - 1894.5 MHz and for E-UTRA carriers of 20 MHz bandwidth when carrier center frequency is within the range 1895 - 1903 MHz.  NOTE 19: Void | | | | | | | |

NOTE: To simplify the above Table, E-UTRA band numbers are listed for bands which are specified only for E-UTRA operation or both E-UTRA and NR operation. NR band numbers are listed for bands which are specified only for NR operation.

#### 6.5B.3.3a Inter-band NE-DC within FR1

##### 6.5B.3.3a.1 General spurious emissions

The general spurious emissions requirements specified in clause 6.6.3.1 of TS 36.101 [4], clause 6.5.3.1 of TS 38.101-1 [2] and TS 38.101-2 [3] apply for each component carrier.

##### 6.5B.3.3a.2 Spurious emission band UE co-existence

This clause specifies the requirements for the specified NE-DC configurations that do not have a corresponding defined EN-DC, for coexistence with protected bands. For the NE-DC configurations that have a corresponding specified EN-DC configuration, the requirements in Table 6.5B.3.3.2-1 apply on each component carrier with all component carriers are active.

#### 6.5B.3.4 Inter-band EN-DC including FR2

General spurious requirement for E-UTRA single carrier and CA operation specified in clauses 6.6.3.1 and 6.6.3.1A of TS 36.101 [4] and for NR single carrier, CA operation and UL-MIMO specified in clause 6.5.3, 6.5A.3 and 6.5D.3 of TS 38.101-2 [3] apply.

##### 6.5B.3.4.1 Spurious emission band UE co-existence

This clause specifies the requirements for the specified EN-DC, for coexistence with protected bands. Unless otherwise stated, for inter-band EN-DC configurations defined in table 5.5B.5.1-1, no requirements for FR2 NR bands to protect E-UTRA and FR1 NR bands are applied to the constituent FR2 NR bands. Spurious emission band UE co-existence requirements specified in TS 36.101 [4] are applied to the constituent E-UTRA bands for the EN-DC configuration.

Spurious emission band UE co-existence requirement for E-UTRA single carrier and CA operation specified in clauses 6.6.3.2 and 6.6.3.2A of TS 36.101 [4] and for NR single carrier, CA operation and UL-MIMO specified in clause 6.5.3.1, 6.5A.3.1 and 6.5D.3.1 of TS 38.101-2 [3] apply.

Table 6.5B.3.4.1-1: Void

#### 6.5B.3.5 Inter-band EN-DC including both FR1 and FR2

General spurious requirement for E-UTRA single carrier and CA operation specified in clauses 6.6.3.1 and 6.6.3.1A of TS 36.101 [4] and for NR single carrier and CA operation specified in clause 6.5.3.1 and 6.5A.3.1 of TS 38.101-1 [2] and for NR single carrier, CA operation and UL-MIMO specified in clause 6.5.3, 6.5A.3 and 6.5D.3 of TS 38.101-2 [3] apply.

##### 6.5B.3.5.1 Spurious emission band UE co-existence

This clause specifies the requirements for the specified EN-DC, for coexistence with protected bands. Unless otherwise stated, for inter-band EN-DC configurations defined in clause 5.5B.6, no requirements for FR2 NR bands to protect E-UTRA and FR1 NR bands are applied to the constituent FR2 NR bands. Spurious emission band UE co-existence requirements for constituent E-UTRA and FR1 NR bands for the inter-band EN-DC are the same as those for the corresponding EN-DC configuration without the FR2 bands specified in 6.5B.3.2.2.

Spurious emission band UE co-existence requirement for E-UTRA single carrier and CA operation specified in clauses 6.6.3.2 and 6.6.3.2A of TS 36.101 [4] and for NR single carrier and CA operation specified in clause 6.5.3.2 and 6.5A.3.2 of TS 38.101-1 [2] and for NR single carrier, CA operation and UL-MIMO specified in clause 6.5.3.1, 6.5A.3.1 and 6.5D.3.1 of TS 38.101-2 [3] apply.

Table 6.5B.3.5.1-1: Void

### 6.5B.4 Additional spurious emissions

#### 6.5B.4.1 General

These requirements are specified in terms of an additional spectrum emission requirement. Additional spurious emission requirements are signalled by the network to indicate that the UE shall meet an additional requirement for a specific deployment scenario as part of the cell handover/broadcast message.

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.

##### 6.5B.4.1.1 Void

#### 6.5B.4.2 Intra-band contiguous EN-DC

##### 6.5B.4.2.1 Minimum requirement (network signalled value "NS\_04")

When "NS 04" is indicated in the cell, the power of any UE emission shall not exceed the levels specified in Table 6.5B.4.1.1-1. This requirement also applies for the frequency ranges that are less than FOOB (MHz) in Table 6.6.3.1-1 from the edge of the channel bandwidth.

Table 6.5B.4.1.1-1: Additional requirements

|  |  |  |
| --- | --- | --- |
| Frequency band  (MHz) | Channel bandwidth / Spectrum emission limit (dBm) | Measurement bandwidth |
| 2495 ≤ f < 2496 | -13 | 1 % of Channel BW for contiguous BW up to 100 MHz,  1 MHz for contiguous BW > 100 MHz |
| 2490.5 ≤ f < 2495 | -13 | 1 MHz |
| 0 < f < 2490.5 | -25 | 1 MHz |

#### 6.5B.4.3 Intra-band non-contiguous EN-DC

##### 6.5B.4.3.1 Minimum requirement (network signalled value "NS\_04")

When "NS 04" is indicated in the cell, the power of any UE emission shall not exceed the levels specified in Table 6.5B.4.1.1-1. This requirement also applies for the frequency ranges that are less than FOOB (MHz) in Table 6.6.3.1-1 from the edge of the channel bandwidth.

Table 6.5B.4.1.1-1: Additional requirements

|  |  |  |
| --- | --- | --- |
| Frequency band  (MHz) | Channel bandwidth / Spectrum emission limit (dBm) | Measurement bandwidth |
| 2495 ≤ f < 2496 | -13 | 1 % of Channel BW for contiguous BW up to 100 MHz,  1 MHz for contiguous BW > 100 MHz |
| 2490.5 ≤ f < 2495 | -13 | 1 MHz |
| 0 < f < 2490.5 | -25 | 1 MHz |

#### 6.5B.4.4 Inter-band EN-DC within FR1

The additional spurious emissions requirements specified for E-UTRA in clause 6.6.3.3 and 6.6.3.3A of TS 36.101 [4] and for NR single carrier, CA operation and UL-MIMO specified in clause 6.5.3.3, 6.5A.3.3 and 6.5D.3 of TS 38.101-1 [2] apply for each component carrier.

#### 6.5B.4.4a Inter-band NE-DC within FR1

The additional spurious emissions requirements specified for E-UTRA in clause 6.6.3.3 and 6.6.3.3A of TS 36.101 [4] and for NR single carrier, CA operation and UL-MIMO specified in clause 6.5.3.3, 6.5A.3.3 and 6.5D.3 of TS 38.101-1 [2] apply for each component carrier.

#### 6.5B.4.5 Inter-band EN-DC including FR2

The additional spurious emissions requirements specified for E-UTRA in clause 6.6.3.3 and 6.6.3.3A of TS 36.101 [4] and for NR single carrier, CA operation and UL-MIMO specified in clause 6.5.3.3, 6.5A.3.3 and 6.5D.3 of TS 38.101-2 [3] apply for each component carrier.

#### 6.5B.4.6 Inter-band EN-DC including both FR1 and FR2

The additional spurious emissions requirements specified for E-UTRA in clause 6.6.3.3 and 6.6.3.3A of TS 36.101 [4] and for NR single carrier, CA operation and UL-MIMO specified in clause 6.5.3.3, 6.5A.3.3 and 6.5D.3 of TS 38.101-1 [2] and in clause 6.5.3.3, 6.5A.3.3 and 6.5D.3 of TS 38.101-2 [3] apply for each component carrier.

### 6.5B.5 Transmit intermodulation for DC

#### 6.5B.5.1 Intra-band contiguous EN-DC

Unless otherwise stated, no transmit intermodulation requirements are applied for intra‑band contiguous EN‑DC.

#### 6.5B.5.2 Intra-band non-contiguous EN-DC

Unless otherwise stated, no transmit intermodulation requirements are applied for intra band non‑contiguous EN DC.

#### 6.5B.5.3 Inter-band EN-DC within FR1

The transmit intermodulation requirement specified in clauses 6.7.1 of TS 36.101 [4] and clauses 6.5.4 and 6.5A.4 of TS 38.101-1 [2] apply for each component carrier in E-UTRA bands and NR bands, respectively.

#### 6.5B.5.3a Inter-band NE-DC within FR1

The transmit intermodulation requirement specified in clauses 6.7.1 and 6.7.1A of TS 36.101 [4] and clauses 6.5.4 and 6.5A.4 of TS 38.101-1 [2] apply for each component carrier in E-UTRA bands and NR bands, respectively.

#### 6.5B.5.4 Inter-band EN-DC including FR2

Transmit intermodulation requirements specified in clause 6.7.1 and 6.7.1A of TS 36.101 [4] apply for each component carrier in E-UTRA bands.

#### 6.5B.5.5 Inter-band EN-DC including both FR1 and FR2

Transmit intermodulation requirement specified in clauses 6.7.1 and 6.7.1A of TS 36.101 [4] and clauses 6.5.4 and 6.5A.4 of TS 38.101-1 [2] apply for each component carrier in E-UTRA bands and NR bands, respectively.

## 6.6B Beam correspondence for DC

### 6.6B.1 Void

### 6.6B.2 Void

### 6.6B.3 Void

### 6.6B.4 Inter-band EN-DC including FR2

Beam correspondence requirement specified in clause 6.6 and 6.6A of TS 38.101-2 [3] apply for NR FR2 bands.

### 6.6B.5 Inter-band EN-DC including both FR1 and FR2

Beam correspondence requirement specified in clause 6.6 and 6.6A of TS 38.101-2 [3] apply for NR FR2 bands.

# 7 Receiver characteristics

## 7.1 General

Unless otherwise stated the receiver characteristics are specified at the antenna connector(s) of the UE for the bands operating on frequency range 1 and over the air of the UE for the bands operating on frequency range 2. The requirements for frequency range 1 and frequency range 2 can be verified separately. For the carrier in frequency range 1, requirements can be verified with NR FR2 link disabled. For the carrier in frequency range 2, requirements can be verified in OTA mode with E-UTRA connecting to the network by OTA without calibration.

The requirements defined in this clause are the extra requirements compared with the single carrier requirements defined in TS 38.101-1 [2] and TS 38.101-2 [3].

Unless otherwise stated, the UL and DL reference measurement channels are the same with the configurations specified in TS 38.101-1 [2] and TS 38.101-2 [3].

Unless otherwise stated, requirements for NR receiver written in TS 38.101-1 [2] and TS 38.101-2 [3] apply and are assumed anchor agnostic. Requirements are verified under conditions where anchor resources do not interfere NR operation.

For intra-band EN-DC, the output power is configured as follows:

- One E-UTRA uplink carrier with the output power set to 29 dB below PCMAX\_L,c and the NR band whose downlink is being tested has its uplink carrier output power set to 4 dB below PCMAX\_L,f,c.

- One NR uplink carrier with the output power set to 29 dB Below PCMAX\_L,f,c and the E-UTRA band whose downlink is being tested has its uplink carrier output power set to 4 dB below PCMAX\_L,c.

For the additional requirements for intra-band non-contiguous EN-DC of two sub-blocks, an in-gap test refers to the case when the interfering signal is located at a negative offset with respect to the assigned lowest channel frequency of the highest sub-block and located at a positive offset with respect to the assigned highest channel frequency of the lowest sub-block.

For the additional requirements for intra-band non-contiguous EN-DC of two sub-blocks, an out-of-gap test refers to the case when the interfering signal(s) is (are) located at a positive offset with respect to the assigned channel frequency of the highest carrier frequency or located at a negative offset with respect to the assigned channel frequency of the lowest carrier frequency.

For the additional requirements for intra-band non-contiguous EN-DC of two sub-blocks with channel bandwidth larger than or equal to 5 MHz, the existing adjacent channel selectivity requirements, in-band blocking requirements (for each case), and narrow band blocking requirements apply for in-gap tests only if the corresponding interferer frequency offsets with respect to the two measured carriers satisfy the following condition in relation to the sub-block gap size Wgap for at least one of the E-UTRA or NR sub-blocks, so that the interferer frequency position does not change the nature of the core requirement tested:

Wgap ≥ 2∙|FInterferer (offset)| – BWChannel

For the E-UTRA sub-block, the FInterferer (offset), for a sub-block with a single component carrier is the interferer frequency offset with respect to carrier as specified in clause 7.5.1, clause 7.6.1 and clause 7.6.3 for the respective requirement in TS 36.101 [4] and BWChannel. FInterferer (offset) for the E-UTRA sub-block with two or more contiguous component carriers is the interference frequency offset with respect to the carrier adjacent to the gap is specified in clause 7.5.1A, 7.6.1A and 7.6.3A in TS 36.101 [4].

For the NR sub-block, the FInterferer (offset), for a sub-block with a single component carrier is the interferer frequency offset with respect to carrier as specified in clause 7.5.1, clause 7.6.1 and clause 7.6.3 for the respective requirement in TS 38.101-1 [2] and BWChannel.

The interferer frequency offsets for adjacent channel selectivity, each in-band blocking case and narrow-band blocking shall be tested separately with a single in-gap interferer at a time.

For the requirements of FR1 in this clause, the UE shall be verified with four Rx antenna ports and skip two Rx antenna ports requirements in operating bands where the UE is equipped with four Rx antenna ports, otherwise, the UE shall be verified with two Rx antenna ports.

## 7.2 Void

## 7.3 Void

## 7.3A Reference sensitivity for CA

### 7.3A.1 General

For NR CA operation NR single carrier REFSENS requirements defined in TS 38.101-1 [2] and TS 38.101-2 [3] apply to all downlink bands part of NR CA configurations listed in Table 5.2A.1-1unless sensitivity degradation is allowed as defined in clause 7.3A.

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

### 7.3A.3 ΔRIB,c for CA

For the UE which supports inter-band NR CA configuration, the minimum requirement for reference sensitivity in clause 7.3.2 in TS 38.101-1 [2] and clause 7.3.2, 7.3A.2in TS 38.101-2 [3] shall be increased by the amount given in ΔRIB,c in Tables below. Unless otherwise stated, ΔRIB,c is set to zero.

In case the UE supports more than one of band combinations for CA, SUL or DC, and an operating band belongs to more than one band combinations then

- When the operating band frequency range is ≤ 1GHz, the applicable additional ∆RIB,c shall be the average value for all band combinations defined in clause 7.3A, 7.3B, 7.3C in this specification and 7.3A, 7.3B in TS 38.101-3 [3], truncated to one decimal place that apply for that operating band among the supported band combinations. In case there is a harmonic relation between low band UL and high band DL, then the maximum ΔRIB,c among the different supported band combinations involving such band shall be applied

- When the operating band frequency range is > 1 GHz, the applicable additional ΔRIB,c shall be the maximum value for all band combinations defined in clause 7.3A, 7.3B, 7.3C in this specification and 7.3A, 7.3B in TS 38.101-3 [3] for the applicable operating bands.

#### 7.3A.3.1 ΔRIB,c for Inter-band CA between FR1 and FR2

Unless otherwise stated, ΔRIB,c for NR FR1 band and FR2 band of inter-band CA defined in table 5.5A.1-1 is set to zero.

Table 7.3A.3.1-1: Void

### 7.3A.4 Void

## 7.3B Reference sensitivity level for DC

### 7.3B.1 General

For EN-DC, E-UTRA and NR single carrier, CA, and MIMO operation of REFSENS requirements defined in TS 38.101-1 [2], TS 38.101-2 [3] and TS 36.101 [4] apply to all downlink bands of EN-DC configurations listed in clause 5.5B, unless sensitivity degradation exception is allowed in this clause of this specification, clause 7.3 in TS 38.101-1 [2], clause 7.3 in TS 38.101-2 [3] or clause 7.3 in TS 36.101 [4]. Allowed exceptions specified in this clause also apply to any higher order EN-DC configuration combination containing one of the band combinations that exception is allowed for. Reference sensitivity exceptions are specified by applying maximum sensitivity degradation (MSD) into applicable REFSENS requirement. EN-DC REFSENS requirements shall be met for NR uplink transmissions using QPSK DFT-s-OFDM waveforms as defined in clause 7.3.2 [2]. Unless otherwise specified UL allocation uses the lowest SCS allowable for a given channel BW. Limits on configured maximum output power for the uplink according to clause 6.2B.4 shall apply.

In case of interband EN-DC the receiver REFSENS requirements in this clause do not apply for 1.4 and 3 MHz E-UTRA carriers. For the case of inter-band EN-DC with a single carrier per cell group and multi‑carrier per cell group, in addition to the E-UTRA and NR single carrier, CA, and MIMO operation of REFSENS requirements defined in TS 38.101-1 [2], TS 38.101-2 [3], and TS 36.101 [4], the REFSENS requirements specified therein also apply with both downlink carriers and both uplink carriers active unless sensitivity exceptions are allowed in this clause of this specification, clause 7.3 in TS 38.101-1 [2] or clause 7.3 in TS 36.101 [4].

For reference sensitivity exception test points where the specified carrier frequency does not correspond to a valid NR-ARFCN, the closest NR-ARFCN as specified in clause 5.4.2 applies.

For operations with 4 Rx antenna ports in an E-UTRA band or an NR band, the MSD in the applicable bands shall be increased by the absolute value of ΔRIB,4R in Table 7.3.1-1a of TS 36.101[4] for the E-UTRA band or in Table 7.3.2-2 of TS 38.101-1 for the NR band when MSD > 0.

NOTE: For inter-band EN-DC, the reference sensitivity requirement with both uplink carriers active is allowed to be verified for only a single inter-band EN-DC configuration per NR band.

### 7.3B.2 Reference sensitivity for DC

#### 7.3B.2.1 Intra-band contiguous EN-DC

For intra-band contiguous EN-DC configurations, the reference sensitivity power level REFSENS is the minimum mean power applied to each one of the UE antenna ports at which the throughput for the carrier(s) of the E-UTRA and NR CGs shall meet or exceed the requirements for the specified E-UTRA and NR reference measurement channels. The reference sensitivity requirements apply with all uplink carriers and all downlink carriers active for EN-DC configuration and Uplink EN-DC configuration listed in Table 5.5B.2-1 and Table 5.5B.3-1, as supported by the UE. For EN-DC configurations where uplink is not available in either the MCG or the SCG or for EN-DC configurations where the UE only supports single uplink operation, reference sensitivity requirements apply with single uplink transmission. The downlink carrier(s) from the cell group with uplink shall be configured closer to the uplink operating band than any of the downlink carriers from the cell group without uplink.

Sensitivity degradation is allowed for Intra-band contiguous EN-DC configurations listed in Table 7.3B.2.1-1 the reference sensitivity is defined only for the specific uplink and downlink test points which are specified in Table 7.3B.2.1-1 and E-UTRA and NR single carrier requriements do not apply.

Table 7.3B.2.1-1: Reference sensitivity (MSD) for intra-band contiguous EN-DC

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| EN-DC configuration / channel allocations /MSD | | | | | | | |
| EN-DC configuration | E-UTRA/NR band | FC (UL)  (MHz) | Channel bandwidth  (MHz) | UL  allocation (LCRB) | FC (DL)  (MHz) | MSD  (dB) | Duplex mode |
| DC\_(n)71AA | 71 | 665.5 | 5 | 5 (RBend =24) | 619.5 | 0 | FDD |
| n71 | 675.5 | 15 | 15 (RBstart = 0) | 629.5 | 1.8 |
| DC\_(n)71AA | 71 | 670.5 | 15 | 15 (RBend = 74) | 624.5 | 0 |
| n71 | 680.5 | 5 | 5 (RBstart = 0) | 634.5 | 1.6 |
| DC\_(n)71AA | 71 | 668 | 10 | 10 (RBend = 49) | 622 | 0 |
| n71 | 678 | 10 | 10 (RBstart = 0) | 632 | 1.7 |
| DC\_(n)71AA | 71 | 668 | 10 | 10 (RBstart = 0) | 622 | 17.2 |
| n71 | 678 | 10 | 10 (RBend = 51) | 632 | 29.4 |
| NOTE 1: The transmitters powers shall be set to PUMAX, as defined in TS 38.101-1 [2], TS 38.101-2 [3], and TS 36.101 [4], with additional limits on configured maximum output power for the uplink according to clause 6.2B.4. | | | | | | | |

#### 7.3B.2.2 Intra-band non-contiguous EN-DC

For intra-band non-contiguous EN-DC configurations, the reference sensitivity power level REFSENS is the minimum mean power applied to each one of the UE antenna ports at which the throughput for the carrier(s) of the E-UTRA and NR CGs shall meet or exceed the requirements for the specified E-UTRA and NR reference measurement channels.

For DC\_3A\_n3A intra-band non-contiguous EN-DC combination, only single switched UL is supported in rel.15 therefore, no MSD is specified and E-UTRA and NR single carrier requriements apply.

#### 7.3B.2.3 Inter-band EN-DC within FR1

Reference sensitivity exceptions are specified for the condition when there is uplink transmission only in the aggressor band.

##### 7.3B.2.3.1 Reference sensitivity exceptions due to UL harmonic interference for EN-DC in NR FR1

Sensitivity degradation is allowed for a band if it is impacted by UL harmonic interference from another band part of the same EN-DC configuration. Reference sensitivity exceptions for the victim band (high) are specified in Table 7.3B.2.3.1-1 with uplink configuration of the aggressor band (low) specified in Table 7.3B.2.3.1-2.

Table 7.3B.2.3.1-1: Reference sensitivity exceptions (MSD) due to UL harmonic for EN-DC in NR FR1

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| E-UTRA or NR Band / Channel bandwidth of the affected DL band / MSD | | | | | | | | | | | | | |
| UL band | DL band | 5 MHz  (dB) | 10 MHz  (dB) | 15 MHz  (dB) | 20 MHz  (dB) | 25 MHz  (dB) | 30 MHz (dB) | 40 MHz  (dB) | 50 MHz  (dB) | 60 MHz  (dB) | 80 MHz  (dB) | 90 MHz  (dB) | 100 MHz  (dB) |
| 1, 3 | n772,13 |  | 23.9 | 22.1 | 20.9 |  |  | 17.9 | 16.8 | 16.0 | 14.8 | 14.3 | 13.8 |
| n773 |  | 1.1 | 0.8 | 0.3 |  |  |  |  |  |  |  |  |
| 2 | n782,13 |  | 23.9 | 22.1 | 20.9 |  |  | 17.9 | 16.8 | 16.0 | 14.8 | 14.3 | 13.8 |
| n783 |  | 1.1 | 0.8 | 0.3 |  |  |  |  |  |  |  |  |
| 3 | n782,13 |  | 23.9 | 22.1 | 20.9 |  |  | 17.9 | 16.8 | 16.0 | 14.8 | 14.3 | 13.8 |
| n783 |  | 1.1 | 0.8 | 0.3 |  |  |  |  |  |  |  |  |
| 5 | n786,7 |  | 10.5 | 8.9 | 7.8 |  |  | 5.4 | 4.2 | 3.5 | 2.3 | 2.1 | 1.4 |
| 8 | n776,7  n786,7 |  | 10.8 | 9.1 | 8 |  |  | 5.1 | 4.2 | 3.5 | 2.3 | 2.1 | 1.4 |
| 8 | n794,5 |  |  |  |  |  |  | 6.8 | 6.2 | 5.6 | 4.9 |  | 4.4 |
| 12 | n668,9,10 | 10 | 7.5 | 6.2 | 5.5 |  |  | 2.4 |  |  |  |  |  |
| 18，19 | n774,5  n784,5 |  | 10.4 | 8.9 | 7.8 |  |  | 4.7 | 3.7 | 3 | 1.7 | 1.2 | 0.7 |
| 28 | n512,13 | 27.8 |  |  |  |  |  |  |  |  |  |  |  |
| n513 | 1.9 |  |  |  |  |  |  |  |  |  |  |  |
| 28 | n774,5 n784,5 |  | 10.4 | 8.9 | 7.8 |  |  | 4.7 | 3.7 | 3 | 1.7 | 1.2 | 0.7 |
| 20 | n776,7  n786,7 |  | 10.8 | 9.1 | 8 |  |  | 6 | 4.0 | 3.2 | 2.0 | 1.5 | 1.0 |
| 26 | n418,9 |  | 10.3 | 8.4 | 7.4 |  |  | 5 | 4.3 | 3.9 | 3.1 | 2.9 | 2.7 |
| 26 | n776,7  n786,7 |  | 10.8 | 9.1 | 8 |  |  | 6 | 4.0 | 3.2 | 2.0 | 1.5 | 1.0 |
| n28 | 18,9,10 | 10.2 | 7.6 | 6.2 | 5.3 |  |  |  |  |  |  |  |  |
| n71 | 211 | 4.6 | 1.0 | 0.7 | 0.6 |  |  |  |  |  |  |  |  |
| 212 | 1.7 | 1.0 | 0.7 | 0.6 |  |  |  |  |  |  |  |  |
| 66 | n782,13 |  | 23.9 | 22.1 | 20.9 |  |  | 17.9 | 16.8 | 16.0 | 14.8 | 14.3 | 13.8 |
| n783 |  | 1.1 | 0.8 | 0.3 |  |  |  |  |  |  |  |  |
| NOTE 1: Void  NOTE 2: The requirements should be verified for UL EARFCN or NR ARFCN of the aggressor (lower) band (superscript LB) such that in MHz and  with carrier frequency in the victim (higher) band in MHz and the channel bandwidth configured in the lower band.  NOTE 3: The requirements are only applicable to channel bandwidths no larger than 20 MHz and with a carrier frequency at  MHz offset from  in the victim (higher band) with , whereandare the channel bandwidths configured in the aggressor (lower) and victim (higher) bands in MHz, respectively.  NOTE 4: These requirements apply when there is at least one individual RE within the uplink transmission bandwidth of the aggressor (lower) band for which the 5th transmitter harmonic is within the downlink transmission bandwidth of a victim (higher) band.  NOTE 5: The requirements should be verified for UL EARFCN of the aggressor (lower) band (superscript LB) such that in MHz and  with carrier frequency in the victim (higher) band in MHz and the channel bandwidth configured in the lower band.  NOTE 6: These requirements apply when there is at least one individual RE within the uplink transmission bandwidth of the aggressor (lower) band for which the 4th transmitter harmonic is within the downlink transmission bandwidth of a victim (higher) band.  NOTE 7: The requirements should be verified for UL EARFCN of the aggressor (lower) band (superscript LB) such that in MHz and  with carrier frequency in the victim (higher) band in MHz and the channel bandwidth configured in the lower band.  NOTE 8: These requirements apply when there is at least one individual RE within the uplink transmission bandwidth of the aggressor (lower) for which the 3rd transmitter harmonic is within the downlink transmission bandwidth of a victim (higher) band.  NOTE 9 The requirements should be verified for UL EARFCN of the aggressor (lower) band (superscript LBsuch that  in MHz and  with the carrier frequency in the victim (higher) band in MHz and the channel bandwidth configured in the low band.  NOTE 10: Void.  NOTE 11: These requirements apply when the lower edge frequency of the 5 MHz uplink channel in Band 71 is located at or below 668 MHz and the downlink channel in Band 2 is located with its upper edge at 1990 MHz.  NOTE 12: These requirements apply when the lower edge frequency of the 10 MHz, 15 MHz, or 20 MHz uplink channel in Band 71 is located at or below 668 MHz and the downlink channel in Band 2 is located with its upper edge at 1990 MHz.  NOTE 13: These requirements apply when there is at least one individual RE within the uplink transmission bandwidth of the aggressor (lower) band for which the 2nd transmitter harmonic is within the downlink transmission bandwidth of a victim (higher) band and a range ∆FHD above and below the edge of this downlink transmission bandwidth. The value ∆FHD depends on the EN-DC band combination: ∆FHD = 10 MHz for DC\_1\_n77, DC\_2\_n77, DC\_66\_n77, DC\_3\_n77 , DC\_3\_n78, DC\_28\_n51, DC\_66\_n78.  NOTE 14: MSD test point can be chosen according to supported BW and lowest SCS supported by the UE. | | | | | | | | | | | | | |

Table 7.3B.2.3.1-2: Uplink configuration for reference sensitivity exceptions due to UL harmonic interference for EN-DC in NR FR1

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| E-UTRA or NR Band / Channel bandwidth of the affected DL band / UL RB allocation of the agressor band | | | | | | | | | | | | | | |
| UL band | DL band | SCS of UL band  (kHz) | 5  MHz  (LCRB) | 10 MHz  (LCRB) | 15 MHz  (LCRB) | 20 MHz  (LCRB) | 25 MHz  (LCRB) | 30 MHz  (LCRB) | 40 MHz  (LCRB) | 50 MHz  (LCRB) | 60 MHz  (LCRB) | 80 MHz  (LCRB) | 90 MHz  (LCRB) | 100 MHz  (LCRB) |
| 1 | n77 | 15 |  | 25 | 36 | 50 |  |  | 100 | 100 | 100 | 100 | 100 | 100 |
| 2 | n78 | 15 |  | 25 | 36 | 50 |  |  | 50 | 50 | 50 | 50 | 50 | 50 |
| 3 | n77, n78 | 15 |  | 25 | 36 | 50 |  |  | 50 | 50 | 50 | 50 | 50 | 50 |
| 5 | n78 | 15 |  | 16 | 25 | 25 |  |  | 25 | 25 | 25 | 25 | 25 | 25 |
| 8 | n77  n78 | 15 |  | 16 | 25 | 25 |  |  | 25 | 25 | 25 | 25 | 25 | 25 |
| 8 | n79 | 15 |  |  |  |  |  |  | 25 | 25 | 25 | 25 |  | 25 |
| 12 | n66 | 15 | 8 | 16 | 20 | 20 |  |  | 20 |  |  |  |  |  |
| 18 | n77, n78 | 15 |  | 16 | 25 | 25 |  |  | 25 | 25 | 25 | 25 | 25 | 25 |
| 19 | n77, n78 | 15 |  | 16 | 25 | 25 |  |  | 25 | 25 | 25 | 25 | 25 | 25 |
| 20 | n77, n78 | 15 |  | 16 | 25 | 25 |  |  | 25 | 25 | 25 | 25 | 25 | 25 |
| 26 | n41 | 15 |  | 16 | 25 | 25 |  |  | 25 | 25 | 25 | 25 | 25 | 25 |
| 26 | n77,  n78 | 15 |  | 16 | 25 | 25 |  |  | 25 | 25 | 25 | 25 | 25 | 25 |
| n28 | 1 | 15 | 8 | 16 | 25 | 25 |  |  |  |  |  |  |  |  |
| 28 | n51 | 15 | 12 |  |  |  |  |  |  |  |  |  |  |  |
| 28 | n77,  n78 | 15 |  | 10 | 15 | 20 |  |  | 25 | 25 | 25 | 25 | 25 | 25 |
| 66 | n78 | 15 |  | 25 | 36 | 50 |  |  | 100 | 100 | 100 | 100 | 100 | 100 |
| n71 | 2 | 15 | 254  85 | 254  85 | 204  85 | 204  85 |  |  |  |  |  |  |  |  |
| NOTE 1: The UL configuration applies regardless of the channel bandwidth of the UL band unless the UL resource blocks exceed that specified in Table 7.3.1-2 in TS 36.101 [4] or Table 7.3.2-3 in TS 38.101-1 [2] for the uplink bandwidth in which case the allocation according to Table 7.3.1-2 in TS 36.101 [4] or Table 7.3.2-3 in TS 38.101-1 [2] applies  NOTE 2: Void  NOTE 3: Unless stated otherwise, UL resource blocks shall be centred within the transmission bandwidth configuration for the channel bandwidth.  NOTE 4: These requirements apply when the lower edge frequency of the 5 MHz uplink channel in Band 71 is located at or below 668 MHz and the downlink channel in Band 2 is located with its upper edge at 1990 MHz.  NOTE 5: These requirements apply when the lower edge frequency of the 10 MHz, 15 MHz, or 20 MHz uplink channel in Band 71 is located at or below 668 MHz and the downlink channel in Band 2 is located with its upper edge at 1990 MHz.  NOTE 6: If the aggressor band is NR band, the test SCS and UL RB can be adjusted according to supported BW and lowest SCS supported by the UE | | | | | | | | | | | | | | |

##### 7.3B.2.3.2 Reference sensitivity exceptions due to receiver harmonic mixing for EN-DC in NR FR1

Sensitivity degradation is allowed for a band if it is impacted by receiver harmonic mixing due to another band part of the same EN-DC configuration. Reference sensitivity exceptions for the victim band (low) are specified in Table 7.3B.2.3.2-1 with uplink configuration of the agressor band (high) specified in Table 7.3B.2.3.2-2.

Table 7.3B.2.3.2-1: Reference sensitivity exceptions (MSD) due to receiver harmonic mixing for EN-DC in NR FR1

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| E-UTRA or NR Band / Channel bandwidth of the affected DL band / MSD | | | | | | | | | | | | |
| UL band | DL band | 5  MHz  (dB) | 10 MHz  (dB) | 15 MHz  (dB) | 20 MHz  (dB) | 25 MHz  (dB) | 40 MHz  (dB) | 50 MHz  (dB) | 60 MHz  (dB) | 80 MHz  (dB) | 90 MHz  (dB) | 100 MHz  (dB) |
| 2 | n714 | 26.8 | 23.6 | 21.2 | 15.6 |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |  |  |
| n41 | 264 | 24.3 | 24.3 | 22.5 | N/A |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |  |  |
| n77 | 3 | 5.7 | 4.0 | 3.0 | 2.7 |  |  |  |  |  |  |  |
| n78 | 3 | 5.7 | 4.0 | 3.0 | 2.7 |  |  |  |  |  |  |  |
| n77 | 418 | 10.4 | 10.4 | 10.4 | 10.4 |  |  |  |  |  |  |  |
| n77 | 282 | 28 | 25 | 23.2 | 22 |  |  |  |  |  |  |  |
| n78 | 418 | 10.4 | 10.4 | 10.4 | 10.4 |  |  |  |  |  |  |  |
| n79 | 114 | 39.3 | 36.3 | 34.5 |  |  |  |  |  |  |  |  |
| n79 | 192 | 29.5 | 26.5 | 24.7 |  |  |  |  |  |  |  |  |
| n79 | 214 | 39.3 | 36.3 | 34.5 |  |  |  |  |  |  |  |  |
| n79 | 262 | 27 | 24 | 22.2 |  |  |  |  |  |  |  |  |
| NOTE 1: These requirements apply when there is at least one individual RE within the uplink transmission bandwidth of the aggressor (higher) band for which the mixing product due to harmonic of victim (lower) band LO with leakage of aggressor (higher) band is within the downlink transmission bandwidth of a victim (lower) band.  NOTE 2: The requirements should be verified for DL EARFCN of the victim (lower) band (superscript LB) such that  with  the DL carrier frequency in the lower band and the UL carrier frequency in the higher band, both in MHz.  NOTE 3: Void  NOTE 4: The requirements should be verified for DL EARFCN or NR‑ARFCN of the victim (lower) band (superscript LB) such that  with  the DL carrier frequency in the lower band and the UL carrier frequency in the higher band, both in MHz.  NOTE 5: Void  NOTE 6: Void  NOTE 7: Void  NOTE 8: The requirements should be verified for DL EARFCN of the victim (lower) band (superscript LB) such that with the DL carrier frequency in the lower band and the UL carrier frequency in the higher band, both in MHz.  NOTE 9: MSD test point can be chosen according to supported BW and lowest SCS supported by the UE. | | | | | | | | | | | | |

Table 7.3B.2.3.2-2: Uplink configuration for reference sensitivity exceptions due to receiver harmonic mixing for EN-DC in NR FR1

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| E-UTRA or NR Band / SCS / Channel bandwidth of the affected DL band / UL RB allocation of the agressor band | | | | | | | | | | | | | |
| UL band | DL band | SCS of UL band  (kHz) | 5 MHz  (LCRB) | 10 MHz  (LCRB) | 15 MHz  (LCRB) | 20 MHz  (LCRB) | 25 MHz  (LCRB) | 40 MHz  (LCRB) | 50 MHz  (LCRB) | 60 MHz  (LCRB) | 80 MHz  (LCRB) | 90 MHz  (LCRB) | 100 MHz  (LCRB) |
| 2 | n71 | 15 | 25 | 50 | 50 | 50 |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| n41 | 26 | 15 | 25 | 50 | 75 |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| n77 | 3 | 15 | 25 | 50 | 75 | 100 |  |  |  |  |  |  |  |
| n78 | 3 | 15 | 25 | 50 | 75 | 100 |  |  |  |  |  |  |  |
| n77 | 28 | 15 | 25 | 50 | 75 | 100 |  |  |  |  |  |  |  |
| n77 | 41 | 15 | 12 | 25 | 36 | 50 |  |  |  |  |  |  |  |
| n78 | 41 | 15 | 12 | 25 | 36 | 50 |  |  |  |  |  |  |  |
| n79 | 11 | 15 | 25 | 50 | 75 |  |  |  |  |  |  |  |  |
| n79 | 19 | 15 | 25 | 50 | 75 |  |  |  |  |  |  |  |  |
| n79 | 21 | 15 | 25 | 50 | 75 |  |  |  |  |  |  |  |  |
| n79 | 26 | 15 | 25 | 50 | 75 |  |  |  |  |  |  |  |  |
| NOTE 1: Void  NOTE 2: Void  NOTE 3: The UL configuration applies regardless of the channel bandwidth of the UL band. UL resource blocks allocation in the table shall be further limited to that specified in Table 7.3.1-2 in TS 36.101 [4] or Table 7.3.2-3 in TS 38.101-1 [2].  NOTE 4: Unless otherwise stated, the UL resource blocks allocation is applied at the center of the channel bandwidth. The note applies to the entire table.  NOTE 5: If the aggressor band is NR band, the test SCS and UL RB can be adjusted according to supported BW and lowest SCS supported by the UE. | | | | | | | | | | | | | |

##### 7.3B.2.3.3 Void

##### 7.3B.2.3.4 Reference sensitivity exceptions due to cross band isolation for EN-DC in NR FR1

Sensitivity degradation is allowed for a band if it is impacted by UL of another band part of the same EN-DC configuration due to cross band isolation issues. Reference sensitivity exceptions for the victim band are specified in Table 7.3B.2.3.4-1 with uplink configuration of the agressor band specified in Table 7.3B.2.3.4-2.

Table 7.3B.2.3.4-1: Reference sensitivity exceptions (MSD) due to cross band isolation for EN-DC in NR FR1

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | E-UTRA or NR Band / Channel bandwidth of the affected DL band / MSD | | | | | | | | | | | | |
| UL band | DL band | 5 MHz  (dB) | 10 MHz  (dB) | 15 MHz  (dB) | 20 MHz  (dB) | 25 MHz  (dB) | 30 MHz  (dB) | 40 MHz  (dB) | 50 MHz  (dB) | 60 MHz  (dB) | 80 MHz  (dB) | 90 MHz  (dB) | 100 MHz  (dB) |
| 1 | n40 | 6.6 | 6.6 | 6.6 | 6.6 | 6.6 | 6.6 | 6.6 | 6.6 | 6.6 | 6.6 |  |  |
| n40 | 1 | 8.3 | 8.3 | 8.3 | 8.3 |  |  |  |  |  |  |  |  |
| n41 | 25 | 0.6 | 0.6 | 0.6 | 0.6 |  |  |  |  |  |  |  |  |
| n77 | 411 | 4.5 | 4.5 | 4.5 | 4.5 |  |  |  |  |  |  |  |  |
| 41 | n77 |  | 8.3 | 8.3 | 8.3 |  |  | 6.3 | 5.3 | 4.5 | 4.0 | 3.9 | 3.8 |
| 3 | n51 | 6.4 |  |  |  |  |  |  |  |  |  |  |  |
| 30 | n66 | 8.3 | 8.3 | 8.3 | 8.3 |  |  | 8.3 |  |  |  |  |  |
| n78 | 71 | 4.5 | 4.5 | 4.5 | 4.5 |  |  |  |  |  |  |  |  |
| n78 | 38 | 3.3 | 3.3 | 3.3 | 3.3 |  |  |  |  |  |  |  |  |
| n78 | 411 | 4.5 | 4.5 | 4.5 | 4.5 |  |  |  |  |  |  |  |  |
| n78 | 46 |  |  |  | 7 |  |  |  |  |  |  |  |  |
| 41 | n78 |  | 8.3 | 8.3 | 8.3 |  |  | 6.3 | 5.3 | 4.5 | 4.0 | 3.9 | 3.8 |
| n79 | 424 | 2.8 | 2.8 | 2.8 | 2.8 |  |  |  |  |  |  |  |  |
| NOTE 1: Applicable only when harmonic mixing MSD for this combination is not applied.  NOTE 2: The DL victim band should be configured using the lowest SCS that is compatible with the highest CBW for which an MSD is specified.  NOTE 3: MSD test point can be chosen according to supported BW and lowest SCS supported by the UE.  NOTE 4: The requirements only apply for UEs supporting inter-band DC\_42\_n79 ENDC with simultaneous Rx/Tx capability. Simultaneous Rx/Tx capability does not apply for UEs supporting band 42 with a n77 implementation only. These restrictions are applicable to related higher order configurations. | | | | | | | | | | | | | |

Table 7.3B.2.3.4-2: Uplink configuration for reference sensitivity exceptions due to cross band isolation for EN-DC in NR FR1

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | | E-UTRA or NR Band / SCS / Channel bandwidth of the affected DL band / UL RB allocation of the agressor band | | | | | | | | | | | | | |
| UL band | DL band | | SCS of UL band (kHz) | 5 MHz  (LCRB) | 10 MHz  (LCRB) | 15 MHz  (LCRB) | 20 MHz  (LCRB) | 25 MHz  (LCRB) | 30 MHz  (LCRB) | 40 MHz  (LCRB) | 50 MHz  (LCRB) | 60 MHz  (LCRB) | 80 MHz  (LCRB) | 90 MHz  (LCRB) | 100 MHz  (LCRB) |
| 1 | n40 | | 15 | 25 | 50 | 75 | 100 | 100 | 100 | 100 | 100 | 100 | 100 |  |  |
| n40 | 1 | | 15 | 25 | 50 | 75 | 100 |  |  |  |  |  |  |  |  |
| n41 | 25 | | 30 | 160 | 160 | 160 | 160 |  |  |  |  |  |  |  |  |
| n77 | 41 | | 30 | 270 | 270 | 270 | 270 |  |  |  |  |  |  |  |  |
| 41 | n77 | | 15 |  | 100 | 100 | 100 |  |  | 100 | 100 | 100 | 100 | 100 | 100 |
| 3 | n51 | | 15 | 25 |  |  |  |  |  |  |  |  |  |  |  |
| 30 | n66 | | 15 | 25 | 25 | 25 | 25 |  |  | 25 |  |  |  |  |  |
| n78 | 7 | | 30 | 270 | 270 | 270 | 270 |  |  |  |  |  |  |  |  |
| n78 | 38 | | 30 | 270 | 270 | 270 | 270 |  |  |  |  |  |  |  |  |
| n78 | 41 | | 30 | 270 | 270 | 270 | 270 |  |  |  |  |  |  |  |  |
| n78 | 46 | | 30 |  |  |  | 270 |  |  |  |  |  |  |  |  |
| 41 | n78 | | 15 |  | 100 | 100 | 100 |  |  | 100 | 100 | 100 | 100 | 100 | 100 |
| n79 | 42 | | 30 | 2704 | 2704 | 2704 | 2704 |  |  |  |  |  |  |  |  |
| NOTE 1: The UL configuration applies regardless of the channel bandwidth of the UL band. UL resource blocks allocation in the table shall be further limited to that specified in Table 7.3.1-2 in TS 36.101 [4] or Table 7.3.2-3 in TS 38.101-1 [2].  NOTE 2: When the maximum UL RB allocation "LCRB" value is less than the maximum transmission bandwidth configuration "NRB" defined in Table 5.3.2-1 in 38.101-1 [2] for the specified UL band SCS, the UL band should be configured using the lowest CBW that is compatible with the maximum specified LCRB value.  NOTE 3: If the aggressor band is NR band, the test SCS and UL RB can be adjusted according to supported BW and lowest SCS supported by the UE.  NOTE 4: The requirements only apply for UEs supporting inter-band ENDC with simultaneous Rx/Tx capability. Simultaneous Rx/Tx capability does not apply for UEs supporting band 42 with a n77 implementation only. These restrictions are applicable to related higher order configurations. | | | | | | | | | | | | | | | |

##### 7.3B.2.3.5 MSD for intermodulation interference due to dual uplink operation for EN-DC in NR FR1

For EN-DC configurations in NR FR1 the UE may indicate capability of not supporting simultaneous dual uplink operation due to possible intermodulation interference overlapping in frequency to its own primary downlink channel bandwidth if

- the intermodulation order is 2;

- the intermodulation order is 3 when both operating bands are between 450 MHz – 960 MHz or between 1427 MHz – 2690 MHz

In the case for EN-DC configurations in NR FR1 for which the intermodulation products caused by dual uplink operation do not interfere with its own primary downlink channel bandwidth as defined in Annex I the UE is mandated to operate in dual and triple uplink mode.

For EN-DC configurations in NR FR1 with uplink and downlink assigned to E-UTRA and NR FR1 bands given in Table 7.3B.2.3.5.1-1, Table 7.3B.2.3.5.2-0 and Table 7.3B.2.3.5.2-1 the reference sensitivity is defined only for the specific uplink and downlink test points specified in Table 7.3B.2.3.5.1-1, Table 7.3B.2.3.5.2-0 and Table 7.3B.2.3.5.2-1. For these test points the reference sensitivity levels specified in clause 7.3.1 in TS 36.101 [4] and 7.3.2 of TS 38.101-1 [2] for the corresponding channel bandwidths or in clause 7.3.1 of TS 36.101 [4] are relaxed by the amount of the parameter MSD given in Table 7.3B.2.3.5.1-1, Table 7.3B.2.3.5.2-0 and Table 7.3B.2.3.5.2-1.

The throughput on each of the CGs shall be ≥ 95% of the maximum throughput of the respective reference measurement channels as specified in Annex A of TS 38.101-1 [2] and Annex A of TS 36.101 [4], with parameters specified in Table 7.3B.2.3.5.1-1, Table 7.3B.2.3.5.2-0 and Table 7.3B.2.3.5.2-1 with dual UL transmissions overlapping in time unless otherwise stated.

###### 7.3B.2.3.5.1 MSD test points for intermodulation interference due to dual uplink operation for EN-DC in NR FR1 involving two bands

Table 7.3B.2.3.5.1-1: MSD test points for PCell due to dual uplink operation for EN-DC in NR FR1 (two bands)

| NR or E-UTRA Band / Channel bandwidth / NRB / MSD | | | | | | | |
| --- | --- | --- | --- | --- | --- | --- | --- |
| EN-DC  Configuration | EUTRA or NR band | UL Fc  (MHz) | UL/DL BW  (MHz) | UL  LCRB | DL Fc (MHz) | MSD  (dB) | IMD order |
| DC\_1A\_n77A | 1 | 1950 | 5 | 25 | 2140 | 29.8 | IMD23 |
| n77 | 4090 | 10 | 50 | 4090 | N/A | N/A |
| DC\_1A\_n77A, DC\_1A\_n78A,  DC\_1A\_SUL\_n78A-n84A | 1 | 1950 | 5 | 25 | 2140 | 8.0 | IMD43 |
| n77, n78 | 3710 | 10 | 50 | 3710 | N/A | N/A |
| DC\_2A\_n66A | 2 | 1855 | 5 | 25 | 1935 | 20 | IMD3 |
| n66 | 1775 | 5 | 25 | 2175 | N/A | N/A |
| DC\_2A\_n66A | 2 | 1883.3 | 5 | 25 | 1963.3 | N/A | N/A |
| n66 | 1750 | 5 | 25 | 2150 | 4 | IMD5 |
| DC\_2A\_n78A | 2 | 1855 | 5 | 25 | 1935 | 26 | IMD23 |
| n78 | 3790 | 10 | 50 | 3790 | N/A | N/A |
| DC\_2A\_n78A | 2 | 1885 | 5 | 25 | 1965 | 8.0 | IMD43 |
| n78 | 3690 | 10 | 50 | 3690 | N/A | N/A |
| DC\_3A\_n7A | 3 | 1730 | 5 | 25 | 1825 | N/A | N/A |
| n7 | 2535 | 10 | 50 | 2655 | 10.2 | IMD4 |
| DC\_3A\_n77A,  DC\_3A\_n78A,  DC\_3A-SUL\_n78A-n80A,  DC\_3C\_n78A | 3 | 1740 | 5 | 25 | 1835 | 26 | IMD23 |
| n77, n78 | 3575 | 10 | 50 | 3575 | N/A | N/A |
| DC\_3A\_n77A,  DC\_3A\_n78A, DC\_3A-SUL\_n78A-n80A,  DC\_3C\_n78A | 3 | 1765 | 5 | 25 | 1860 | 8.0 | IMD43 |
| n77, n78 | 3435 | 10 | 50 | 3435 | N/A | N/A |
| DC\_5A\_n66A | 5 | 838 | 5 | 25 | 883 | 30 | IMD23 |
| n66 | 1721 | 5 | 25 | 2121 | N/A | N/A |
| DC\_5A\_n78A | 5 | 844 | 5 | 25 | 889 | 8.3 | IMD4 |
| n78 | 3421 | 10 | 50 | 3421 | N/A | N/A |
| DC\_8A\_n77A,  DC\_8A\_n78A, DC\_8A-SUL\_n78A-n81A | 8 | 897.5 | 5 | 25 | 942.5 | 8.3 | IMD4 |
| n77, n78 | 3635 | 10 | 50 | 3635 | N/A | N/A |
| DC\_8A\_n79A, DC\_8A-SUL\_n79A-n81A | 8 | 897.5 | 5 | 25 | 942.5 | 4.8 | IMD5 |
| n79 | 4532.5 | 40 | 216 | 4532.5 | N/A | N/A |
| DC\_18A\_n77A  DC\_18A\_n78A | 18 | N/A | N/A | N/A | N/A | N/A | IMD4 |
| n77,  n78 | N/A | N/A | N/A | N/A | N/A | N/A |
| DC\_19A\_n78A | 19 | N/A | N/A | N/A | N/A | N/A | IMD4 |
| n78 | N/A | N/A | N/A | N/A | N/A | N/A |
| DC\_20A\_n8A | 20 | 849.5 | 5 | 25 | 808.5 | 25 | IMD3 |
| n8 | 892.5 | 5 | 25 | 937.5 | 25 | IMD3 |
| DC\_20A\_n77A,  DC\_20A\_n78A,  DC\_20A-SUL\_n78A-n82A | 20 | 850 | 5 | 25 | 809 | 11 | IMD4 |
| n77, n78 | 3359 | 10 | 50 | 3359 | N/A | N/A |
| DC\_20A\_n77A | 20 | 840 | 5 | 25 | 799 | 6.5 | IMD5 |
| n77 | 4159 | 10 | 50 | 4159 | N/A | N/A |
| DC\_21A\_n79A | 21 | 1457.5 | 5 | 25 | 1505.5 | 18.4 | IMD3 |
| n79 | 4420.5 | 40 | 216 | 4420.5 | N/A | N/A |
| DC\_26A\_n41A | 26 | 839 | 5 | 25 | 884 | 15.6 | IMD33 |
| n41 | 2562 | 10 | 50 | 2562 | N/A | N/A |
| DC\_28A\_n51A | 28 | 742.3 | 5 | 25 | 797.3 | 5 | IMD4 |
| n51 | 1429.5 | 5 | 25 | 1429.5 | N/A | N/A |
| DC\_26A\_n77A,  DC\_26A\_n78A | 26 | 836.5 | 5 | 25 | 881.5 | 11.1 | IMD4 |
| n77, n78 | 3391 | 10 | 50 | 3391 | N/A | N/A |
| DC\_28A\_n77A,  DC\_28A\_n78A, DC\_28A-SUL\_n78A-n83A | 28 | 705.5 | 5 | 25 | 760.5 | 5.5 | IMD5 |
| n77, n78 | 3582.5 | 10 | 50 | 3582.5 | N/A | N/A |
| DC\_66A\_n5A | n5 | 838 | 5 | 25 | 883 | 30 | IMD23 |
| 66 | 1721 | 5 | 25 | 2121 | N/A | N/A |
| DC\_66A\_n71A | 66 | 1750 | 5 | 25 | 2150 | 5 | IMD4 |
| n71 | 675 | 5 | 25 | 629 | N/A | N/A |
| DC\_66A\_n78A | 66 | 1730 | 5 | 25 | 2130 | 5.0 | IMD5 |
| n78 | 3660 | 5 | 50 | 3660 | N/A | N/A |
| NOTE 1: Both of the transmitters shall be set min(+20 dBm, PCMAX\_L,c) as defined in clause 6.2.5A.  NOTE 2: RBstart = 0  NOTE 3: This band is subject to IMD5 also which MSD is not specified.  NOTE 4: Void.  NOTE 5: Void  NOTE 6: For NR band, UL/DL BW and UL LCRB can be adjusted according to the supported BW and lowest SCS supported by the UE. | | | | | | | |

###### 7.3B.2.3.5.2 MSD test points for intermodulation interference due to dual uplink operation for EN-DC in NR FR1 involving three bands

Table 7.3B.2.3.5.2-0: MSD test points for Pcell due to dual uplink operation for EN-DC in NR FR1 (three bands)

| NR or E-UTRA Band / Channel bandwidth / NRB / MSD | | | | | | | |
| --- | --- | --- | --- | --- | --- | --- | --- |
| EN-DC Configuration | EUTRA/NR band | UL Fc  (MHz) | UL/DL BW  (MHz) | UL  LCRB | DL Fc (MHz) | MSD  (dB) | IMD order |
| DC\_66A\_(n)71AA | 66 | 1750 | 5 | 25 | 2150 | 5 | IMD4 |
| n71 | 678 | 10 | 10 (RBstart =0) | 632 | N/A | N/A |
| NOTE 1: For NR band, UL/DL BW and UL LCRB can be adjusted according to the supported BW and lowest SCS supported by the UE. | | | | | | | |

Table 7.3B.2.3.5.2-1: MSD test points for Scell due to dual uplink operation for EN-DC in NR FR1 (three bands)

| NR or E-UTRA Band / Channel bandwidth / NRB / MSD | | | | | | | |
| --- | --- | --- | --- | --- | --- | --- | --- |
| EN-DC Configuration | EUTRA / NR band | UL Fc  (MHz) | UL/DL BW  (MHz) | UL  LCRB | DL Fc (MHz) | MSD  (dB) | IMD order |
| DC\_1A-3A\_n28A | 1 | 1975 | 5 | 25 | 2165 | N/A | N/A |
| n28 | 710.5 | 5 | 25 | 765.5 | N/A | N/A |
| 3 | 1723.5 | 5 | 25 | 1818.5 | 4.0 | IMD5 |
| DC\_1A-3A\_n28A | 3 | 1780 | 5 | 25 | 1875 | N/A | N/A |
| n28 | 710.5 | 5 | 25 | 765.5 | N/A | N/A |
| 1 | 1949 | 5 | 25 | 2139 | 11.0 | IMD4 |
| DC\_1A-7A\_n28A | 1 | 1935 | 5 | 25 | 2125 | N/A | N/A |
| n28 | 718 | 5 | 25 | 773 | N/A | N/A |
| 7 | 2533 | 10 | 50 | 2653 | 30.0 | IMD2 |
| DC\_1A-3A\_n77A  DC\_1A-3A\_n77C | 1 | 1950 | 5 | 25 | 2140 | N/A | N/A |
| 3 | 1712.5 | 5 | 25 | 1807.5 | 31.5 | IMD2 |
| n77 | 3757.5 | 10 | 50 | 3757.5 | N/A | N/A |
| 1 | 1950 | 5 | 25 | 2140 | N/A | N/A |
| 3 | 1775 | 5 | 25 | 1870 | 8.5 | IMD4 |
| n77 | 3980 | 10 | 50 | 3980 | N/A | N/A |
| 1 | 1950 | 5 | 25 | 2140 | 31.0 | IMD2 |
| 3 | 1775 | 5 | 25 | 1870 | N/A | N/A |
| n77 | 3915 | 10 | 50 | 3915 | N/A | N/A |
| DC\_1A-3A\_n78A  DC\_1A-3A\_n78C  DC\_1A-3C\_n78A | 1 | 1950 | 5 | 25 | 2140 | N/A | N/A |
| 3 | 1712.5 | 5 | 25 | 1807.5 | 31.2 | IMD2 |
| n78 | 3757.5 | 10 | 50 | 3757.5 | N/A | N/A |
| 1 | 1935 | 5 | 25 | 2125 | 2.8 | IMD5 |
| 3 | 1775 | 5 | 25 | 1870 | N/A | N/A |
| n78 | 3725 | 10 | 50 | 3725 | N/A | N/A |
| DC\_1A-5A\_n78A | 1 | 1932 | 5 | 25 | 2122 | 18.1 | IMD3 |
| 5 | 829 | 5 | 25 | 874 | N/A | N/A |
| n78 | 3780 | 10 | 50 | 3780 | N/A | N/A |
| 1 | 1975 | 5 | 25 | 2165 | N/A | N/A |
| 5 | 840 | 5 | 25 | 885 | 3.1 | IMD5 |
| n78 | 3405 | 10 | 50 | 3405 | N/A | N/A |
| DC\_1A-7A\_n78A | 1 | 1977.5 | 5 | 25 | 2167.5 | N/A | N/A |
| 7 | 2507.5 | 5 | 25 | 2627.5 | 9.1 | IMD4 |
| n78 | 3305 | 10 | 50 | 3305 | N/A | N/A |
| 1 | 1950 | 5 | 25 | 2140 | 8.7 | IMD4 |
| 7 | 2510 | 10 | 50 | 2630 | N/A | N/A |
| n78 | 3580 | 10 | 50 | 3580 | N/A | N/A |
| DC\_1A-8A\_n78A | 1 | 1945 | 5 | 25 | 2135 | N/A | N/A |
| 8 | 900 | 5 | 25 | 945 | N/A | N/A |
| n78 | 3745 | 10 | 52 | 3745 | 14.9 | IMD3 |
| 1 | 1940 | 5 | 25 | 2130 | N/A | N/A |
| 8 | 895 | 5 | 25 | 940 | 3.3 | IMD5 |
| n78 | 3380 | 10 | 52 | 3330 | N/A | N/A |
| DC\_1A-3A\_n79A | 1 | 1950 | 5 | 25 | 2140 | 3.6 | IMD5 |
| 3 | 1750 | 5 | 25 | 1845 | N/A | N/A |
| n79 | 4860 | 40 | 216 | 4860 | N/A | N/A |
| DC\_1A-18A\_n77A | 1 | N/A | N/A | N/A | N/A | N/A | N/A |
| 18 | N/A | N/A | N/A | N/A | N/A | IMD5 |
| n77 | N/A | N/A | N/A | N/A | N/A | N/A |
| 1 | 1930 | 5 | 25 | 2120 | 16.4 | IMD3 |
| 18 | 825 | 5 | 25 | 870 | N/A | N/A |
| n77 | 3770 | 10 | 50 | 3770 | N/A | N/A |
| DC\_1A-18A\_n78A | 1 | N/A | N/A | N/A | N/A | N/A | N/A |
| 18 | N/A | N/A | N/A | N/A | N/A | IMD5 |
| n78 | N/A | N/A | N/A | N/A | N/A | N/A |
| 1 | 1930 | 5 | 25 | 2120 | 16.4 | IMD3 |
| 18 | 819 | 5 | 25 | 864 | N/A | N/A |
| n78 | 3758 | 10 | 50 | 3758 | N/A | N/A |
| DC\_1A-18A\_n79A | 1 | 1935 | 5 | 25 | 2125 | N/A | N/A |
| 18 | 822.5 | 5 | 25 | 867.5 | 18.3 | IMD3 |
| n79 | 4737.5 | 40 | 216 | 4737.5 | N/A | N/A |
| 1 | 1930 | 5 | 25 | 2120 | N/A | N/A |
| 18 | 820 | 5 | 25 | 865 | 8.9 | IMD4 |
| n79 | 4925 | 40 | 216 | 4925 | N/A | N/A |
| 1 | 1935 | 5 | 25 | 2125 | 8.1 | IMD4 |
| 18 | 822.5 | 5 | 25 | 867.5 | N/A | N/A |
| n79 | 4592.5 | 40 | 216 | 4592.5 | N/A | N/A |
| DC\_1A-19A\_n77A  DC\_1A-19A\_n78A | 1 | 1940 | 5 | 25 | 2130 | 17.8 | IMD3 |
| 19 | 832.5 | 5 | 25 | 877.5 | N/A | N/A |
| n77, n78 | 3795 | 10 | 50 | 3795 | N/A | N/A |
| 1 | N/A | N/A | N/A | N/A | N/A | N/A |
| 19 | N/A | N/A | N/A | N/A | N/A | IMD5 |
| n78 | N/A | N/A | N/A | N/A | N/A | N/A |
| DC\_1A-19A\_n79A | 1 | 1950 | 5 | 25 | 2140 | N/A | N/A |
| 19 | 837.5 | 5 | 25 | 882.5 | 18.3 | IMD3 |
| n79 | 4782.5 | 40 | 216 | 4782.5 | N/A | N/A |
| 1 | 1950 | 5 | 25 | 2140 | 8.1 | IMD4 |
| 19 | 837.5 | 5 | 25 | 882.5 | N/A | N/A |
| n79 | 4652.5 | 40 | 216 | 4652.5 | N/A | N/A |
| DC\_1A-20A\_n78A | 1 | 1930 | 5 | 25 | 2120 | 20.3 | IMD3 |
| 20 | 835 | 5 | 25 | 794 | N/A | N/A |
| n78 | 3790 | 10 | 50 | 3790 | N/A | N/A |
| DC\_1A-20A\_n78A | 1 | 1950 | 5 | 25 | 2140 | N/A | N/A |
| 20 | 851 | 5 | 25 | 810 | 3.0 | IMD5 |
| n78 | 3330 | 10 | 50 | 3330 | N/A | N/A |
| DC\_1A-21A\_n77A  DC\_1A-21A\_n78A | 1 | 1964.6 | 5 | 25 | 2154.6 | 30.6 | IMD2 |
| 21 | 1450.4 | 5 | 25 | 1498.4 | N/A | N/A |
| n77, n78 | 3605 | 10 | 50 | 3605 | N/A | N/A |
| 1 | N/A | N/A | N/A | N/A | N/A | N/A |
| 21 | N/A | N/A | N/A | N/A | N/A | IMD2 |
| n78 | N/A | N/A | N/A | N/A | N/A | N/A |
| 1 | 1950 | 5 | 25 | 2140 | N/A | N/A |
| 21 | 1452 | 5 | 25 | 1500 | 2.9 | IMD5 |
| n77, n78 | 3675 | 10 | 50 | 3675 | N/A | N/A |
| DC\_1A-21A\_n79A | 1 | N/A | N/A | N/A | N/A | N/A | N/A |
| 21 | N/A | N/A | N/A | N/A | N/A | IMD4 |
| n79 | N/A | N/A | N/A | N/A | N/A | N/A |
| DC\_1A-28A\_n77A | 1 | 1960 | 5 | 25 | 2150 | 15.8 | IMD3 |
| 28 | 740 | 5 | 25 | 795 | N/A | N/A |
| n77 | 3630 | 10 | 50 | 3630 | N/A | N/A |
| DC\_1A-28A\_n77A | 1 | 1960 | 5 | 25 | 2150 | N/A | N/A |
| 28 | 725 | 5 | 25 | 780 | 4.3 | IMD5 |
| n77 | 3330 | 10 | 50 | 3330 | N/A | N/A |
| DC\_1A-28A\_n78A | 1 | 1960 | 5 | 25 | 2150 | 15.7 | IMD3 |
| 28 | 740 | 5 | 25 | 795 | N/A | N/A |
| n78 | 3630 | 10 | 50 | 3630 | N/A | N/A |
| DC\_1A-28A\_n78A | 1 | 1970 | 5 | 25 | 2160 | N/A | N/A |
| 28 | 739 | 5 | 25 | 794 | 4.2 | IMD5 |
| n78 | 3352 | 10 | 50 | 3352 | N/A | N/A |
| DC\_1A\_n28A-n78A | 1 | 1950 | 5 | 25 | 2140 | N/A | N/A |
| n28 | 733 | 5 | 25 | 788 | N/A | N/A |
| n78 | 3416 | 10 | 50 | 3416 | 15.7 | IMD3 |
| 1 | 1950 | 5 | 25 | 2140 | N/A | N/A |
| n78 | 3320 | 10 | 50 | 3320 | N/A | N/A |
| n28 | 735 | 5 | 25 | 790 | 3.3 | IMD5 |
| DC\_1A-28A\_n79A | 1 | 1930 | 5 | 25 | 2120 | N/A | N/A |
| 28 | 733 | 5 | 25 | 788 | 15.2 | IMD3 |
| n79 | 4648 | 40 | 216 | 4648 | N/A | N/A |
| 1 | 1925 | 5 | 25 | 2115 | N/A | N/A |
| 28 | 740 | 5 | 25 | 795 | 10.0 | IMD4 |
| n79 | 4980 | 40 | 216 | 4980 | N/A | N/A |
| 1 | 1977.5 | 5 | 25 | 2167.5 | 1.2 | IMD4 |
| 28 | 745.5 | 5 | 25 | 800.5 | N/A | N/A |
| n79 | 4420 | 40 | 216 | 4420 | N/A | N/A |
| 1 | 1935 | 5 | 25 | 2125 | 4.5 | IMD5 |
| 28 | 718 | 5 | 25 | 773 | N/A | N/A |
| n79 | 4807 | 40 | 216 | 4807 | N/A | N/A |
| DC\_1A-41A\_n77A | 1 | 1970 | 5 | 25 | 2160 | N/A | N/A |
| n77 | 3400 | 10 | 50 | 3400 | N/A |
| 41 | 2510 | 5 | 25 | 2510 | 11.0 | IMD4 |
| 1 | 1950 | 5 | 25 | 2140 | 9.3 | IMD4 |
| n77 | 3710 | 10 | 50 | 3710 | N/A | N/A |
| 41 | 2640 | 5 | 25 | 2640 | N/A | N/A |
| 1 | 1930 | 5 | 25 | 2120 | N/A | N/A |
| n77 | 4150 | 10 | 50 | 4150 | N/A |
| 41 | 2510 | 5 | 25 | 2510 | 3.6 | IMD5 |
| DC\_1A-41A\_n78A | 1 | 1950 | 5 | 25 | 2140 | 9.3 | IMD4 |
| 41 | 2640 | 5 | 25 | 2640 | N/A | N/A |
| n78 | 3710 | 10 | 50 | 3710 | N/A | N/A |
| 1 | 1975 | 5 | 25 | 2165 | N/A | N/A |
| 41 | 2515 | 5 | 25 | 2515 | 12 | IMD4 |
| n78 | 3410 | 10 | 50 | 3410 | N/A | N/A |
| DC\_1A-41A\_n78A | 1 | 1955 | 5 | 25 | 2145 | 8.7 | IMD4 |
| 41 | 2507.5 | 10 | 50 | 2507.5 | N/A | N/A |
| n78 | 3580 | 10 | 50 | 3580 | N/A | N/A |
| DC\_1A-41A\_n79A | 1 | 1970 | 5 | 25 | 2160 | N/A | N/A |
| n79 | 4500 | 40 | 216 | 4500 | N/A |
| 41 | 2530 | 5 | 25 | 2530 | 29.4 | IMD2 |
| DC\_1A-42A\_n79A | 1 | 1977.5 | 5 | 25 | 2167.5 | N/A | N/A |
| n79 | 4420 | 40 | 216 | 4420 | N/A | N/A |
| 42 | 3490 | 5 | 25 | 3490 | 4.8 | IMD5 |
| 42 | 3402.5 | 5 | 25 | 3402.5 | N/A | N/A |
| n79 | 4640 | 40 | 216 | 4640 | N/A | N/A |
| 1 | 1975 | 5 | 25 | 2165 | 15.5 | IMD3 |
| 42 | 3450 | 5 | 25 | 3450 | N/A | N/A |
| n79 | 4520 | 40 | 216 | 4520 | N/A | N/A |
| 1 | 1950 | 5 | 25 | 2140 | 9.3 | IMD4 |
| DC\_1A\_n78A-n79A | 1 | 1950 | 5 | 25 | 2140 | N/A | N/A |
| n78 | 3410 | 10 | 50 | 3410 | N/A | N/A |
| n79 | 4870 | 40 | 216 | 4870 | 15.9 | IMD3 |
| 1 | 1950 | 5 | 25 | 2140 | N/A | N/A |
| n79 | 4670 | 40 | 216 | 4670 | N/A | N/A |
| n78 | 3490 | 10 | 50 | 3490 | 4.6 | IMD5 |
| DC\_2A-12A\_n66A | 2 | N/A | N/A | N/A | N/A | N/A | IMD4 |
| 12 | N/A | N/A | N/A | N/A | N/A | N/A |
| n66 | N/A | N/A | N/A | N/A | N/A | N/A |
| DC\_3A-5A\_n78A | 3 | N/A | N/A | N/A | N/A | N/A | IMD3 |
| 5 | N/A | N/A | N/A | N/A | N/A | N/A |
| n78 | N/A | N/A | N/A | N/A | N/A | N/A |
| DC\_3A-7A\_n28A | 3 | 1712.5 | 5 | 25 | 1807.5 | N/A | N/A |
| n28 | 743 | 5 | 25 | 798 | N/A | N/A |
| 7 | 2562 | 10 | 50 | 2682 | 16.9 | IMD3 |
| 7 | 2543 | 10 | 50 | 2663 | N/A | N/A |
| n28 | 710.5 | 5 | 25 | 765.5 | N/A | N/A |
| 3 | 1737.5 | 5 | 25 | 1832.5 | 26.0 | IMD2 |
| DC\_3A-7A\_n78A  DC\_3C-7A\_n78A DC\_3C-7C\_n78A | 3 | 1725 | 5 | 25 | 1820 | 17.6 | IMD3 |
| 7 | 2565 | 5 | 25 | 2685 | N/A | N/A |
| n78 | 3310 | 10 | 50 | 3310 | N/A | N/A |
| 3 | 1725 | 5 | 25 | 1820 | 8.6 | IMD4 |
| 7 | 2565 | 5 | 25 | 2685 | N/A | N/A |
| n78 | 3475 | 10 | 50 | 3475 | N/A | N/A |
| DC\_3A-8A\_n78A | 8 | 910 | 5 | 25 | 955 | N/A | N/A |
| n78 | 3640 | 10 | 50 | 3640 | N/A | N/A |
| 3 | 1725 | 5 | 25 | 1820 | 16.5 | IMD3 |
| DC\_3A-19A\_n78A | 3 | N/A | N/A | N/A | N/A | N/A | IMD3 |
| 19 | N/A | N/A | N/A | N/A | N/A | N/A |
| n78 | N/A | N/A | N/A | N/A | N/A | N/A |
| DC\_3A-19A\_n79A | 3 | 1775 | 5 | 25 | 1870 | N/A | N/A |
| 19 | 840 | 5 | 25 | 885 | 18.5 | IMD3 |
| n79 | 4435 | 40 | 216 | 4435 | N/A | N/A |
| 3 | 1782.5 | 5 | 25 | 1877.5 | 0.2 | IMD4 |
| 19 | 842.5 | 5 | 25 | 887.5 | N/A | N/A |
| n79 | 4420 | 40 | 216 | 4420 | N/A | N/A |
| DC\_3A-20A\_n28A | 20 | 852 | 5 | 25 | 811 | N/A | N/A |
| n28 | 728 | 5 | 25 | 783 | N/A | N/A |
| 3 | 1733 | 5 | 25 | 1828 | 9.4 | IMD4 |
| DC\_3A-20A\_n78A  DC\_3C-20A\_n78A | 3 | 1725 | 5 | 25 | 1820 | 17.3 | IMD3 |
| 20 | 845 | 5 | 25 | 804 | N/A | N/A |
| n78 | 3510 | 10 | 50 | 3510 | N/A | N/A |
| DC\_3A-21A\_n77A  DC\_3A-21A\_n78A | 3 | 1767.5 | 5 | 25 | 1862.5 | N/A | N/A |
| 21 | 1459.5 | 5 | 25 | 1507.5 | 8.8 | IMD4 |
| n77, n78 | 3795 | 10 | 50 | 3795 | N/A | N/A |
| 3 | N/A | N/A | N/A | N/A | N/A | IMD2 |
| 21 | N/A | N/A | N/A | N/A | N/A | N/A |
| n78 | N/A | N/A | N/A | N/A | N/A | N/A |
| DC\_3A-21A\_n77A | 3 | 1771.6 | 5 | 25 | 1866.6 | 3.4 | IMD5 |
| 21 | 1450.4 | 5 | 25 | 1498.4 | N/A | N/A |
| n77 | 3935 | 10 | 50 | 3935 | N/A | N/A |
| DC\_3A-21A\_n79A | 3 | N/A | N/A | N/A | N/A | N/A | N/A |
| 21 | N/A | N/A | N/A | N/A | N/A | IMD3 |
| n79 | N/A | N/A | N/A | N/A | N/A | N/A |
| 3 | 1774.2 | 5 | 25 | 1869.2 | 17.8 | IMD3 |
| 21 | 1450.4 | 5 | 25 | 1498.4 | N/A | N/A |
| n79 | 4770 | 40 | 216 | 4770 | N/A | N/A |
| DC\_3A-28A\_n77A | 3 | 1712.5 | 5 | 25 | 1807.5 | N/A | N/A |
| 28 | 715 | 5 | 25 | 770 | 15.3 | IMD3 |
| n77 | 4195 | 10 | 50 | 4195 | N/A | N/A |
| 3 | 1755 | 5 | 25 | 1850 | 17.0 | IMD3 |
| 28 | 735 | 5 | 25 | 790 | N/A | N/A |
| n77 | 3320 | 10 | 50 | 3320 | N/A | N/A |
| DC\_3A-28A\_n78A | 3 | 1775 | 5 | 25 | 1870 | 17.3 | IMD3 |
| 28 | 740 | 5 | 25 | 760 | N/A | N/A |
| n78 | 3350 | 10 | 25 | 3350 | N/A | N/A |
| DC\_3A-28A\_n79A | 3 | 1770 | 5 | 25 | 1865 | N/A | N/A |
| 28 | 725 | 5 | 25 | 780 | 10.3 | IMD4 |
| n79 | 4530 | 40 | 216 | 4530 | N/A | N/A |
| 3 | 1775 | 5 | 25 | 1870 | 5.7 | IMD5 |
| 28 | 725 | 5 | 25 | 780 | N/A | N/A |
| n79 | 4770 | 40 | 216 | 4770 | N/A | N/A |
| DC\_3A\_n28A-n78A | 3 | 1750 | 5 | 25 | 1845 | N/A | N/A |
| n28 | 743 | 5 | 25 | 798 | N/A | N/A |
| n78 | 3764 | 10 | 50 | 3764 | 4.5 | IMD5 |
| DC\_3A-41A\_n78A | 41 | 2620 | 5 | 25 | 2620 | N/A | N/A |
| n78 | 3400 | 10 | 50 | 3400 | N/A | N/A |
| 3 | 1745 | 5 | 25 | 1840 | 16.4 | IMD3 |
| DC\_3A\_n78A-n79A | 3 | 1770 | 5 | 25 | 1865 | N/A | N/A |
| n78 | 3340 | 10 | 50 | 3340 | N/A | N/A |
| n79 | 4910 | 40 | 216 | 4910 | 16.3 | IMD3 |
| 3 | 1770 | 5 | 25 | 1865 | N/A | N/A |
| n79 | 4510 | 40 | 216 | 4510 | N/A | N/A |
| n78 | 3710 | 10 | 50 | 3710 | 4.2 | IMD5 |
| DC\_3A-SUL\_n78A-n82A | 3 | 1775 | 5 | 25 | 1870 | 4 | IMD4 |
| n82 | 840 | 5 | 25 |  | N/A | N/A |
| DC\_3A-21A\_n79A | 3 | 1774.2 | 5 | 25 | 1869.2 | 17.8 | IMD3 |
| 21 | 1450.4 | 5 | 25 | 1498.4 | N/A | N/A |
| n79 | 4770 | 40 | 216 | 4770 | N/A | N/A |
| DC\_5A-7A\_n78A | 5 | 844 | 5 | 25 | 889 | N/A | N/A |
| 7 | 2525 | 5 | 25 | 2645 | 30.1 | IMD2 |
| n78 | 3489 | 10 | 50 | 3489 | N/A | N/A |
| 5 | 834 | 5 | 25 | 879 | 30.2 | IMD2 |
| 7 | 2550 | 5 | 25 | 2670 | N/A | N/A |
| n78 | 3429 | 10 | 50 | 3429 | N/A | N/A |
| 5 | 830 | 5 | 25 | 875 | 3.3 | IMD5 |
| 7 | 2525 | 5 | 25 | 2645 | N/A | N/A |
| n78 | 3350 | 10 | 50 | 3350 | N/A | N/A |
| DC\_5A\_41A\_n78A | 5 | 860 | 5 | 25 | 885 | 30.2 | IMD2 |
| 41 | 2615 | 5 | 25 | 2615 | N/A | N/A |
| n78 | 3500 | 10 | 50 | 3500 | N/A | N/A |
| 5 | 856.5 | 5 | 25 | 881.5 | 3.1 | IMD5 |
| 41 | 2620.5 | 5 | 25 | 2620.5 | N/A | N/A |
| n78 | 3490 | 10 | 50 | 3490 | N/A | N/A |
| DC\_7A-20A\_n28A | 20 | 842 | 5 | 25 | 801 | N/A | N/A |
| n28 | 728 | 5 | 25 | 783 | N/A | N/A |
| 7 | 2520 | 10 | 50 | 2640 | 5.9 | IMD5 |
| DC\_7A-20A\_n78A | 7 | 2560 | 5 | 25 | 2680 | N/A | N/A |
| 20 | 851 | 5 | 25 | 810 | 30.5 | IMD2 |
| n78 | 3370 | 10 | 50 | 3370 | N/A | N/A |
| DC\_7A-20A\_n78A | 7 | 2560 | 5 | 25 | 2680 | N/A | N/A |
| 20 | 851 | 5 | 25 | 810 | 3.0 | IMD5 |
| n78 | 3435 | 10 | 50 | 3435 | N/A | N/A |
| DC\_7A-20A\_n78A | 7 | 2555 | 5 | 25 | 2675 | 30.8 | IMD2 |
| 20 | 845 | 5 | 25 | 804 | N/A | N/A |
| n78 | 3520 | 10 | 50 | 3520 | N/A | N/A |
| DC\_7A-28A\_n78A | 7 | 2567.5 | 5 | 25 | 2687.5 | N/A | N/A |
| 28 | 727.5 | 5 | 25 | 782.5 | 28.8 | IMD2 |
| n78 | 3350 | 10 | 50 | 3350 | N/A | N/A |
| 7 | 2567.5 | 5 | 25 | 2687.5 | N/A | N/A |
| 28 | 727.5 | 5 | 25 | 782.5 | 3.0 | IMD5 |
| n78 | 3460 | 10 | 50 | 3460 | N/A | N/A |
| 7 | 2530 | 5 | 25 | 2650 | 30.5 | IMD2 |
| 28 | 740 | 5 | 25 | 795 | N/A | N/A |
| n78 | 3390 | 10 | 50 | 3390 | N/A | N/A |
| DC\_7A\_n28A-n78A | 7 | 2565 | 5 | 25 | 2685 | N/A | N/A |
| n28 | 745 | 5 | 25 | 800 | N/A | N/A |
| n78 | 3310 | 10 | 50 | 3310 | 29.7 | IMD2 |
| 7 | 2565 | 5 | 25 | 2685 | N/A | N/A |
| n78 | 3365 | 10 | 50 | 3365 | N/A | N/A |
| n28 | 745 | 5 | 25 | 800 | 28.8 | IMD2 |
| DC\_7A-46A\_n78A6 | 7 | N/A | N/A | N/A | N/A | N/A | N/A |
| 46 | N/A | N/A | N/A | N/A | N/A | IMD2, IMD5 |
| n78 | N/A | N/A | N/A | N/A | N/A | N/A |
| DC\_18A-28A\_n77A | 18 | 820 | 5 | 25 | 865 | N/A | N/A |
| 28 | 723 | 5 | 25 | 778 | 4.4 | IMD5 |
| n77 | 4058 | 10 | 50 | 4058 | N/A | N/A |
| DC\_18A-28A\_n77A | 18 | 820 | 5 | 25 | 865 | 3.9 | IMD5 |
| 28 | 723 | 5 | 25 | 778 | N/A | N/A |
| n77 | 3757 | 10 | 50 | 3757 | N/A | N/A |
| DC\_18A-28A\_n78A | 18 | 819 | 5 | 25 | 864 | 3.8 | IMD5 |
| 28 | 723 | 5 | 25 | 778 | N/A | N/A |
| n78 | 3756 | 10 | 50 | 3756 | N/A | N/A |
| DC\_19A-21A\_n77A  DC\_19A-21A\_n78A | 19 | 837.5 | 5 | 25 | 882.5 | 18.7 | IMD3 |
| 21 | 1450.4 | 5 | 25 | 1498.4 | N/A | N/A |
| n77, n78 | 3783.3 | 10 | 50 | 3783.3 | N/A | N/A |
| DC\_19A-21A\_n77A | 19 | 837.5 | 5 | 25 | 882.5 | N/A | N/A |
| 21 | 1454.5 | 5 | 25 | 1502.5 | 9.0 | IMD4 |
| n77 | 4015 | 10 | 50 | 4015 | N/A | N/A |
| DC\_19A-21A\_n79A | 19 | N/A | N/A | N/A | N/A | N/A | IMD5 |
| 21 | N/A | N/A | N/A | N/A | N/A | N/A |
| n79 | N/A | N/A | N/A | N/A | N/A | N/A |
| 19 | 837.5 | 5 | 25 | 882.2 | N/A | N/A |
| 21 | 1452 | 5 | 25 | 1500 | 3.8 | IMD5 |
| n79 | 4850 | 40 | 216 | 4850 | N/A | N/A |
| DC\_21A-28A\_n77A | 21 | 1452 | 5 | 25 | 1500 | N/A | N/A |
| 28 | 730.5 | 5 | 25 | 785.5 | 16.9 | IMD3 |
| n77 | 3689.5 | 10 | 50 | 3689.5 | N/A | N/A |
| 21 | 1450.5 | 5 | 25 | 1498.5 | 9.9 | IMD4 |
| 28 | 730.5 | 5 | 25 | 785.5 | N/A | N/A |
| n77 | 3690 | 10 | 50 | 3690 | N/A | N/A |
| DC\_21A-28A\_n79A | 21 | 1450 | 5 | 25 | 1498 | 5.2 | IMD5 |
| 28 | 730.5 | 5 | 25 | 785.5 | N/A | N/A |
| n79 | 4420 | 40 | 216 | 4420 | N/A | N/A |
| DC\_28A-42A\_79A | 28 | 730 | 5 | 25 | 785 | N/A | N/A |
| 42 | 3420 | 5 | 25 | 3420 | 15.3 | IMD3 |
| n79 | 4880 | 40 | 216 | 4880 | N/A | N/A |
| 28 | 745 | 5 | 25 | 800 | 16.2 | IMD2 |
| 42 | 3597.5 | 5 | 25 | 3597.5 | N/A | N/A |
| n79 | 4420 | 40 | 216 | 4420 | N/A | N/A |
| DC\_19A\_n78A-n79A | 19 | 835 | 5 | 25 | 880 | N/A | N/A |
| n78 | 3680 | 10 | 50 | 3680 | N/A | N/A |
| n79 | 4515 | 40 | 216 | 4515 | 29.3 | IMD2 |
| 19 | 835 | 5 | 25 | 880 | N/A | N/A |
| n79 | 4550 | 40 | 216 | 4550 | N/A | N/A |
| n78 | 3715 | 10 | 50 | 3715 | 28.8 | IMD2 |
| DC\_20A\_n28A-n78A, DC\_20A\_SUL\_n78A-n83A | 20 | 857 | 5 | 25 | 816 | N/A | N/A |
| n28, n83 | 743 | 5 | 25 | 798 | N/A | N/A |
| n78 | 3314 | 10 | 50 | 3314 | 8.7 | IMD4 |
| 20 | 837 | 5 | 25 | 796 | N/A | N/A |
| n78 | 3310 | 10 | 50 | 3310 | N/A | N/A |
| n28 | 744 | 5 | 25 | 799 | 9.4 | IMD4 |
| DC\_21A\_n78A-n79A | 21 | 1453 | 5 | 25 | 1501 | N/A | N/A |
| n78 | 3420 | 10 | 50 | 3420 | N/A | N/A |
| n79 | 4873 | 40 | 216 | 4873 | 30.1 | IMD2 |
| 21 | 1453 | 5 | 25 | 1501 | N/A | N/A |
| n79 | 4940 | 40 | 216 | 4940 | N/A | N/A |
| n78 | 3487 | 10 | 50 | 3487 | 29.8 | IMD2 |
| NOTE 1: For NR band, UL/DL BW and UL LCRB can be adjusted according to the supported BW and lowest SCS supported by the UE. | | | | | | | |

###### 7.3B.2.3.5.3 Void

##### 7.3B.2.3.6 Reference sensitivity exceptions due to Tx non-linearity interference in 1st or 2nd adjacent channel of UL band for EN-DC in NR FR1

Sensitivity degradation is allowed for a band if it is impacted by Tx non-linearity interference in 1st or 2nd adjacent channel from another UL band part of the same EN-DC configuration. Reference sensitivity exceptions for the victim band (DL band) are specified in Table 7.3B.2.3.6-1 with uplink configuration of the aggressor band (UL band) specified in Table 7.3B.2.3.6-1.

Table 7.3B.2.3.6-1: Reference sensitivity exceptions (MSD) due to Tx non-linearity interference in 1st or 2nd adjacent channel of UL band for EN-DC in NR FR1

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| UL band | DL band | SCS of UL band (kHz) | LCRB of UL band | Applicable UL BW(MHz) | MSD value of DL band (dB) | The adjacent channel of UL band |
| n40 | 1 | 30 | 25 | ≥ 70 | 21.5 | 2nd adjacent channel |
| NOTE 1: For interference in 2nd adjacent channel, the MSD exceptions are applicable to the case that interference located in 2nd adjacent channel of UL band falls into the DL channels. (The victim frequency of DL band can be expressed as , where is the centre frequency of UL channel and is the allocated transmission frequency of UL band). | | | | | | |

#### 7.3B.2.3a Inter-band NE-DC within FR1

Reference sensitivity exceptions are specified for the condition when there is uplink transmission only in the aggressor band. This clause addresses directly only NE-DC configurations that don't have a corresponding specified EN-DC configuration or specific NE-DC exceptions.

##### 7.3B.2.3a.1 Reference sensitivity exceptions due to UL harmonic interference for NE-DC in NR FR1

Sensitivity degradation is allowed for a band if it is impacted by UL harmonic interference from another band part of the same NE-DC configuration. For the NE-DC cconfigurations that have an EN-DC defined configuration, the reference sensitivity exceptions for the victim band (high) are specified in Table 7.3B.2.3.1-1 with uplink configuration of the aggressor band (low) specified in Table 7.3B.2.3.1-2 are applicable.

#### 7.3B.2.4 Inter-band EN-DC including FR2

##### 7.3B.2.4.1 Void

#### 7.3B.2.5 Inter-band EN-DC including both FR1 and FR2

##### 7.3B.2.5.1 Reference sensitivity exceptions due to UL harmonic interference for EN-DC including both FR1 and FR2

For inter-band EN-DC of E-UTRA and NR in both FR1 and FR2, the UE is allowed to apply each sensitivity degradation for EN-DC in FR1 specified in clause 7.3B.2.3 TS 38.101-3 and for EN-DC including FR2 specified in clause 7.3B.2.3 of TS 38.101-3 independently.

### 7.3B.3 ΔRIB,c, ΔRIBNC for DC

#### 7.3B.3.0 General

For the UE which supports inter-band EN-DC or NE-DC configuration, the minimum requirement for reference sensitivity in Table 7.3.1-1 and Table 7.3.1-1a in TS 36.101 [4], clause 7.3.2, 7.3A.2, 7.3C.2 in TS 38.101-1 [2] and clause 7.3.2, 7.3A.2 in TS 38.101-2 [3] shall be increased by the amount given in ΔRIB,c, ΔRIBNC in Tables below where unless otherwise stated, the same ΔRIB,c, ΔRIBNC are applicable to NR band(s) part for DC configurations which have the same NR operating band combination. Unless otherwise stated, ΔRIB,c or ΔRIBNC is set to zero.

In case the UE supports more than one of band combinations for CA, SUL or DC, and an operating band belongs to more than one band combinations then

- When the operating band frequency range is ≤ 1 GHz, the applicable additional ΔRIB,c shall be the average value for all band combinations defined in clause 7.3A, 7.3B, 7.3C in this specification and 7.3A, 7.3B in TS 38.101-3 [3], truncated to one decimal place that apply for that operating band among the supported band combinations. In case there is a harmonic relation between low band UL and high band DL, then the maximum ΔRIB,c among the different supported band combinations involving such band shall be applied

- When the operating band frequency range is > 1 GHz, the applicable additional ΔRIB,c shall be the maximum value for all band combinations defined in clause 7.3A, 7.3B, 7.3C in this specification and 7.3A, 7.3B in TS 38.101-3 [3] for the applicable operating bands.

Unless ΔRIB,c is specified for the NE-DC configuration, the specified ΔRIB,c for the EN-DC configuration including same bands as the corresponding NE-DC configuration is applicable for the NE-DC configuration.

#### 7.3B.3.1 Intra-band contiguous EN-DC

#### 7.3B.3.2 Intra-band non-contiguous EN-DC

Table 7.3B.3.2-1: Intra-band non-contiguous EN-DC with one uplink configuration on E-UTRA for reference sensitivity

| DC configuration | Aggregated channel bandwidth | | Wgap / (MHz) | UL E-UTRA allocation | ΔRIBNC (dB) | Duplex mode |
| --- | --- | --- | --- | --- | --- | --- |
| E-UTRA | NR |
| DC\_3A\_n3A | 5 MHz | 5 MHz | 45.0 < Wgap ≤ 65.0 | 121 | 4.7 | FDD |
| 0.0 < Wgap ≤ 45.0 | 251 | 0 |
| 5 MHz | 10 MHz | 40.0 < Wgap ≤ 60.0 | 121 | 3.8 |
| 0.0 < Wgap ≤ 40.0 | 251 | 0 |
| 5 MHz | 15 MHz | 35.0 < Wgap ≤ 55.0 | 121 | 3.6 |
| 0.0 < Wgap ≤ 35.0 | 251 | 0 |
| 5 MHz | 20 MHz | 30.0 < Wgap ≤ 50.0 | 121 | 3.4 |
| 0.0 < Wgap ≤ 30.0 | 251 | 0 |
| 5 MHz | 25 MHz | 25.0 < Wgap ≤ 45.0 | 121 | 3.2 |
| 0.0 < Wgap ≤ 25.0 | 251 | 0 |
| 5 MHz | 30 MHz | 20.0 < Wgap ≤ 40.0 | 121 | 3.0 |
| 0.0 < Wgap ≤ 20.0 | 251 | 0 |
| 10 MHz | 5 MHz | 30.0 < Wgap ≤ 60.0 | 125 | 5.1 |
| 0.0 < Wgap ≤ 30.0 | 321 | 0 |
| 10 MHz | 10MHz | 25.0 < Wgap ≤ 55.0 | 125 | 4.3 |
| 0.0 < Wgap ≤ 25.0 | 321 | 0 |
| 10 MHz | 15 MHz | 20.0 < Wgap ≤ 50.0 | 125 | 3.8 |
| 0.0 < Wgap ≤ 20.0 | 321 | 0 |
| 10 MHz | 20 MHz | 15.0 < Wgap ≤ 45.0 | 125 | 3.5 |
| 0.0 < Wgap ≤ 15.0 | 321 | 0 |
| 10 MHz | 25 MHz | 10.0 < Wgap ≤ 40.0 | 125 | 3.2 |
| 0.0 < Wgap ≤ 10.0 | 321 | 0 |
| 10 MHz | 30 MHz | 5.0 < Wgap ≤ 35.0 | 125 | 2.8 |
| 0.0 < Wgap ≤ 5.0 | 321 | 0 |
| 15 MHz | 5 MHz | 25.0 < Wgap ≤ 55.0 | 126 | 6.0 |
| 0.0 < Wgap ≤ 25.0 | 321 | 0 |
| 15 MHz | 10 MHz | 20.0 < Wgap ≤ 50.0 | 126 | 4.7 |
| 0.0 < Wgap ≤ 20.0 | 321 | 0 |
| 15 MHz | 15 MHz | 15.0 < Wgap ≤ 45.0 | 126 | 4.2 |
| 0.0 < Wgap ≤ 15.0 | 321 | 0 |
| 15 MHz | 20 MHz | 10.0 < Wgap ≤ 40.0 | 126 | 3.8 |
| 0.0 < Wgap ≤ 10.0 | 321 | 0 |
| 15 MHz | 25 MHz | 5.0 < Wgap ≤ 35.0 | 126 | 3.5 |
| 0.0 < Wgap ≤ 5.0 | 321 | 0 |
| 15 MHz | 30 MHz | 0.0 < Wgap ≤ 30.0 | 126 | 3.3 |
| 20 MHz | 5 MHz | 15.0 < Wgap ≤ 50.0 | 167 | 6.5 |
| 0.0 < Wgap ≤ 15.0 | 321 | 0 |
| 20 MHz | 10 MHz | 10.0 < Wgap ≤ 45.0 | 167 | 5.1 |
| 0.0 < Wgap ≤ 10.0 | 321 | 0 |
| 20 MHz | 15 MHz | 5.0 < Wgap ≤ 40.0 | 167 | 4.5 |
| 0.0 < Wgap ≤ 5.0 | 321 | 0 |
| 20 MHz | 20 MHz | 0.0 < Wgap ≤ 35.0 | 167 | 4.1 |
| 20 MHz | 25 MHz | 0.0 < Wgap ≤ 30.0 | 167 | 3.8 |
| 20 MHz | 30 MHz | 0.0 < Wgap ≤ 25.0 | 167 | 3.6 |
| NOTE 1: UL resource blocks shall be located as close as possible to the downlink operating band but confined within the transmission.  NOTE 2: Wgap is the sub-block gap between the two sub-blocks.  NOTE 3: The table only applies when the center frequency of E-UTRA carrier is higher than the NR carrier, and the ΔRIBNC applies to the NR DL carrier only  NOTE 4: All combinations of channel bandwidths defined in Table 5.3B.1.3-1.  NOTE 5: UL resource blocks shall be located at RBstart = 25.  NOTE 6: UL resource blocks shall be located at RBstart = 35.  NOTE 7: UL resource blocks shall be located at RBstart = 50. | | | | | | |

#### 7.3B.3.3 Inter-band EN-DC within FR1

##### 7.3B.3.3.1 ΔRIB,c for EN-DC in two bands

Table 7.3B.3.3.1-1: ΔRIB,c due to EN-DC(two bands)

|  |  |  |
| --- | --- | --- |
| Inter-band EN-DC configuration | E-UTRA or NR Band | ΔRIB,c (dB) |
| DC\_1\_n28 | n28 | 0.2 |
| DC\_1\_n51 | n51 | 0.1 |
| DC\_1\_n77 | 1 | 0.2 |
| n77 | 0.5 |
| DC\_1\_n78 | n78 | 0.5 |
| DC\_2\_n66 | 2 | 0.3 |
| n66 | 0.3 |
| DC\_2\_n78 | 2 | 0.2 |
| n78 | 0.5 |
| DC\_3\_n51 | 3 | 0.2 |
| n51 | 0.2 |
| DC\_3\_n77 | 3 | 0.2 |
| n77 | 0.5 |
| DC\_3\_n78 | 3 | 0.2 |
| n78 | 0.5 |
| DC\_5\_n78 | 5 | 0.2 |
| n78 | 0.5 |
| DC\_7\_n51 | n51 | 0.2 |
| DC\_7\_n77 | n77 | 0.5 |
| DC\_7\_n78  DC\_7-7\_n78 | n78 | 0.5 |
| DC\_8\_n77 | 8 | 0.2 |
| n77 | 0.5 |
| DC\_8\_n78 | 8 | 0.2 |
| n78 | 0.5 |
| DC\_11\_n77 | n77 | 0.5 |
| DC\_11\_n78 | n78 | 0.5 |
| DC\_12\_n5 | 12 | 0.3 |
| n5 | 0.5 |
| DC\_12\_n66 | 12 | 0.5 |
| DC\_18\_n77 | n77 | 0.5 |
| DC\_19\_n77 | n77 | 0.5 |
| DC\_19\_n78 | n78 | 0.5 |
| DC\_20\_n51 | n51 | 0.2 |
| DC\_20\_n77 | n77 | 0.5 |
| DC\_20\_n78 | n78 | 0.5 |
| DC\_21\_n77 | n77 | 0.5 |
| DC\_21\_n78 | n78 | 0.5 |
| DC\_25\_n41 | n41 | 01 |
| 0.52 |
| DC\_26\_n77 | n77 | 0.5 |
| DC\_26\_n78 | n78 | 0.5 |
| DC\_28\_n51 | n51 | 0.2 |
| DC\_28\_n77 | 28 | 0.2 |
| n77 | 0.5 |
| DC\_28\_n78 | 28 | 0.2 |
| n78 | 0.5 |
| DC\_30\_n66 | 30 | 0.5 |
| n66 | 0.4 |
| DC\_38\_n78 | 38 | 0.4 |
| n78 | 0.5 |
| DC\_39\_n78 | n78 | 0.5 |
| DC\_39\_n79 | n79 | 0.5 |
| DC\_40\_n77 | 40 | 0.4 |
| n77 | 0.5 |
| DC\_41\_n77 | n77 | 0.5 |
| DC\_41\_n78 | n78 | 0.5 |
| DC\_41\_n79 | n79 | 0.5 |
| DC\_42\_n51 | n51 | 0.2 |
| DC\_66\_n78 | 66 | 0.2 |
| n78 | 0.5 |
| NOTE 1: The requirement is applied for UE transmitting on the frequency range of 2545 – 2690 MHz.  NOTE 2: The requirement is applied for UE transmitting on the frequency range of 2496 – 2545 MHz. | | |

##### 7.3B.3.3.2 ΔRIB,c for EN-DC three bands

Table 7.3B.3.3.2-1: ΔRIB,c due to EN-DC (three bands)

|  |  |  |
| --- | --- | --- |
| Inter-band EN-DC configuration | E-UTRA or NR Band | ΔRIB,c (dB) |
| DC\_1-3\_n28 | n28 | 0.2 |
| DC\_1-3\_n77 | 1 | 0.2 |
| 3 | 0.2 |
| n77 | 0.5 |
| DC\_1-3\_n78 | 1 | 0.2 |
| 3 | 0.2 |
| n78 | 0.5 |
| DC\_1-5\_n78 | 1 | 0.2 |
| 5 | 0.2 |
| n78 | 0.5 |
| DC\_1-7\_n28 | n28 | 0.2 |
| DC\_1-7\_n78  DC\_1-7-7\_n78 | 1 | 0.2 |
| 7 | 0.2 |
| n78 | 0.5 |
| DC\_1-8\_n78 | 8 | 0.2 |
| n78 | 0.5 |
| DC\_1-18\_n77 | n77 | 0.5 |
| DC\_1-18\_n78 | n78 | 0.5 |
| DC\_1-19\_n77 | n77 | 0.5 |
| DC\_1-19\_n78 | n78 | 0.5 |
| DC\_1-19\_n79 | 1 | 0.3 |
| 19 | 0.3 |
| DC\_1-20\_n28 |  |  |
| 20 | 0.2 |
| n28 | 0.2 |
| DC\_1-20\_n78 | n78 | 0.5 |
| DC\_1-21\_n77 | n77 | 0.5 |
| DC\_1-21\_n78 | 1 | 0.2 |
| n78 | 0.5 |
| DC\_1-28\_n77 | 28 | 0.2 |
| n77 | 0.5 |
| DC\_1-28\_n78  DC\_1\_n28-n78 | 28 or n28 | 0.2 |
| n78 | 0.5 |
| DC\_1\_n28-n79 | 1 | 0.3 |
| 28 | 0.3 |
| DC\_1-42\_n77 | 1 | 0.2 |
| 42 | 0.5 |
| n77 | 0.5 |
| DC\_1-41\_n77 | n77 | 0.5 |
| DC\_1-41\_n78 | n78 | 0.5 |
| DC\_1-42\_n78 | 1 | 0.2 |
| 42 | 0.5 |
| n78 | 0.5 |
| DC\_1-42\_n79 | 42 | 0.5 |
| DC\_1\_n77-n79 | 1 | 0.2 |
| n77 | 0.5 |
| DC\_1\_n78-n79 | n78 | 0.5 |
| DC\_1-SUL\_n78-n84 | n78 | 0.5 |
| DC\_2\_5\_n66 | 2 | 0.3 |
| n66 | 0.3 |
| DC\_2\_30\_n66 | 2 | 0.4 |
| 30 | 0.5 |
| n66 | 0.4 |
| DC\_2-66\_n71B | 2 | 0.3 |
| 66 | 0.3 |
| DC\_3\_n3-n77 | 3 | 0.2 |
| n3 | 0.2 |
| n77 | 0.5 |
| DC\_3\_n3-n78 | 3 | 0.2 |
| n3 | 0.2 |
| n78 | 0.5 |
| DC\_3-5\_n78 | 3 | 0.2 |
| 5 | 0.2 |
| n78 | 0.5 |
| DC\_3-7\_n78, DC\_3-7-7\_n78 | 3 | 0.2 |
| 7 | 0.2 |
| n78 | 0.5 |
| DC\_3-8\_n78 | 3 | 0.2 |
| 8 | 0.2 |
| n78 | 0.5 |
| DC\_3-19\_n77 | 3 | 0.2 |
| n77 | 0.5 |
| DC\_3-19\_n78 | 3 | 0.2 |
| n78 | 0.5 |
| DC\_3-20\_n28 | 20 | 0.1 |
| n28 | 0.1 |
| DC\_3-20\_n78 | 3 | 0.2 |
| n78 | 0.5 |
| DC\_3-21\_n77 | 3 | 0.3 |
| 21 | 0.5 |
| n77 | 0.5 |
| DC\_3-21\_n78 | 3 | 0.3 |
| 21 | 0.5 |
| n78 | 0.5 |
| DC\_3-21\_n79 | 3 | 0.3 |
| 21 | 0.5 |
| DC\_3-28\_n78  DC\_3\_n28-n78 | 3 | 0.2 |
| n78 | 0.5 |
| DC\_3-38\_n78 | 3 | 0.2 |
| 38 | 0.4 |
| n78 | 0.5 |
| DC\_3-41\_n78 | 3 | 0.2 |
| 41 | 01 |
| 0.52 |
| n78 | 0.5 |
| DC\_3-42\_n77 | 3 | 0.2 |
| 42 | 0.5 |
| n77 | 0.5 |
| DC\_3-42\_n78 | 3 | 0.2 |
| 42 | 0.5 |
| n78 | 0.5 |
| DC\_3-42\_n79 | 3 | 0.2 |
| 42 | 0.5 |
| DC\_3\_n77-n79 | 3 | 0.2 |
| n77 | 0.5 |
| DC\_3\_n78-n79 | 3 | 0.2 |
| n78 | 0.5 |
| DC\_3-SUL\_n78-n80 | 3 | 0.2 |
| n78 | 0.5 |
| DC\_3-SUL\_n78-n82 | 3 | 0.2 |
| n78 | 0.5 |
| DC\_5-7\_n78 | 5 | 0.2 |
| 7 | 0.2 |
| n78 | 0.5 |
| DC\_5\_30\_n66 | 30 | 0.5 |
| n66 | 0.4 |
| DC\_7-20\_n28 | 20 | 0.2 |
| n28 | 0.2 |
| DC\_7-20\_n78 | n78 | 0.5 |
| DC\_7-28\_n78 | n78 | 0.5 |
| DC\_7\_n28-n78 | n78 | 0.5 |
| DC\_7-46\_n78 | n78 | 0.5 |
| DC\_8A-SUL\_n78-n81 | 8 | 0.2 |
| n78 | 0.2 |
| DC\_18-28\_n77 | n77 | 0.5 |
| DC\_18-28\_n78 | n78 | 0.5 |
| DC\_19-21\_n77 | n77 | 0.5 |
| DC\_19-21\_n78 | n78 | 0.5 |
| DC\_19-42\_n77 | 42 | 0.5 |
| n77 | 0.5 |
| DC\_19-42\_n78 | 42 | 0.5 |
| n78 | 0.5 |
| DC\_19-42\_n79 | 42 | 0.5 |
| DC\_19\_n77-n79 | n77 | 0.5 |
| DC\_19\_n78-n79 | n78 | 0.5 |
| DC\_20\_n28-n75 | n28 | 0.2 |
| DC\_20\_n28-n78 | 20 | 0.2 |
| n28 | 0.2 |
| n78 | 0.5 |
| DC\_20\_n75-n78 | n78 | 0.5 |
| DC\_20\_n76-n78 | n78 | 0.5 |
| DC\_20-SUL\_n78-n82 | n78 | 0.5 |
| DC\_20-SUL\_n78-n83 | 20 | 0.2 |
| n78 | 0.5 |
| DC\_21-42\_n77 | 42 | 0.5 |
| n77 | 0.5 |
| DC\_21-42\_n78 | 42 | 0.5 |
| n78 | 0.5 |
| DC\_21-42\_n79 | 42 | 0.5 |
| DC\_21\_n77-n79 | n77 | 0.5 |
| DC\_21\_n78-n79 | n78 | 0.5 |
| DC\_28-SUL\_n78-n83 | 28 | 0.2 |
| n78 | 0.5 |
| DC\_28-42\_n77 | 28 | 0.2 |
| 42 | 0.5 |
| n77 | 0.5 |
| DC\_28-42\_n78 | 28 | 0.2 |
| 42 | 0.5 |
| n78 | 0.5 |
| DC\_28-42\_n79 | 28 | 0.2 |
| 42 | 0.5 |
| DC\_41-42\_n77 | 42 | 0.5 |
| n77 | 0.5 |
| DC\_41-42\_n78 | 42 | 0.5 |
| n78 | 0.5 |
| DC\_41-42\_n79 | 42 | 0.5 |
| DC\_66-SUL\_n78-n86 | 66 | 0.2 |
| n78 | 0.5 |
| NOTE 1: The requirement is applied for UE transmitting on the frequency range of 2545 – 2690 MHz.  NOTE 2: The requirement is applied for UE transmitting on the frequency range of 2496 – 2545 MHz. | | |

7.3B.3.3.3 ΔRIB,c for EN-DC four bands

Table 7.3B.3.3.3-1: ΔRIB,c due to EN-DC (four bands)

|  |  |  |
| --- | --- | --- |
| Inter-band EN-DC configuration | E-UTRA or NR Band | ΔRIB,c (dB) |
| DC\_1-3-5\_n78 | 1 | 0.2 |
| 3 | 0.2 |
| n78 | 0.5 |
| DC\_1-3-7\_n28 | n28 | 0.2 |
| DC\_1-3-7\_n78  DC\_1-3-7-7\_n78 | 1 | 0.3 |
| 3 | 0.3 |
| 7 | 0.3 |
| n78 | 0.5 |
| DC\_1-3-8\_n78 | 1 | 0.2 |
| 3 | 0.2 |
| 8 | 0.2 |
| n78 | 0.5 |
| DC\_1-3-19\_n78 | 1 | 0.2 |
| 3 | 0.2 |
| n78 | 0.5 |
| DC\_1-3-20\_n28 | 20 | 0.2 |
| n28 | 0.2 |
| DC\_1-3-20\_n78 | 1 | 0.2 |
| 3 | 0.2 |
| n78 | 0.5 |
| DC\_1-3-21\_n77 | 1 | 0.2 |
| 3 | 0.3 |
| 21 | 0.5 |
| n77 | 0.5 |
| DC\_1-3-21\_n78 | 1 | 0.2 |
| 3 | 0.3 |
| 21 | 0.5 |
| n78 | 0.5 |
| DC\_1-3-21\_n79 | 3 | 0.3 |
| 21 | 0.5 |
| DC\_1-3-28\_n77 | 1 | 0.2 |
| 3 | 0.2 |
| 28 | 0.2 |
| n77 | 0.5 |
| DC\_1-3-28\_n78  DC\_1-3\_n28-n78 | 1 | 0.2 |
| 3 | 0.2 |
| 28 or n28 | 0.2 |
| n78 | 0.5 |
| DC\_1-3-28\_n79 | 1 | 0.2 |
| 3 | 0.2 |
| 28 | 0.2 |
| DC\_1-3-42\_n77 | 1 | 0.2 |
| 3 | 0.2 |
| 42 | 0.5 |
| n77 | 0.5 |
| DC\_1-3-42\_n78 | 1 | 0.2 |
| 3 | 0.2 |
| 42 | 0.5 |
| n78 | 0.5 |
| DC\_1-3-42\_n79 | 1 | 0.2 |
| 3 | 0.2 |
| 42 | 0.5 |
| DC\_1-5-7\_n78  DC\_1-5-7-7\_n78 | 1 | 0.2 |
| 5 | 0.2 |
| 7 | 0.2 |
| n78 | 0.5 |
| DC\_1-7-20\_n28 | 20 | 0.2 |
| n28 | 0.2 |
| DC\_1-7-20\_n78 | 1 | 0.2 |
| 7 | 0.2 |
| 20 | 0.2 |
| n78 | 0.5 |
| DC\_1-7\_n28-n78 | 1 | 0.2 |
| 7 | 0.2 |
| n28 | 0.2 |
| n78 | 0.5 |
| DC\_1-18-28\_n77 | n77 | 0.5 |
| DC\_1-18-28\_n78 | n78 | 0.5 |
| DC\_1-19-42\_n77 | 1 | 0.2 |
| 42 | 0.5 |
| n77 | 0.5 |
| DC\_1-19-42\_n78 | 42 | 0.5 |
| n78 | 0.5 |
| DC\_1-19-42\_n79 | 42 | 0.5 |
| DC\_1-20\_n28-n78 | 20 | 0.2 |
| n28 | 0.2 |
| n78 | 0.5 |
| DC\_1-21-42\_n77 | 1 | 0.2 |
| 42 | 0.5 |
| n77 | 0.5 |
| DC\_1-21-42\_n78 | 42 | 0.5 |
| n78 | 0.5 |
| DC\_1-21-42\_n79 | 42 | 0.5 |
| DC\_1-28-42\_n77 | 1 | 0.2 |
| 28 | 0.2 |
| 42 | 0.5 |
| n77 | 0.5 |
| DC\_1-28-42\_n78 | 28 | 0.2 |
| 42 | 0.5 |
| n78 | 0.5 |
| DC\_1-28-42\_n79 | 28 | 0.2 |
| 42 | 0.5 |
| DC\_1-41-42\_n77 | 42 | 0.5 |
| n77 | 0.5 |
| DC\_1-41-42\_n78 | 42 | 0.5 |
| n78 | 0.5 |
| DC\_1-41-42\_n79 | 42 | 0.5 |
| DC\_1-41-42\_n79 | 42 | 0.5 |
| DC\_2-66-(n)71 | 2 | 0.3 |
| 66 | 0.3 |
| DC\_3-5-7\_n78, DC\_3-5-7-7\_n78 | 3 | 0.2 |
| 5 | 0.2 |
| 7 | 0.2 |
| n78 | 0.5 |
| DC\_3-7-7\_n78 | 3 | 0.2 |
| 7 | 0.2 |
| n78 | 0.5 |
| DC\_3-7-20\_n28 | 20 | 0.2 |
| n28 | 0.1 |
| DC\_3-7-20\_n78 | 3 | 0.2 |
| 7 | 0.2 |
| n78 | 0.5 |
| DC\_3-7-28\_n78  DC\_3-7\_n28-n78 | 3 | 0.2 |
| 7 | 0.2 |
| 28 or n28 | 0.2 |
| n78 | 0.5 |
| DC\_3-19-21\_n77 | 3 | 0.3 |
| 21 | 0.5 |
| n77 | 0.5 |
| DC\_3-19-21\_n78 | 3 | 0.3 |
| 21 | 0.5 |
| n78 | 0.5 |
| DC\_3-19-21\_n79 | 3 | 0.3 |
| 21 | 0.5 |
| DC\_3-19-42\_n77 | 3 | 0.2 |
| 42 | 0.5 |
| n77 | 0.5 |
| DC\_3-19-42\_n78 | 3 | 0.2 |
| 42 | 0.5 |
| n78 | 0.5 |
| DC\_3-19-42\_n79 | 3 | 0.2 |
| 42 | 0.5 |
| DC\_3-20\_n28-n78 | 3 | 0.2 |
| 20 | 0.2 |
| n28 | 0.2 |
| n78 | 0.5 |
| DC\_3-21-42\_n77 | 3 | 0.3 |
| 21 | 0.5 |
| 42 | 0.5 |
| n77 | 0.5 |
| DC\_3-21-42\_n78 | 3 | 0.3 |
| 21 | 0.5 |
| 42 | 0.5 |
| n78 | 0.5 |
| DC\_3-21-42\_n79 | 3 | 0.3 |
| 21 | 0.5 |
| 42 | 0.5 |
| DC\_3-28-42\_n77 | 3 | 0.2 |
| 28 | 0.2 |
| 42 | 0.5 |
| n77 | 0.5 |
| DC\_3-28-42\_n78 | 3 | 0.2 |
| 28 | 0.2 |
| 42 | 0.5 |
| n78 | 0.5 |
| DC\_3-28-42\_n79 | 3 | 0.2 |
| 28 | 0.2 |
| 42 | 0.5 |
| DC\_5-7-7\_n78 | 5 | 0.2 |
| 7 | 0.2 |
| n78 | 0.5 |
| DC\_7-20\_n28-n78 | 20 | 0.2 |
| n28 | 0.2 |
| n78 | 0.5 |
| DC\_19-21-42\_n77 | 42 | 0.5 |
| n77 | 0.5 |
| DC\_19-21-42\_n78 | 42 | 0.5 |
| n78 | 0.5 |
| DC\_19-21-42\_n79 | 42 | 0.5 |
| DC\_21-28-42\_n77 | 28 | 0.2 |
| 42 | 0.5 |
| n77 | 0.5 |
| DC\_21-28-42\_n78 | 28 | 0.2 |
| 42 | 0.5 |
| n78 | 0.5 |
| DC\_21-28-42\_n79 | 28 | 0.2 |
| 42 | 0.5 |

##### 7.3B.3.3.4 ΔRIB,c for EN-DC five bands

Table 7.3B.3.3.4-1: ΔRIB,c due to EN-DC (five bands)

| Inter-band EN-DC configuration | E-UTRA or NR Band | ΔRIB,c (dB) |
| --- | --- | --- |
| DC\_1-3-5-7\_n78,  DC\_1-3-5-7-7\_n78 | 1 | 0.2 |
| 3 | 0.2 |
| 5 | 0.2 |
| 7 | 0.2 |
| n78 | 0.5 |
| DC\_1-3-7-20\_n28 | 20 | 0.2 |
| n28 | 0.2 |
| DC\_1-3-7-20\_n78 | 1 | 0.2 |
| 3 | 0.2 |
| 7 | 0.2 |
| n78 | 0.5 |
| DC\_1-3-7\_n28-n78 | 1 | 0.2 |
| 3 | 0.2 |
| 7 | 0.2 |
| n28 | 0.2 |
| n78 | 0.5 |
| DC\_1-3-19-21\_n77 | 1 | 0.2 |
| 3 | 0.3 |
| 21 | 0.5 |
| n77 | 0.5 |
| DC\_1-3-19-21\_n78 | 1 | 0.2 |
| 3 | 0.3 |
| 21 | 0.5 |
| n78 | 0.5 |
| DC\_1-3-19-21\_n79 | 3 | 0.3 |
| 21 | 0.5 |
| DC\_1-3-19-42\_n77 | 1 | 0.2 |
| 3 | 0.2 |
| 42 | 0.5 |
| n77 | 0.5 |
| DC\_1-3-19-42\_n78 | 1 | 0.2 |
| 3 | 0.2 |
| 42 | 0.5 |
| n78 | 0.5 |
| DC\_1-3-19-42\_n79 | 1 | 0.2 |
| 3 | 0.2 |
| 42 | 0.5 |
| DC\_1-3-28-42\_n77 | 1 | 0.2 |
| 3 | 0.2 |
| 28 | 0.2 |
| 42 | 0.5 |
| n77 | 0.5 |
| DC\_1-3-28-42\_n78 | 1 | 0.2 |
| 3 | 0.2 |
| 28 | 0.2 |
| 42 | 0.5 |
| n78 | 0.5 |
| DC\_1-3-28-42\_n79 | 1 | 0.2 |
| 3 | 0.2 |
| 28 | 0.2 |
| 42 | 0.5 |
| DC\_1-3-20\_n28-n78 | 1 | 0.2 |
| 3 | 0.2 |
| 20 | 0.2 |
| n28 | 0.2 |
| n78 | 0.5 |
| DC\_1-3-21-42\_n77 | 1 | 0.2 |
| 3 | 0.3 |
| 21 | 0.5 |
| 42 | 0.5 |
| n77 | 0.2 |
| DC\_1-3-21-42\_n78 | 1 | 0.2 |
| 3 | 0.3 |
| 21 | 0.5 |
| 42 | 0.5 |
| n78 | 0.2 |
| DC\_1-3-21-42\_n79 | 1 | 0.2 |
| 3 | 0.3 |
| 21 | 0.5 |
| 42 | 0.5 |
| DC\_1-7-20\_n28-n78 | 1 | 0.2 |
| 7 | 0.2 |
| 20 | 0.2 |
| n28 | 0.2 |
| n78 | 0.5 |
| DC\_1-19-21-42\_n77 | 1 | 0.2 |
| 42 | 0.5 |
| n77 | 0.5 |
| DC\_1-19-21-42\_n78 | 42 | 0.5 |
| n78 | 0.5 |
| DC\_1-19-21-42\_n79 | 42 | 0.5 |
| DC\_1-21-28-42\_n77 | 1 | 0.2 |
| 28 | 0.2 |
| 42 | 0.5 |
| n77 | 0.5 |
| DC\_1-21-28-42\_n78 | 28 | 0.2 |
| 42 | 0.5 |
| n78 | 0.5 |
| DC\_1-21-28-42\_n79 | 28 | 0.2 |
| 42 | 0.5 |
| DC\_3-7-20\_n28-n78 | 3 | 0.2 |
| 7 | 0.2 |
| 20 | 0.2 |
| n28 | 0.2 |

##### 7.3B.3.3.5 ΔRIB,c for EN-DC six bands

Table 7.3B.3.3.5-1: ΔRIB,c due to EN-DC (six bands)

|  |  |  |
| --- | --- | --- |
| Inter-band EN-DC configuration | E-UTRA or NR Band | ΔRIB,c (dB) |
| DC\_1-3-7-20\_n28-n78 | 1 | 0.2 |
| 3 | 0.2 |
| 7 | 0.2 |
| 20 | 0.2 |
| n28 | 0.2 |
| n78 | 0.5 |

#### 7.3B.3.3a Inter-band NE-DC within FR1

Unless ΔRIB,c is specified in this clause, the value of ΔRIB,c for the correspondingly specified EN-DC configuration in clause 7.3B.3.3 is applicable.

#### 7.3B.3.4 Inter-band EN-DC including FR2

##### 7.3B.3.4.1 ΔRIB,c for EN-DC in two bands

Unless otherwise stated, ΔRIB,c for E-UTRA and FR2 NR bands of inter-band EN-DC combinations defined in table 5.5B.5.1-1 is set to zero.

Table 7.3B.3.4.1-1: Void

##### 7.3B.3.4.2 ΔRIB,c for EN-DC three bands

Unless otherwise stated, ΔRIB,c for FR2 NR bands is set to zero, and ΔRIB,c for constituent E-UTRA bands for inter-band EN-DC defined in table 5.5B.5.3-1 is the same as those for the corresponding E-UTRA CA configuration specified in TS 36.101 [4], without the FR2 NR bands.

Table 7.3B.3.4.2-1: Void

##### 7.3B.3.4.3 ΔRIB,c for EN-DC four bands

Unless otherwise stated, ΔRIB,c for FR2 NR bands is set to zero, and ΔRIB,c for constituent E-UTRA bands for inter-band EN-DC defined in table 5.2B.5.3-1 is the same as those for the corresponding E-UTRA CA configuration specified in TS 36.101 [4], without the FR2 NR bands.

Table 7.3B.3.4.3-1: Void

##### 7.3B.3.4.4 ΔRIB,c for EN-DC five bands

Unless otherwise stated, ΔRIB,c for FR2 NR bands is set to zero, and ΔRIB,c for constituent E-UTRA bands for inter-band EN-DC defined in table 5.5B.5.4-1 is the same as those for the corresponding E-UTRA CA configuration specified in TS 36.101 [4], without the FR2 NR bands.

Table 7.3B.3.4.4-1: Void

##### 7.3B.3.4.5 Void

#### 7.3B.3.5 Inter-band EN-DC including both FR1 and FR2

##### 7.3B.3.5.2 ΔRIB,c for EN-DC three bands

Unless otherwise stated, for inter-band EN-DC configurations defined in table 5.5B.6.2-1, ΔRIB,c for constituent FR2 NR bands is set to zero, and ΔRIB,c for constituent E-UTRA and FR1 NR bands is the same as those for the corresponding inter band EN-DC configuration without the FR2 bands specified in 7.3B.3.3.

Table 7.3B.3.5.2-1: Void

##### 7.3B.3.5.3 ΔRIB,c for EN-DC four bands

Unless otherwise stated, for inter-band EN-DC configurations defined in table 5.5B.6.3-1, ΔRIB,c for constituent FR2 NR bands is set to zero, and ΔRIB,c for constituent E-UTRA and FR1 NR bands is the same as those for the corresponding inter band EN-DC configuration without the FR2 bands specified in 7.3B.3.3.

##### 7.3B.3.5.4 ΔRIB,c for EN-DC five bands

Unless otherwise stated, for a certain inter-band EN-DC configurations defined in table 5.5B.6.4-1, ΔRIB,c for constituent FR2 NR bands is set to zero, and ΔRIB,c for constituent E-UTRA and FR1 NR bands is the same as those for the corresponding inter band EN-DC configuration without the FR2 bands specified in 7.3B.3.3.

##### 7.3B.3.5.5 ΔRIB,c for EN-DC six bands

Unless otherwise stated, for inter-band EN-DC configurations defined in table 5.5B.6.5-1, ΔRIB,c for constituent FR2 NR bands is set to zero, and ΔRIB,c for constituent E-UTRA and FR1 NR bands is the same as those for the corresponding inter band EN-DC configuration without the FR2 bands specified in 7.3B.3.3.

## 7.4 Void

## 7.4A Maximum input level for CA

For inter-band NR CA between FR1 and FR2, the maximum input level specified in TS 38.101-1 [2] and TS 38.101-2 [3] apply for FR1 and FR2 respectively.

## 7.4B Maximum input level for DC in FR1

### 7.4B.1 Intra-band contiguous EN-DC in FR1

Intra-band contiguous EN-DC maximum input level requirement and parameters are defined in Table 7.4B.1-1.

Table 7.4B.1-1: Maximum Input

|  |  |
| --- | --- |
| Power in Largest CC, E-UTRA or NR, dBm | X1 |
| Power in each other CC, dBm | X1 – 10\*log10(NxSCSx/NySCSy) |
| NOTE 1: Power in Largest E-UTRA or NR bandwidth CC, listed in Table 7.4-1 [2]  NOTE 2: Nx, SCSx is the number of RB's and Sub carrier spacing in the largest carrier bandwidth and could be E-UTRA or NR carrier  NOTE 3: Ny, SCSy is the number of RB's in any other carrier.  NOTE 4: Void.  NOTE 5: Void. | |

### 7.4B.2 Intra-band non-contiguous EN-DC in FR1

For the E-UTRA sub-block containing one or multiple CC's, the requirement is defined in clause 7.4.1 for single carrier operation and in clause 7.4.1A for CA in TS 36.101 [4].

For the NR sub-block, the requirement is defined in clause 7.4 in TS 38.101-1 [2].

### 7.4B.3 Inter-band EN-DC within FR1

Maximum input level requirement for E-UTRA single carrier and CA operation specified in clauses 7.4.1 and 7.4.1A of TS 36.101 [4] and for NR single carrier and CA operation specified in clauses 7.4 and 7.4A of TS 38.101-1 [2] apply.

7.4B.3a Inter-band NE-DC within FR1

Maximum input level requirement for E-UTRA single carrier and CA operation specified in clauses 7.4.1 and 7.4.1A of TS 36.101 [4] and for NR single carrier and CA operation specified in clauses 7.4 and 7.4A of TS 38.101-1 [2] apply.

7.4B.4 Inter-band EN-DC including FR2

Maximum input level requirement for E-UTRA single carrier and CA operation specified in clauses 7.4.1 and 7.4.1A of TS 36.101 [4] and for NR single carrier and CA operation specified in clauses 7.4, 7. and 7.4B of TS 38.101-2 [3] apply.

7.4B.5 Inter-band EN-DC including both FR1 and FR2

Maximum input level requirement for E-UTRA single carrier and CA operation specified in clauses 7.4.1 and 7.4.1A of TS 36.101 [4] and for NR single carrier and CA operation specified in clauses 7.4, 7.4A and 7.4B of TS 38.101-1 [2] and TS 38.101-2 [3] apply.

## 7.5 Void

## 7.5A Adjacent channel selectivity for CA

For inter-band NR CA between FR1 and FR2, the adjacent channel selectivity specified in TS 38.101-1 [2] and TS 38.101-2 [3] apply for FR1 and FR2 respectively.

## 7.5B Adjacent channel selectivity for DC in FR1

### 7.5B.1 Intra-band contiguous EN-DC in FR1

Intra-band contiguous EN-DC ACS requirement and parameters are defined for test case 1 in Table 7.5B.1-1 and for test case 2 in Table 7.5B.1-2.

Table 7.5B.1-1: ACS test case 1

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| EN-DC Aggregated Bandwidth, MHz | <=100 | >100, <=120 | >120, <=140 | >140, <=160 |
| ACS, dB | X1 | 19.2 | 18.5 | 17.9 |
| Pinterferer, dBm | PI 2 | Aggregated power + 17.7 dB | Aggregated power + 17 dB | Aggregated power + 16.4dB |
| Pw in Transmission BW configuration, per CC, dBm | REFSENS +14dB | | | |
| NOTE 1: X is ACS level at the specified EN-DC aggregated bandwidth from Table 7.5.1A-1 in TS 36.101 [4]  NOTE 2: PI is from Table 7.5.1A-2 in TS 36.101 [4]  NOTE 3: Jammer BW and offset is from Table 7.5.1A-2 [4] and is applied from the lowest edge of the lowest carrier and the highest edge of the highest carrier  NOTE 4: Void.  NOTE 5: Void. | | | | |

Table 7.5B.1-2: ACS test case 2

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| EN-DC Aggregated Bandwidth, ENBW, MHz | ≤100 | >100, ≤120 | >120, ≤140 | >140, ≤160 |
| Pw in Transmission Bandwidth Configuration, perCC, dBm | PW 1 | -42.7 +10log10(NRB,c/ NRB\_agg) | -42 +10log10(NRB,c/ NRB\_agg) | -41.4 +10log10(NRB,c/ NRB\_agg) |
| Pinterferer, dBm | -25 | | | |
| NOTE 1: PW is wanted signal power level at the specified EN-DC aggregated Bandwidth from Table 7.5.1A-3 in TS 36.101 [4]  NOTE 2: Jammer BW and offset is from Table 7.5.1A-3 [4] and is applied from the lowest edge of the lowest carrier and the highest edge of the highest carrier  NOTE 3: Void.  NOTE 4: Void. | | | | |

### 7.5B.2 Intra-band non-contiguous EN-DC in FR1

For the E-UTRA sub-block containing one or multiple CC's, the requirement is defned in clause 7.5.1 for single carrier operation and in clause 7.5.1A for CA in TS 36.101 [4].

For the NR sub-block, the requirement is defined in clause 7.5 in TS 38.101-1 [2].

The blocker configuration is defined in the general clause 7.1.

### 7.5B.3 Inter-band EN-DC within FR1

Adjacent channel selectivity requirement for E-UTRA single carrier and CA operation specified in clauses 7.5.1 and 7.5.1A of TS 36.101 [4] and for NR single carrier and CA operation specified in clauses 7.5 and 7.5A of TS 38.101-1 [2] apply.

7.5B.3a Inter-band NE-DC within FR1

Adjacent channel selectivity requirement for E-UTRA single carrier and CA operation specified in clauses 7.5.1 and 7.5.1A of TS 36.101 [4] and for NR single carrier and CA operation specified in clauses 7.5 and 7.5A of TS 38.101-1 [2] apply.

7.5B.4 Inter-band EN-DC including FR2

Adjacent channel selectivity requirement for E-UTRA single carrier and CA operation specified in clauses 7.5.1 and 7.5.1A of TS 36.101 [4] and for NR single carrier and CA operation specified in clauses 7.5, 7.5A and 7.5B of TS 38.101-2 [3] apply.

7.5B.5 Inter-band EN-DC including both FR1 and FR2

Adjacent channel selectivity requirement for E-UTRA single carrier and CA operation specified in clauses 7.5.1 and 7.5.1A of TS 36.101 [4] and for NR single carrier and CA operation specified in clauses 7.5, 7.5A and 7.5B of TS 38.101-1 [2] and TS 38.101-2 [3] apply.

## 7.6 Void

## 7.6A Blocking characteristics for CA

For inter-band NR CA between FR1 and FR2, the in-band blocking characteristics specified in TS 38.101-1 [2] and TS 38.101-2 [3] apply for FR1 and FR2 respectively. The narrow band blocking and out-of-band blocking specified in TS 38.101-1 [2] apply for FR1.

## 7.6B Blocking characteristics for DC in FR1

### 7.6B.1 General

### 7.6B.2 In‑band blocking for DC in FR1

#### 7.6B.2.1 Intra-band contiguous EN-DC in FR1

Intra-band contiguous EN-DC in-band blocking requirement and parameters are defined in Table 7.6B.2.1-1.

Table 7.6B.2.1-1: In-band blocking

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| EN-DC Aggregated Bandwidth, MHz | ≤100 | >100, ≤120 | >120, ≤140 | >140, ≤160 |
| Pw in Transmission Bandwidth Configuration, perCC, dBm | PW 1 | REFSENS + Aggregated BW specific value below | | |
| 16.8 | 17.5 | 18 |
| NOTE 1: PW is wanted signal power level at the specified EN-DC aggregated Bandwidth from Table 7.6.1.1A-1 in TS 36.101 [4]  NOTE 2: Interferer values are specified from Table 7.6.1.1A-2 in TS 36.101 [4]  NOTE 3: Jammer BW and offset is from Table 7.6.1.1A-1 [4] and is applied from the lowest edge of the lowest carrier and the highest edge of the highest carrier  NOTE 4: Void.  NOTE 5: Void. | | | | |

#### 7.6B.2.2 Intra-band non-contiguous EN-DC in FR1

For the E-TRA sub-block containing one or multiple CC's, the requirement is deined in clause 7.6.1.1 for single carrier operation and in clause 7.6.1.1A for CA in TS 36.101 [4].

For the NR sub-block, the requirement is defined in clause 7.6.2 in TS 38.101-1 [2].

The blocker configuration is defined in the general clause 7.1.

#### 7.6B.2.3 Inter-band EN-DC within FR1

Inband blocking requirement for E-UTRA single carrier and CA operation specified in clauses 7.6.1.1 and 7.6.1.1A of TS 36.101 [4] and for NR single carrier and CA operation specified in clauses 7.6.2 and 7.6A.2 of TS 38.101-1 [2] apply.

7.6B.2.3a Inter-band NE-DC within FR1

Inband blocking requirement for E-UTRA single carrier and CA operation specified in clauses 7.6.1.1 and 7.6.1.1A of TS 36.101 [4] and for NR single carrier and CA operation specified in clauses 7.6.2 and 7.6A.2 of TS 38.101-1 [2] apply.

7.6B.2.4 Inter-band EN-DC including FR2

Inband blocking requirement for E-UTRA single carrier and CA operation specified in clauses 7.6.1.1 and 7.6.1.1A of TS 36.101 [4] and for NR single carrier and CA operation specified in clauses 7.6.2, 7.6A.2 and 7.6B.2 of TS 38.101-2 [3] apply.

7.6B.2.5 Inter-band EN-DC including both FR1 and FR2

Inband blocking requirement for E-UTRA single carrier and CA operation specified in clauses 7.6.1.1 and 7.6.1.1A of TS 36.101 [4] and for NR single carrier and CA operation specified in clauses 7.6.2, 7.6A.2 and 7.6B.2 of TS 38.101-1 [2] and TS 38.101-2 [3] apply.

### 7.6B.3 Out-of-band blocking for DC in FR1

#### 7.6B.3.1 Intra-band contiguous EN-DC in FR1

Intra-band contiguous EN-DC out-of-band requirement and parameters are defined in Table 7.6B.3.1-1.

Table 7.6B.3.1-1: Out-of-band blocking

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| EN-DC Aggregated Bandwidth, MHz | ≤100 | >100, ≤120 | >120, ≤140 | >140, ≤160 |
| Pw in Transmission Bandwidth Configuration, perCC, dBm | REFSENS + Aggregated BW specific value below | | | |
| 9 | | | |
| NOTE 1: Interferer values and offsets are specified from Table 7.6.2.1A-2 in TS 36.101 [4]  NOTE 2: Void.  NOTE 3: Void. | | | | |

For Table 7.6.2.1A-2 from TS 36.101 [4] in frequency range 1, 2 and 3, up to exceptions are allowed for spurious response frequencies in each assigned frequency channel when measured using a 1MHz step size. For these exceptions the requirements of subclause 7.7B.1 Spurious response are applicable.

#### 7.6B.3.2 Intra-band non-contiguous EN-DC in FR1

For the E-UTRA sub-block containing one or multiple CC's, the requirement is dfined in clause 7.6.2.1 for single carrier operation and in clause 7.6.2.1A for CA in TS 36.101 [4].

For the NR sub-block, the requirement is defined in clause 7.6.3 is [2].

#### 7.6B.3.3 Inter-band EN-DC within FR1

Out-of band blocking requirements for E-UTRA single carrier and CA operation specified in clauses 7.6.2.1 and 7.6.2.1A of TS 36.101 [4] and for NR single carrier and CA operation specified in clauses 7.6.3 and 7.6A.3 of TS 38.101-1 [2] apply for lowest level EN-DC fallbacks (two bands) in clause 5.5B.4.1 with following conditions

one E-UTRA uplink carrier with the output power set to 4 dB below PCMAX\_L,c and the NR band whose downlink is being tested has its uplink carrier output power set to 29 dB below PCMAX\_L,f,c.

one NR uplink carrier with the output power set to 4 dB below PCMAX\_L,f,c on the NR band with both E-UTRA and NR downlinks being tested with E-UTRA output power set to 29 dB below PCMAX\_L,c.

If CW interferer falls in a gap between FDL\_high of the E-UTRA or NR band and FDL\_low of the NR or EUTRA band, where the corresponding OOB ranges 1 and 2 overlap, then the lower level interferer limit of the overlapping OOB ranges applies.

If FDL\_high of the lower E-UTRA or NR band is greater than or equal to the FDL\_low of the upper NR or E-UTRA band as in overlapping RX frequency ranges, then the OOB range shall start from the FDL\_low of the lower E-UTRA or NR band, and from the FDL\_high of the upper NR or E-UTRA band.

For EN‑DC combination listed in Table 7.6B.3.3-1 under the first test condition above, exceptions to the requirement specified in Table 7.6B.3.3-2 are allowed when the second order intermodulation product of the lower frequency band UL carrier and the CW interfering signal fully or partially overlaps with the higher frequency band DL carrier.

Table 7.6B.3.3-1: EN‑DC combination with exceptions allowed

|  |
| --- |
| EN-DC combination |
| DC\_5\_n78 |
| DC\_8\_n77 |
| DC\_8\_n78 |
| DC\_8\_n79 |
| DC\_11\_n77 |
| DC\_18\_n77 |
| DC\_18\_n78 |
| DC\_18\_n79 |
| DC\_19\_n77 |
| DC\_19\_n78 |
| DC\_19\_n79 |
| DC\_20\_n77 |
| DC\_20\_n78 |
| DC\_21\_n77 |
| DC\_26\_n77 |
| DC\_26\_n78 |
| DC\_26\_n79 |
| DC\_28\_n77 |
| DC\_28\_n78 |
| DC\_28\_n79 |

|  |  |  |
| --- | --- | --- |
| Parameter | Unit | Level |
| PInterferer (CW) | dBm | -441 |
| NOTE 1: The requirement applies when , where and are the carrier frequencies for lower frequency band UL and higher frequency band DL, respectively. and are the channel bandwidths configured for lower frequency band UL carrier and higher frequency band DL carrier in MHz, respectively. | | |

For each of the two test cases in clauses 7.6.2.1 and 7.6.2.1A of TS 36.101 [4] and for NR single carrier and CA operation specified in clauses 7.6.3 and 7.6A.3 of TS 38.101-1 [2] for all interferer frequency ranges a maximum of



exceptions are allowed for spurious response frequencies in each assigned frequency channel when measured using a step size of  MHz with *NRB* the 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 7.7 apply.

#### 7.6B.3.3a Inter-band NE-DC within FR1

Out-of band blocking requirements for E-UTRA single carrier and CA operation specified in clauses 7.6.2.1 and 7.6.2.1A of TS 36.101 [4] and for NR single carrier and CA operation specified in clauses 7.6.3 and 7.6A.3 of TS 38.101-1 [2] apply for lowest level NE-DC fallbacks (two bands) in clause 5.5B.4a.1 with following conditions

one E-UTRA uplink carrier with the output power set to 4 dB below PCMAX\_L,c and the NR band whose downlink is being tested has its uplink carrier output power set to 29 dB below PCMAX\_L,f,c.

one NR uplink carrier with the output power set to 4 dB below PCMAX\_L,f,c on the NR band with both E-UTRA and NR downlinks being tested with E-UTRA output power set to 29 dB below PCMAX\_L,c.

#### 7.6B.3.4 Inter-band EN-DC including FR2

Out-of band blocking requirements specified for E-UTRA single carrier and CA operation specified in clauses 7.6.2.1 and 7.6.2.1A of TS 36.101 [4] apply for lowest level EN-DC fallbacks (two bands) in clause 5.5B.5.1 with only E-UTRA UL with output power as in TS 36.101 [4] (4 dB below PCMAX\_L).

#### 7.6B.3.5 Inter-band EN-DC including both FR1 and FR2

Out-of band blocking requirements specified for E-UTRA single carrier and CA operation specified in clauses 7.6.2.1 and 7.6.2.1A of TS 36.101 [4] and for NR single carrier and CA operation specified in clauses 7.6.3 and 7.6A.3 of TS 38.101-1 [2] apply for lowest level EN-DC fallbacks (three bands) in clause 5.5B.6.2 with only E-UTRA UL with output power as in TS 36.101 [4] (4 dB below PCMAX\_L).

### 7.6B.4 Narrow band blocking for DC in FR1

#### 7.6B.4.1 Intra-band contiguous EN-DC in FR1

Intra-band contiguous EN-DC narrow band blocking requirement and parameters are defined in Table 7.6B.4.1-1.

Table 7.6B.4.1-1: Narrow band blocking parameters

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| EN-DC Aggregated Bandwidth, MHz | ≤100 | >100, ≤120 | >120, ≤140 | >140, ≤160 |
| Pw in Transmission Bandwidth Configuration, perCC, dBm | REFSENS + Aggregated BW specific value below | | | |
| 16 | | | |
| PUW, dBm (CW) | -55 | | | |
| NOTE 1: Jammer offset is from Table 7.6.3.1A-1 [4] and is applied from the lowest edge of the lowest carrier and the highest edge of the highest carrier  NOTE 2: Void.  NOTE 3: Void.  NOTE 4: If NR carrier BW > 40 MHz, no narrow band blocking requirements apply when blocker is applied at the edge of the NR carrier. | | | | |

#### 7.6B.4.2 Intra-band non-contiguous EN-DC in FR1

For the E-TRA sub-block containing one or multiple CC's, the requirement is deined in clause 7.6.3.1 for single carrier operation and in clause 7.6.3.1A for CA in TS 36.101 [4].

For the NR sub-block, the requirement is defined in clause 7.6.4 in TS 38.101-1 [2].

The blocker configuration is defined in the general clause 7.1.

#### 7.6B.4.3 Inter-band EN-DC within FR1

Narrow band blocking requirement for E-UTRA single carrier and CA operation specified in clauses 7.6.3.1 and 7.6.3.1A of TS 36.101 [4] and for NR single carrier and CA operation specified in clauses 7.6.4 and 7.6A.4 of TS 38.101-1 [2] apply.

7.6B.4.3a Inter-band NE-DC within FR1

Narrow band blocking requirement for E-UTRA single carrier and CA operation specified in clauses 7.6.3.1 and 7.6.3.1A of TS 36.101 [4] and for NR single carrier and CA operation specified in clauses 7.6.4 and 7.6A.4 of TS 38.101-1 [2] apply.

7.6B.4.4 Inter-band EN-DC including FR2

Narrow band blocking requirement for E-UTRA single carrier and CA operation specified in clauses 7.6.3.1 and 7.6.3.1A of TS 36.101 [4] apply.

7.6B.4.5 Inter-band EN-DC including both FR1 and FR2

Narrow band blocking requirement for E-UTRA single carrier and CA operation specified in clauses 7.6.3.1 and 7.6.3.1A of TS 36.101 [4] and for NR single carrier and CA operation specified in clauses 7.6.4 and 7.6A.4 of TS 38.101-1 [2] apply.

## 7.7 Void

## 7.7A Spurious response for CA

For inter-band NR CA between FR1 and FR2, the spurious response specified in TS 38.101-1 [2] apply for FR1.

## 7.7B Spurious response for DC in FR1

### 7.7B.1 Intra-band contiguous EN-DC in FR1

Intra-band contiguous EN-DC spurious response requirement and parameters are defined in Table 7.7B.1-1.

Table 7.7B.1-1: Spurious Response Parameters

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| EN-DC Aggregated Bandwidth, MHz | ≤100 | >100, ≤120 | >120, ≤140 | >140, ≤160 |
| Pw in Transmission Bandwidth Configuration, perCC, dBm | REFSENS + Aggregated BW specific value below | | | |
| 9 | | | |
| Pinterferer, dBm (CW) | -44 | | | |
| NOTE 1: Void.  NOTE 2: Void. | | | | |

### 7.7B.2 Intra-band non-contiguous EN-DC in FR1

For the E-UTRA sub-block containing one or multiple CC's, the requirement is defined in clause 7.7.1 for single carrier operation and in clause 7.7.1A for CA in TS 36.101 [4].

For the NR sub-block, the requirement is defined in clause 7.7 is [2].

### 7.7B.3 Inter-band EN-DC within FR1

Spurious response requirement for E-UTRA single carrier and CA operation specified in clauses 7.7.1 and 7.7.1A of TS 36.101 [4] and for NR single carrier and CA operation specified in clauses 7.7 and 7.7A of TS 38.101-1 [2] apply for lowest level EN-DC fallbacks (two bands) in clause 5.5B.4.1 with following conditions

- one E-UTRA uplink carrier with the output power set to 4 dB below PCMAX\_L,c and the NR band whose downlink is being tested has its uplink carrier output power set to 29 dB below PCMAX\_L,f,c.

- one NR uplink carrier with the output power set to 4 dB below PCMAX\_L,f,c on the NR band with both E-UTRA and NR downlinks being tested with E-UTRA output power set to 29 dB below PCMAX\_L,c.

7.7B.3a Inter-band NE-DC within FR1

Spurious response requirement for E-UTRA single carrier and CA operation specified in clauses 7.7.1 and 7.7.1A of TS 36.101 [4] and for NR single carrier and CA operation specified in clauses 7.7 and 7.7A of TS 38.101-1 [2] apply for lowest level NE-DC fallbacks (two bands) in clause 5.5B.4a.1 with following conditions

one E-UTRA uplink carrier with the output power set to 4 dB below PCMAX\_L,c and the NR band whose downlink is being tested has its uplink carrier output power set to 29 dB below PCMAX\_L,f,c.

one NR uplink carrier with the output power set to 4 dB below PCMAX\_L,f,c on the NR band with both E-UTRA and NR downlinks being tested with E-UTRA output power set to 29 dB below PCMAX\_L,c.

7.7B.4 Inter-band EN-DC including FR2

Spurious response requirement for E-UTRA single carrier and CA operation specified in clauses 7.7.1 and 7.7.1A of TS 36.101 [4] apply for lowest level EN-DC fallbacks (two bands) in clause 5.5B.5.1 with only E-UTRA UL with output power as in TS 36.101 [4] (4 dB below PCMAX\_L).

7.7B.5 Inter-band EN-DC including both FR1 and FR2

Spurious response requirement for E-UTRA single carrier and CA operation specified in clauses 7.7.1 and 7.7.1A of TS 36.101 [4] and for NR single carrier and CA operation specified in clauses 7.7 and 7.7A of TS 38.101-1 [2] apply for lowest level EN-DC fallbacks (three bands) in clause 5.5B.6.2 with only E-UTRA UL with output power as in TS 36.101 [4] (4 dB below PCMAX\_L).

## 7.8 Void

## 7.8A Intermodulation characteristics for CA

For inter-band NR CA between FR1 and FR2, the intermodulation characteristics specified in TS 38.101-1 [2] apply for FR1.

## 7.8B Intermodulation characteristics for DC in FR1

### 7.8B.1 General

### 7.8B.2 Wide band Intermodulation

#### 7.8B.2.1 Intra-band contiguous EN-DC in FR1

Intra-band contiguous EN-DC wide band intermodulation requirement and parameters are defined in Table 7.8B.2.1-1.

**Table 7.8B.2.1-1: Wide band intermodulation**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| EN-DC Aggregated Bandwidth, MHz | <=100 | >100, <=120 | >120, <=140 | >140, <=160 |
| Pw in Transmission Bandwidth Configuration, perCC, dBm | PW 1 | REFSENS + Aggregated BW specific value below | | |
| 16.8 | 17.5 | 18.0 |
| Pinterferer 1, dBm (CW)2 | -46 | | | |
| Pinterferer 2, dBm (Modulated)2 | -46 | | | |
| NOTE 1: PW is wanted signal power level from Table 7.8.1A-1 in TS 36.101 [4]  NOTE 2: Jammer BW and offsets is from Table 7.8.1A-1 [4] and is applied from the lowest edge of the lowest carrier and the highest edge of the highest carrier  NOTE 3: Void.  NOTE 4: Void. | | | | |

#### 7.8B.2.2 Intra-band non-contiguous EN-DC in FR1

For the E-UTRA sub-block containing one or multiple CC's, the requirement is defined in clause 7.8.1 for single carrier operation and in clause 7.8.1A for CA in TS 36.101 [4].

For the NR sub-block, the requirement is defined in clause 7.8.2 in TS 38.101-1 [2].

The blocker configuration is defined in the general clause 7.1 and the requirement only apply for out of gap interferers.

#### 7.8B.2.3 Inter-band EN-DC within FR1

Wide band Intermodulation requirement for E-UTRA single carrier and CA operation specified in clauses 7.8.1 and 7.8.1A of TS 36.101 [4] and for NR single carrier and CA operation specified in clauses 7.8.2 and 7.8A.2 of TS 38.101-1 [2] apply.

7.8B.2.3a Inter-band NE-DC within FR1

Wide band Intermodulation requirement for E-UTRA single carrier and CA operation specified in clauses 7.8.1 and 7.8.1A of TS 36.101 [4] and for NR single carrier and CA operation specified in clauses 7.8.2 and 7.8A.2 of TS 38.101-1 [2] apply.

7.8B.2.4 Inter-band EN-DC including FR2

Wide band Intermodulation requirement for E-UTRA single carrier and CA operation specified in clauses 7.8.1 and 7.8.1A of TS 36.101 [4] apply.

7.8B.2.5 Inter-band EN-DC including both FR1 and FR2

Wide band Intermodulation requirement for E-UTRA single carrier and CA operation specified in clauses 7.8.1 and 7.8.1A of TS 36.101 [4] and for NR single carrier and CA operation specified in clauses 7.8.2 and 7.8A.2 of TS 38.101-1 [2] apply.

## 7.9 Void

## 7.9A Spurious emissions for CA

For inter-band NR CA between FR1 and FR2, the spurious emission specified in TS 38.101-1 [2] and TS 38.101-2 [3] apply for FR1 and FR2 respectively.

## 7.9B Spurious emissions for DC in FR1

### 7.9B.1 Intra-band contiguous EN-DC in FR1

The requirement is defined in clause 7.9A.1 in TS 38.101-1 [2].

### 7.9B.2 Intra-band non-contiguous EN-DC in FR1

Spurious emissions requirement for E-UTRA single carrier and CA operation specified in clauses 7.9.1 and 7.9.1A of TS 36.101 [4] and for NR single carrier and CA operation specified in clauses 7.9 and 7.9A of TS 38.101-1 [2] apply.

### 7.9B.3 Inter-band EN-DC within FR1

E-UTRA requirements from TS 36.101 [4] and NR requirements from TS 38.101-1 [2] apply.

7.9B.3a Inter-band NE-DC within FR1

E-UTRA requirements from TS 36.101 [4] and NR requirements from TS 38.101-1 [2] apply.

7.9B.4 Inter-band EN-DC including FR2

Spurious emissions requirement for E-UTRA single carrier and CA operation specified in clauses 7.9.1 and 7.9.1A of TS 36.101 [4] and for NR single carrier and CA operation specified in clause 7.9 of TS 38.101-2 [3] apply.

7.9B.5 Inter-band EN-DC including both FR1 and FR2

Spurious emissions requirement for E-UTRA single carrier and CA operation specified in clauses 7.9.1 and 7.9.1A of TS 36.101 [4] and for NR single carrier and CA operation specified in clauses 7.9 and 7.9A of TS 38.101-1 [2] and TS 38.101-2 [3] apply.