**3GPP TSG-RAN WG4 Meeting #108bis Rev R4-2315970
Xiamen, China, 9 – 13 Oct, 2023**

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| --- |
| *CR-Form-v12.2* |
| **CHANGE REQUEST** |
|  |
|  | **38.101-3** | **CR** |  | **rev** |  | **Current version:** | **18.2.0** |  |
|  |
| *For* [***HE******LP***](http://www.3gpp.org/3G_Specs/CRs.htm#_blank)*on using this form: comprehensive instructions can be found at* [*http://www.3gpp.org/Change-Requests*](http://www.3gpp.org/Change-Requests)*.* |
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| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| ***Proposed change affects:*** | UICC apps |  | ME | **X** | Radio Access Network |  | Core Network |  |

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| --- |
|  |
| ***Title:***  | Draft R18 38101-3 CR for 3Tx inter-band ENDC |
|  |  |
| ***Source to WG:*** | OPPO |
| ***Source to TSG:*** | R4 |
|  |  |
| ***Work item code:*** | 4Rx\_low\_NR\_band\_handheld\_3Tx\_NR\_CA\_ENDC-Core |  | ***Date:*** | 2023-09-20 |
|  |  |  |  |  |
| ***Category:*** | **B** |  | ***Release:*** | Rel-18 |
|  | *Use one of the following categories:****F*** *(correction)****A*** *(mirror corresponding to a change in an earlier release)****B*** *(addition of feature),* ***C*** *(functional modification of feature)****D*** *(editorial modification)*Detailed explanations of the above categories canbe found in 3GPP [TR 21.900](http://www.3gpp.org/ftp/Specs/html-info/21900.htm). | *Use one of the following releases:Rel-8 (Release 8)Rel-9 (Release 9)Rel-10 (Release 10)Rel-11 (Release 11)…Rel-16 (Release 16)Rel-17 (Release 17)Rel-18 (Release 18)Rel-19 (Release 19)* |
|  |  |
| ***Reason for change:*** | Inter-band ENDC with 3Tx is introduced in Rel-18, the requirements need to be defined. |
|  |  |
| ***Summary of change:*** | Introduce requirements for inter-band ENDC+UL MIMO. |
|  |  |
| ***Consequences if not approved:*** | The requirements for inter-band ENDC with 3Tx will not be defined. |
|  |  |
| ***Clauses affected:*** | 4.2; 4.3; 5.5B.4; 6.2H; 6.3H; 6.4H; 6.5H; 7.1; 7.3B.2.3 |
|  |  |
|  | **Y** | **N** |  |  |
| ***Other specs*** |  | **X** |  Other core specifications  | TS/TR ... CR ...  |
| ***affected:*** | **X** |  |  Test specifications | TS 38.521-3 |
| ***(show related CRs)*** |  | **X** |  O&M Specifications | TS/TR ... CR ...  |
|  |  |
| ***Other comments:*** |  |
|  |  |
| ***This CR's revision history:*** |  |

## <<< START OF CHANGES >>>

## 4.2 Applicability of minimum requirements

a) In this specification the Minimum Requirements are specified as general requirements and additional requirements. Where the Requirement is specified as a general requirement, the requirement is mandated to be met in all scenarios

b) For specific scenarios for which an additional requirement is specified, in addition to meeting the general requirement, the UE is mandated to meet the additional requirements.

c) The spurious emissions power requirements are for the long-term average of the power. For the purpose of reducing measurement uncertainty it is acceptable to average the measured power over a period of time sufficient to reduce the uncertainty due to the statistical nature of the signal

d) Terminal that supports EN-DC or NE-DC configuration shall meet E-UTRA requirements as specified in TS 36.101 [4] and NR requirements as in TS 38.101-1 [2] and TS 38.101-2 [3] unless otherwise specified in this specification

e) All the requirements for intra-band contiguous and non-contiguous EN-DC or NE-DC apply under the assumption of the same uplink-downlink and special subframe configurations in the E-UTRA and slot format indicated by UL-DL-configurationCommon and UL-DL-configurationDedicated in the NR for the EN-DC or NE-DC, a time offset between the two RATs configurations may be required.

f) For EN-DC or NE-DC combinations with CA configurations for E-UTRA and/or NR, all the requirements for E-UTRA and/or NR all the requirements for E-UTRA and/or NR intra-band contiguous and non-contiguous CA apply under the assumption of the same slot format indicated by UL-DL-configurationCommon and UL-DL-configurationDedicated in the PSCell and SCells for NR and the same uplink-downlink and special subframe configurations in Pcell and SCells for E-UTRA.

A terminal which supports an EN-DC or NE-DC configuration shall support:

 If any subsets of the EN-DC or NE-DC configuration do not specify its own bandwidth combination sets in 5.3B, then the terminal shall support the same E-UTRA bandwidth combination sets it signals the support for in E-UTRA CA configuration part of E-UTRA – NR DC and shall support the same NR bandwidth combination sets it signals the support for in NR CA configuration part of E-UTRA – NR DC.

Else if one of the subsets of the EN-DC or NE-DC configuration specify its own bandwidth combination sets in 5.3B, then the terminal shall support a product set of channel bandwidth for each band specified by E-UTRA bandwidth combination sets, NR bandwidth combination sets, and EN-DC or NE-DC bandwidth combination sets it singnals the support.A terminal which supports an inter-band EN-DC or NE-DC configuration with a certain UL configuration shall support the all lower order DL configurations of the lower order EN-DC or NE-DC combinations, which have this certain UL configuration and the fallbacks of this UL configuration.

A terminal which supports NE-DC configurations shall meet the minimum requirements for corresponding EN-DC configuration, unless otherwise specified.

For CA or DC configurations, which include FR2 intra-band CA combinations with multiple FR2 sub-blocks, where at least one of the sub-blocks is a contiguous CA combination :

- if the field *partialFR2-FallbackRX-Req* is not present, the UE shall meet all applicable UE RF requirements for the highest order CA configuration and all associated fallback CA configurations;

- if the field *partialFR2-FallbackRX-Req* is present, for each FR2 intra-band CA configuration with multiple sub-blocks that the UE indicates support for explicitly in UE capability signalling: the in-gap UE RF requirements in clauses 7.5A, 7.5B, 7.6A, 7.6B apply as the equivalent requirements for the associated fallback FR2 intra-band CA configurations with the same number of sub-blocks, where at least one of the sub-blocks consists of a contiguous CA configuration. The UE shall meet all applicable UE RF requirements for fallback CA configurations with a lesser number of sub-blocks;

- regardless of the field *partialFR2-FallbackRX-Req*, the UE shall meet all DL out-of-gap requirements for all lower order fallback CA configurations.

Terminal that supports inter-band NR-DC between FR1 and FR2 configuration shall meet the requirements for corresponding CA configuration (suffix A), unless otherwise specified.

For a terminal that supports inter-band Dual-Connectivity (DC) with UL MIMO or Tx diversity operation, the requirements are targeted for FWA form factor in current specification.

## 4.3 Specification suffix information

Unless stated otherwise the following suffixes are used for indicating at 2nd level clause, shown in Table 4.3-1.

Table 4.3-1: Definition of suffixes

|  |  |
| --- | --- |
| Clause suffix | Variant |
| None | Single Carrier |
| A | Carrier Aggregation (CA) between FR1 and FR2 |
| B | Dual-Connectivity (DC) with and without SUL including UL sharing from UE perspective, inter-band NR DC between FR1 and FR2 |
| D | UL MIMO |
| E | V2X |
| F | Shared spectrum channel access |
| H | Dual-Connectivity (DC) with UL MIMO |

## <<< Unchanged sections omitted >>>

### 5.5B.4 Inter-band EN-DC within FR1

#### 5.5B.4.1 Inter-band EN-DC configurations within FR1 (two bands)

Table 5.5B.4.1-1: Inter-band EN-DC configurations within FR1 (two bands)

| **EN-DC****configuration** | **Uplink EN-DC****configuration****(NOTE 1)** | **Single UL allowed** | **DL interruption allowed****(Note 14)** |
| --- | --- | --- | --- |
| DC\_1A\_n3ADC\_1C\_n3A | DC\_1A\_n3ADC\_1C\_n3A | DC\_1\_n3 |  |
| DC\_1A\_n5A | DC\_1A\_n5A | No |  |
| DC\_1A\_n7ADC\_1A\_n7B | DC\_1A\_n7ADC\_1A\_n7B | No |  |
| DC\_1A-1A\_n7ADC\_1A-1A\_n7B | DC\_1A\_n7A | No |  |
| DC\_1A\_n8A | DC\_1A\_n8A | No |  |
| DC\_1A\_n20A | DC\_1A\_n20A | No |  |
| DC\_1A\_n28A | DC\_1A\_n28A | No |  |
| DC\_1A\_n26A | DC\_1A\_n26A | No |  |
| DC\_1A-1A\_n28A | DC\_1A\_n28A | No |  |
| DC\_1A\_n38ADC\_1C\_n38A | DC\_1A\_n38A | No |  |
| DC\_1A\_n40ADC\_1A\_n40B | DC\_1A\_n40A | No |  |
| DC\_1A\_n41A7 | DC\_1A\_n41A | No |  |
| DC\_1A\_n50A | DC\_1A\_n50A | No |  |
| DC\_1A\_n51A | DC\_1A\_n51A | No |  |
| DC\_1A\_n71ADC\_1A\_n71B | DC\_1A\_n71A | No |  |
| DC\_1A\_n77A7DC\_1A\_n77C7 | DC\_1A\_n77A | DC\_1\_n77 | No |
| DC\_1A\_n77(2A)7,21DC\_1A\_n77(3A)7 | DC\_1A\_n77A21 | DC\_1\_n77 | No |
| DC\_1A\_n78A7DC\_1A\_n78C7, 21 | DC\_1A\_n78A 21 | No | No |
| DC\_1A\_n78(2A)7,21DC\_1A\_n78(A-C)7 | DC\_1A\_n78A21 | No | No |
| DC\_1A-1A\_n78A | DC\_1A\_n78A | No | No |
| DC\_1A\_n79A7DC\_1A\_n79C7 | DC\_1A\_n79A | No | No |
| DC\_1A\_n105A | DC\_1A\_n105A | No |  |
| DC\_2A\_n5A | DC\_2A\_n5A | No |  |
| DC\_2A-2A\_n5A | DC\_2A\_n5A | No |  |
| DC\_2A\_n7A | DC\_2A\_n7A | No |  |
| DC\_2A\_n7(2A) | DC\_2A\_n7A | No |  |
| DC\_2A-2A\_n7A | DC\_2A\_n7A | No |  |
| DC\_2A\_n12A | DC\_2A\_n12A | No |  |
| DC\_2A\_n25A11, 13, 20 | N/A | N/A |  |
| DC\_2A\_n28A | DC\_2A\_n28A | No |  |
| DC\_2A\_n30A | DC\_2A\_n30A | No |  |
| DC\_2A-2A\_n30A | DC\_2A\_n30A | No |  |
| DC\_2A\_n38A | DC\_2A\_n38A | No |  |
| DC\_2A-2A\_n38A | DC\_2A\_n38A | No |  |
| DC\_2A\_n41ADC\_2A\_n41CDC\_2C\_n41A | DC\_2A\_n41ADC\_2C\_n41A | No |  |
| DC\_2A\_n41(2A) | DC\_2A\_n41A | No |  |
| DC\_2A-2A\_n41A | DC\_2A\_n41A | No |  |
| DC\_2A\_n46A | DC\_2A\_n46A | No |  |
| DC\_2A\_n48ADC\_2A\_n48B | DC\_2A\_n48A | No |  |
| DC\_2A\_n66A | DC\_2A\_n66A | DC\_2\_n66 |  |
| DC\_2A\_n66(2A) | DC\_2A\_n66A | DC\_2\_n66 |  |
| DC\_2A-2A\_n66A | DC\_2A\_n66A | DC\_2\_n66 |  |
| DC\_2A\_n71ADC\_2A\_n71BDC\_2C\_n71A | DC\_2A\_n71A | No |  |
| DC\_2A-2A\_n71A | DC\_2A\_n71A | No |  |
| DC\_2A\_n77ADC\_2A\_n77C21 | DC\_2A\_n77A21 | DC\_2\_n77 |  |
| DC\_2A\_n77(2A) 21 | DC\_2A\_n77A21 | DC\_2\_n77 |  |
| DC\_2A-2A\_n77A21DC\_2A-2A\_n77C21 | DC\_2A\_n77A21 | DC\_2\_n77 |  |
| DC\_2A-2A\_n77(2A) 21 | DC\_2A\_n77A21 | DC\_2\_n77 |  |
| DC\_2A\_n78A | DC\_2A\_n78A | DC\_2\_n78 |  |
| DC\_2A-2A\_n78(2A) | DC\_2A\_n78A | DC\_2\_n78 |  |
| DC\_2A\_n78(2A) | DC\_2A\_n78A | DC\_2\_n78 |  |
| DC\_2A-2A\_n78A | DC\_2A\_n78A | DC\_2\_n78 |  |
| DC\_3A\_n1ADC\_3C\_n1A | DC\_3A\_n1ADC\_3C\_n1A | DC\_3\_n1 |  |
| DC\_3A-3A\_n1A | DC\_3A\_n1A | DC\_3\_n1 |  |
| DC\_3A\_n5ADC\_3C\_n5A | DC\_3A\_n5A | DC\_3\_n5 |  |
| DC\_3A\_n7ADC\_3A\_n7BDC\_3C\_n7ADC\_3C\_n7B | DC\_3A\_n7ADC\_3A\_n7BDC\_3C\_n7A | No |  |
| DC\_3A-3A\_n7ADC\_3A-3A\_n7B | DC\_3A\_n7A | No |  |
| DC\_3A\_n8A | DC\_3A\_n8A | No |  |
| DC\_3A-3A\_n8A | DC\_3A\_n8A | No |  |
| DC\_3A\_n20ADC\_3C\_n20A | DC\_3A\_n20A | No |  |
| DC\_3A\_n26ADC\_3C\_n26A | DC\_3A\_n26ADC\_3C\_n26A | Yes |  |
| DC\_3A\_n28ADC\_3C\_n28A | DC\_3A\_n28ADC\_3C\_n28A | No |  |
| DC\_3A\_n34A | DC\_3A\_n34A | No |  |
| DC\_3A\_n38ADC\_3C\_n38A | DC\_3A\_n38A | No |  |
| DC\_3A\_n40ADC\_3A\_n40B | DC\_3A\_n40A | No |  |
| DC\_3A\_n41A7DC\_3A\_n41CDC\_3C\_n41A7 | DC\_3A\_n41ADC\_3C\_n41A | DC\_3\_n41 | No |
| DC\_3A\_n50A | DC\_3A\_n50A | No |  |
| DC\_3A\_n51A | DC\_3A\_n51A | No |  |
| DC\_3A\_n71ADC\_3A\_n71B | DC\_3A\_n71A | No |  |
| DC\_3A\_n77A7DC\_3A\_n77C7DC\_3C\_n77A7,21 | DC\_3A\_n77A21DC\_3C\_n77A | DC\_3\_n77 | No |
| DC\_3A\_n77(2A)7,21DC\_3A\_n77(3A)7DC\_3C\_n77(2A)7,21 | DC\_3A\_n77A,21DC\_3C\_n77A | DC\_3\_n77 | No |
| DC\_3A-3A\_n77A7 | DC\_3A\_n77A | DC\_3\_n77 | No |
| DC\_3A\_n78A7,ADC\_3A\_n78C7DC\_3C\_n78A7 | DC\_3A\_n78ADC\_3C\_n78A | DC\_3\_n78 | No |
| DC\_3A\_n78(2A)7,21DC\_3A\_n78(A-C)7DC\_3C\_n78(2A)7 | DC\_3A\_n78A,21DC\_3C\_n78A | DC\_3\_n78 | No |
| <<< Unchanged sections omitted >>> |
| DC\_40A\_n77ADC\_40A\_n77C | DC\_40A\_n77A | No |  |
| DC\_40A\_n78AADC\_40C\_n78A | DC\_40A\_n78ADC\_40C\_n78A | No |  |
| DC\_40A\_n78(2A)DC\_40C\_n78(2A) | DC\_40A\_n78ADC\_40C\_n78A | No |  |
| <<< Unchanged sections omitted >>> |
| NOTE 1: Uplink EN-DC configurations are the configurations supported by the present release of specifications.NOTE 2: Restricted to E-UTRA operation when inter-band carrier aggregation is configured. The downlink operating band for Band 46 is paired with the uplink operating band (external E-UTRA band) of the carrier aggregation configuration that is supporting the configured Pcell.NOTE 3: The minimum requirements apply only when there is non-simultaneous Tx/Rx operation between E-UTRA and NR carriers. This restriction applies also for these carriers when applicable EN-DC configuration is part of a higher order EN-DC configuration.NOTE 4: For UEs not indicating *interBandMRDC-WithOverlapDL-Bands-r16*, the minimum requirements for intra-band non-contiguous EN-DC apply for the Band 42/48 and Band n77/n78 combination. For UEs not indicating *interBandMRDC-WithOverlapDL-Bands-r16*, when UE capability *interBandContiguousMRDC* is indicated, the minimum requirements for intra-band-contiguous EN-DC also should be met in addtion to intra-band non-contiguous EN-DC*.* The intra-band requirements also apply for these carriers when applicable EN-DC configuration is a subset of a higher order EN-DC configuration.NOTE 5: The frequency range above 3600 MHz for Band n78 is not used in this combination.NOTE 6: The frequency range below 2506 MHz for Band 41 is not used in this combination.NOTE 7: Applicable for UE supporting inter-band EN-DC with mandatory simultaneous Rx/Tx capability.NOTE 8: The frequency range in band n28 / 28 is restricted for this band combination to 703 - 733 MHz for the UL and 758-788 MHz for the DL. This restriction also apply for any band combinations when DC\_20\_n28/ DC\_28\_n20/ CA\_20-28/ CA\_n20-n28 is a subset of a higher order band combination.NOTE 9: The combination is not used alone as fall back mode of other band combinations in which UL in Band 42 or Band 48 is not used.NOTE 10: Void.NOTE 11: For UEs not indicating *interBandMRDC-WithOverlapDL-Bands-r16*, the minimum requirements for apply when the maximum power spectral density imbalance between downlink carriers is within 6 dB. For UEs indicating interBandMRDC-WithOverlapDL-Bands-r16, the power imbalance requirement defined in clause 7.6B.2.6 apply. For these UEs, the power spectral density imbalance condition also applies for these carriers when applicable EN-DC configuration is a subset of a higher order EN-DC configuration.NOTE 12: Applicable for frequency range above 4800 MHz for Band n79 in this combination.NOTE 13: For UEs not indicating *interBandMRDC-WithOverlapDL-Bands-r16*, the minimum requirements apply for synchronized DL carriers with a maximum receive time difference ≤ 3 usec. The requirements also apply for these carriers when applicable EN-DC configuration is a subset of a higher order EN-DC configuration.NOTE 14: Applicable when dynamic switching between two uplink carriers is conducted. The DL interruption requirements for NR DL carrier(s) and E-UTRA DL carrier(s) are specified in clause 8.2.1.2.14 of 38.133 [15] and clause 7.32.2.12 of 36.133 [16] respectively.NOTE 15: Simultaneous Rx/Tx capability does not apply for UEs supporting band 42 with a n77 implementation only. Same restrictions are applied to related higher order configurations.NOTE 16: The frequency range in band n41 is restricted for this band combination to 2595 – 2645 MHz.NOTE 17: The frequency range in band n28 is restricted for this band combination to 728 - 738 MHz for the UL and 783 - 793 MHz for the DL. This restriction applies also for these band combinations when applicable EN-DC configuration is part of a higher order EN-DC configuration.NOTE 18: Only single switched UL is supported.NOTE 19: The implementation with 4 antennas is targeted for FWA form factor for this band combination.NOTE 20: The combination is not used alone as fallback mode of other band combinations in which UL in Band 2 is not used.NOTE 21: For this DC configuration, reference sensitivity exceptions for Power Class 2, if allowed, are specified in Clause 7.3B.2.3 with 1Tx antenna connector in each band. If the uplink EN-DC configuration supported in Table 6.2B.1.3-1 is applicable to the same EN-DC configuration, the note is not shown as the reference sensitivity exceptions, if any, have been confirmed.NOTE 22: The PC2 Uplink EN-DC configuration supported in Table 6.2B.1.3-1 is applicable to the same EN-DC configuration without additional indication of NOTE 21.NOTE A: Minimum requirements for Power Class 2 are applicable for this uplink combination with UL MIMO supported in one of the two bands as specified in Table 6.2H.1.3-1. |

## <<< Unchanged sections omitted >>>

## 6.2H Transmitter power for DC with UL MIMO

### 6.2H.1 UE maximum output power for DC with UL MIMO

#### 6.2H.1.1 void

#### 6.2H.1.2 void

#### 6.2H.1.3 Inter-band EN-DC with UL MIMO 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 6.2H.1.3-1: Maximum output power for inter-band EN-DC with UL MIMO (two bands)

| EN-DC configuration | Power class 2(dBm) | Tolerance(dB) | Power class 3(dBm) | Tolerance(dB) |
| --- | --- | --- | --- | --- |
| DC\_3A\_n78A5 | 26 | +2/-3 | 23 | +2/-3 |
| DC\_40A\_n78A5,6 | 26 | +2/-3 | 23 | +2/-3 |
| NOTE 1: An uplink DC configuration in which at least one of the bands has NOTE 3 in Table 6.2.1-1 in TS 38.101-1 or NOTE 2 in Table 6.2.2-1 in TS 36.101 is allowed to reduce the lower tolerance limit by 1.5 dB when the transmission bandwidths of at least one of the bands is confined within FUL\_low and FUL\_low + 4 MHz or FUL\_high - 4 MHz and FUL\_high.NOTE 2: PPowerClass, EN-DC is the maximum UE power specified without taking into account the toleranceNOTE 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.NOTE 5: The UE supports PC3 in E-UTRA band, and supports PC2 with UL MIMO in NR bandNOTE 6: The UE supports PC3 in E-UTRA band, and supports PC3 with UL MIMO in NR bandNOTE 7: FWA form factor is targeted unless otherwise stated. |

If a UE supports a different power class than the default UE power class for an E-UTRA TDD and NR TDD Inter-band EN-DC band combination and the supported power class enables higher maximum output power than that of the default power class:

– if the field of UE capability *maxUplinkDutyCycle-interBandENDC-TDD-PC2-r16* is absent and the percentage of NR uplink symbols transmitted in a certain evaluation period is larger than 30% (The exact evaluation period is no less than one radio frame); or

– if the field of UE capability *maxUplinkDutyCycle-interBandENDC-TDD-PC2-r16* is present and the percentage of NR uplink symbols transmitted in a certain evaluation period is larger than *maxUplinkDutyCycle-interBandENDC-TDD-PC2-r16* as defined in TS38.331 (The exact evaluation period is no less than one radio frame); or

– if the IE *p-maxUE-FR1* as defined in TS 38.331 is provided and set to the maximum output power of the default power class or lower;

– shall apply all requirements for the default power class to the supported power class and set the configured transmitted power as specified sub-clause 6.2H.4;

– Else if the IE *p-maxUE-FR1* as defined in TS 38.331 is not provided or set to the higher value than the maximum output power of the default power class and the percentage of NR uplink symbols transmitted in a certain evaluation period is less than or equal t*o maxUplinkDutyCycle-interBandENDC-TDD-PC2-r16* as defined in TS 38.331; or

– if the IE *p-maxUE-FR1* as defined in TS 38.331 is not provided or set to the higher value than the maximum output power of the default power class and the percentage of NR uplink symbols transmitted in a certain evaluation period is less than or equal to 30% when *maxUplinkDutyCycle-interBandENDC-TDD-PC2-r16* is absent. (The exact evaluation period is no less than one radio frame):

– shall apply all requirements for the supported power class and set the configured transmitted power class as specified in sub-clause 6.2H.4.

If a UE supports a different power class than the default UE power class for an E-UTRA FDD and NR TDD EN-DC band combination and the supported power class enables higher maximum output power than that of the default power class:

If UE indicating the two capabilities *maxUplinkDutyCycle-FDD-TDD-EN-DC1* and *maxUplinkDutyCycle-FDD-TDD-EN-DC2*:

– if the IE *p-maxUE-FR1* as defined in TS 38.331 is not provided or set to the higher value than the maximum output power of the default power class, and the percentage of EUTRA uplink symbols transmitted in a certain evaluation period is between 40% and 70%, and the percentage of NR uplink symbols transmitted in a certain evaluation period is less than or equal t*omaxUplinkDutyCycle-FDD-TDD-EN-DC1*as defined in TS 38.331 (The exact evaluation period is no less than one radio frame); or

– if the IE *p-maxUE-FR1* as defined in TS 38.331 is not provided or set to the higher value than the maximum output power of the default power class, and the percentage of EUTRA uplink symbols transmitted in a certain evaluation period is no larger than 40%, and the percentage of NR uplink symbols transmitted in a certain evaluation period is less than or equal t*o maxUplinkDutyCycle-FDD-TDD-EN-DC2* as defined in TS 38.331 (The exact evaluation period is no less than one radio frame)

– shall apply all requirements for the supported power class and set the configured transmitted power class as specified in sub-clause 6.2H.4.

– else

– shall apply all requirements for the default power class and set the configured transmitted power as specified sub-clause 6.2H.4;

else

– shall apply all requirements for the supported power class and set the configured transmitted power as specified sub-clause 6.2H.4;

## <<< Unchanged sections omitted >>>

### 6.2H.2 UE maximum output power reduction for DC with UL MIMO

#### 6.2H.2.1 void

#### 6.2H.2.2 void

#### 6.2H.2.3 Inter-band EN-DC with UL MIMO 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.

## <<< Unchanged sections omitted >>>

### 6.2H.3 UE additional maximum output power reduction for EN-DC with UL MIMO

#### 6.2H.3.1 void

#### 6.2H.3.2 void

#### 6.2H.3.3 Inter-band EN-DC with UL MIMO within FR1

For inter-band EN-DC with UL MIMO in one of the two frequency bands, unless specified in Table 6.2B.3.3-1, 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.

## <<< Unchanged sections omitted >>>

### 6.2H.4 Configured output power for DC with UL MIMO

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

##### 6.2H.4.1.1 void

##### 6.2H.4.1.2 void

6.2H.4.1.3 Inter-band EN-DC with UL MIMO within FR1

For inter-band UL CA with UL MIMO in one of the two frequency bands, the requirements in clause 6.2A.4.1.3 apply except that:

- If the NR component carrier is configured with UL MIMO, the MPRc and A-MPRc are specified in clause 6.2D.2 and clause 6.2D.3 of [2] respectively.

## <<< Unchanged sections omitted >>>

6.3H Output power dynamics for DC with UL MIMO

### 6.3H.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 with UL MIMO, output power dynamics requirement for E-UTRA single carrier operation specified in clauses 6.3 of TS 36.101 [4] and for NR single carrier with UL MIMO operation specified in clause 6.3D of TS 38.101-1 [2] apply.

### 6.3H.1 void

### 6.3H.2 void

### 6.3H.3 Output power dynamics for inter-band EN-DC with UL MIMO

For a UE indicating support of IE *singleUL-Transmission* for the specific inter-band EN-DC combination with UL MIMO for which only single switched UL is supported, the requirements defined in 6.3B.5 apply.

## <<< Unchanged sections omitted >>>

## 6.4H Transmit signal quality for DC with UL MIMO

### 6.4H.1 Frequency error for DC with UL MIMO

#### 6.4H.1.1 void

#### 6.4H.1.2 void

#### 6.4H.1.3 Frequency error for inter-band EN-DC with UL MIMO within FR1

For inter-band EN-DC with UL MIMO and 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 6.4D.1 in TS 38.101-1 [2], respectively, with all component carriers active.

## <<< Unchanged sections omitted >>>

## 6.5H Output RF spectrum emissions for DC with UL MIMO

### 6.5H.1 Occupied bandwidth for EN-DC with UL MIMO

#### 6.5H.1.1 void

#### 6.5H.1.2 void

#### 6.5H.1.3 Inter-band EN-DC with UL MIMO within FR1

Occupied bandwidth requirement for E-UTRA single carrier specified in clauses 6.6.1 of TS 36.101 [4] and for NR single carrier specified in clause 6.5D.1 of TS 38.101-1 [2] apply.

### 6.5H.2 Out-of-band emissions for DC with UL MIMO

#### 6.5H.2.1 void

#### 6.5H.2.2 void

#### 6.5H.2.3 Inter-band EN-DC with UL MIMO 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 6.5D.2 of TS 38.101-1 [2] apply for each component carrier.6.5H.3 Spurious emissions for DC with UL MIMO

#### 6.5H.3.1 void

#### 6.5H.3.2 void

#### 6.5H.3.3 Inter-band EN-DC with UL MIMO within FR1

The requirements in 6.5B.3.3 apply except that:

- For the NR component carrier configured with UL MIMO, the general spurious emissions specified in clause 6.5D.3.1 of TS 38.101-1 [2] are applied, and the coexistence band protection requirements specified in clause 6.5D.3.2 of [2] are applied.

### 6.5H.4 Additional spurious emissions for DC with UL MIMO

#### 6.5H.4.1 void

#### 6.5H.4.2 void

#### 6.5H.4.3 Inter-band EN-DC with UL MIMO within FR1

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

### 6.5H.5 Transmit intermodulation for DC with UL MIMO

#### 6.5H.5.1 void

#### 6.5H.5.2 void

#### 6.5H.5.3 Inter-band EN-DC with UL MIMO within FR1

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

## <<< Unchanged sections omitted >>>

# 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 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 sub-clauses with suffix A or B: the minimum requirements for band combinations including Band n41 also apply for the corresponding band combinations with Band n90 replacing Band n41 but with otherwise identical parameters. For brevity the said band combinations with Band n90 are not listed in the tables below but are covered by this specification.

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.

Unless otherwise stated, the receiver requirements of inter-band EN-DC are applicable to UE with one or two Tx antenna connectors in NR band.

## <<< Unchanged sections omitted >>>

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

##### 7.3B.2.3.0 General

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

The reference sensitivity exceptions due to harmonic, harmonic mixing, cross band isolation and power class 2 or power class 3 EN-DC intermodulation interferences are applicable to the UL aggressor band configured with either one Tx antenna connector or two Tx antenna connectors with UL MIMO or Tx diversity operation.

## <<< Unchanged sections omitted >>>

##### 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 aggressor 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 | 5MHz(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) |
| 1 | n714 | 26.8 | 23.6 | 21.2 | 15.6 |  |  |  |  |  |  |  |
| 1 | n1054 | 26.8 | 23.6 | 21.2 | 15.6 |  |  |  |  |  |  |  |
| 2 | n714 | 26.8 | 23.6 | 21.2 | 15.6 |  |  |  |  |  |  |  |
| n2 | 714 | 26.8 | 23.6 | 21.2 | 15.6 |  |  |  |  |  |  |  |
| 7 | n264,12 | [2.0] |  |  |  |  |  |  |  |  |  |  |
| 7 | n105 | 5.7 | 4.0 | 3.0 | 2.7 |  |  |  |  |  |  |  |
| n25 | 714 | 26.8 | 23.6 | 21.2 | 15.6 |  |  |  |  |  |  |  |
| n38 | 59 | N/A | N/A |  |  |  |  |  |  |  |  |  |
| n40 | 284 | 37.8 | 34.8 | 33 | 30.3 |  |  |  |  |  |  |  |
| n41 | 54 | 24.3  | 24.3 |  |  |  |  |  |  |  |  |  |
| 48 | n122 | 31 | 28 |  |  |  |  |  |  |  |  |  |
| n41 | 189 | N/A | N/A | N/A |  |  |  |  |  |  |  |  |
| n41 | 264 | 24.3 | 24.3 | 22.5 | N/A |  |  |  |  |  |  |  |
| n77 | 2 | 6.1 |  5.0 | 4.0 | 3.7 |  |  |  |  |  |  |  |
| n77 | 3 | 5.7 | 4.0 | 3.0 | 2.7 |  |  |  |  |  |  |  |
| n78 | 3 | 5.7 | 4.0 | 3.0 | 2.7 |  |  |  |  |  |  |  |
| n77 | 78 | 10.4 | 10.4 | 10.4 | 10.4 |  |  |  |  |  |  |  |
| n77 | 122 | 31 | 28 |  |  |  |  |  |  |  |  |  |
| n77 | 132 | 31 | 28 |  |  |  |  |  |  |  |  |  |
| n77 | 142 | 31 | 28 |  |  |  |  |  |  |  |  |  |
| n77 | 19 | 7.2 | 5.0 | 3.8 |  |  |  |  |  |  |  |  |
| n77 | 418 | 10.4 | 10.4 | 10.4 | 10.4 |  |  |  |  |  |  |  |
| n77 | 25 | [6.1] | [5.0] | [4.0] | [3.7] |  |  |  |  |  |  |  |
| n77 | 282 | 28 | 25 | 23.2 | 22 |  |  |  |  |  |  |  |
| n7711 | 292 | 31 | 28 |  |  |  |  |  |  |  |  |  |
| n78 | 8 | 5.7 | 4.0 | 3.0 | 2.7 |  |  |  |  |  |  |  |
| n78 | 122 | 31 | 28 |  |  |  |  |  |  |  |  |  |
| n78 | 132 | 31 | 28 |  |  |  |  |  |  |  |  |  |
| n78 | 408 | 10.4 | 10.4 | 10.4 | 10.4 |  |  |  |  |  |  |  |
| n78 | 19 | 7.2 | 5.0 | 3.8 |  |  |  |  |  |  |  |  |
| 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 |  |  |  |  |  |  |  |  |
| n79 | 82 | 25 | 22 |  |  |  |  |  |  |  |  |  |
| 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 $f\_{UL}^{HB}$ 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 $f\_{UL}^{HB}$ the UL carrier frequency in the higher band, both in MHz. NOTE 5: VoidNOTE 6: VoidNOTE 7: VoidNOTE 8: The requirements should be verified for DL EARFCN of the victim (lower) band (superscript LB) such that$ f\_{DL}^{LB}=\left⌊f\_{UL}^{HB}/0.15\right⌋0.1$ with the DL carrier frequency in the lower band and $f\_{UL}^{HB}$ the UL carrier frequency in the higher band, both in MHz. NOTE 9: No requirements apply for the case that there is at least one individual RE within the uplink transmission bandwidth of the relative higher band and when the frequency range of relative higher band’s uplink channel bandwidth or uplink 1st adjacent channel bandwidth is fully or partially overlapped with the 3 times of the frequency range of the relative lower band’s downlink channel bandwidth. The reference sensitivity is only verified when this is not the case.NOTE 10: MSD test point can be chosen according to supported BW and lowest SCS supported by the UE.NOTE 11: The MSD test points cannot be verified for the band combination in US due to the Band n77 frequency range restriction.NOTE 12: The requirements should be verified for the lowest NR ARFCN of the affected DL (lower) band and for the highest NR ARFCN of the UL (higher) band |

Table 7.3B.2.3.2-1a: Reference sensitivity exceptions (MSD) due to receiver harmonic mixing for PC2 EN-DC in NR FR1

|  |
| --- |
| E-UTRA or NR Band / Channel bandwidth of the affected DL band / MSD |
| UL band | DL band | 5MHz(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) |
| n77 | 2 | 9.1 | 8.0 | 7.0 | 6.7 |  |  |  |  |  |  |  |
| n77 | 3 | 8.1 | 7.0 | 6.0 | 5.7 |  |  |  |  |  |  |  |
| n77 | 121 | 34 | 31 |  |  |  |  |  |  |  |  |  |
| n77 | 131 | 34 | 31 |  |  |  |  |  |  |  |  |  |
| n77 | 141 | 34 | 31 |  |  |  |  |  |  |  |  |  |
| n77 | 19 | 9.8 | 7.2 | 5.8 |  |  |  |  |  |  |  |  |
| n77 | 281 | 31 | 28 | 26.2 | 25 |  |  |  |  |  |  |  |
| n772 | 291 | 34 | 31 |  |  |  |  |  |  |  |  |  |
| n77 | 414 | 19.4 | 19.4 | 19.4 | 19.4 |  |  |  |  |  |  |  |
| n78 | 19 | 9.8 | 7.2 | 5.8 |  |  |  |  |  |  |  |  |
| n78 | 282 | 31 | 28 | 26.2 | 25 |  |  |  |  |  |  |  |
| n78 | 40 | 16.2 | 13.2 | 11.4 | 10.2 |  |  |  |  |  |  |  |
| n79 | 191 | 32.5 | 29.5 | 27.7 |  |  |  |  |  |  |  |  |
| n79 | 213 | 42.3 | 39.3 | 37.5 |  |  |  |  |  |  |  |  |
| NOTE 1: 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 $f\_{UL}^{HB}$ the UL carrier frequency in the higher band, both in MHz.NOTE 2: For a UE which supports this band combination only when the Band n77 frequency range restriction defined in NOTE 12 of Table 5.2-1 from TS 38.101-1 applies, the MSD test point(s) cannot be verified for the band combination and the test point(s) can be skipped. .NOTE 3: 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 $f\_{UL}^{HB}$ the UL carrier frequency in the higher band, both in MHz.  NOTE 4: The requirements should be verified for DL EARFCN of the victim (lower) band (superscript LB) such that$ f\_{DL}^{LB}=\left⌊f\_{UL}^{HB}/0.15\right⌋0.1$ with the DL carrier frequency in the lower band and $f\_{UL}^{HB}$ the UL carrier frequency in the higher band, both in MHz. |

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 aggressor 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) |
| 1 | n71 | 15 | 25 | 50 | 75 | 100 |  |  |  |  |  |  |  |
| 1 | n105 | 15 | 25 | 50 | 75 | 100 |  |  |  |  |  |  |  |
| 2 | n71 | 15 | 25 | 50 | 50 | 50 |  |  |  |  |  |  |  |
| n2 | 71 | 15 | 25 | 50 | 50 | 50 |  |  |  |  |  |  |  |
| 7 | n26 | 15 |  |  |  | 256 |  |  |  |  |  |  |  |
| 7 | n105 | 15 | 25 | 50 | 75 | 100 |  |  |  |  |  |  |  |
| n25 | 71 | 15 | 25 | 50 | 50 | 50 |  |  |  |  |  |  |  |
| n40 | 28 | 15 | 25 | 50 | 75 | 100 |  |  |  |  |  |  |  |
| n41 | 5 | 15 | 25 | 50 |  |  |  |  |  |  |  |  |  |
| n41 | 26 | 15 | 25 | 50 | 75 |  |  |  |  |  |  |  |  |
| 41 | n77 | 15 |  | 50 | 75 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 |
| 48 | n12 | 15 | 25 | 50 |  |  |  |  |  |  |  |  |  |
| n77 | 2 | 15 | 25 | 50 | 75 | 100 |  |  |  |  |  |  |  |
| n77 | 3 | 15 | 25 | 50 | 75 | 100 |  |  |  |  |  |  |  |
| n78 | 3 | 15 | 25 | 50 | 75 | 100 |  |  |  |  |  |  |  |
| n77 | 7 | 15 | 12 | 25 | 36 | 50 |  |  |  |  |  |  |  |
| n77 | 12 | 15 | 25 | 50 |  |  |  |  |  |  |  |  |  |
| n77 | 13 | 15 | 25 | 50 |  |  |  |  |  |  |  |  |  |
| n77 | 14 | 15 | 25 | 50 |  |  |  |  |  |  |  |  |  |
| n77 | 19 | 15 | 25 | 50 | 75 |  |  |  |  |  |  |  |  |
| n77 | 25 | 15 | 25 | 50 | 75 | 100 |  |  |  |  |  |  |  |
| n77 | 28 | 15 | 25 | 50 | 75 | 100 |  |  |  |  |  |  |  |
| n77 | 29 | 15 | 25 | 50 |  |  |  |  |  |  |  |  |  |
| n77 | 41 | 15 | 12 | 25 | 36 | 50 |  |  |  |  |  |  |  |
| n78 | 8 | 15 | 25 | 25 | 20 | 20 |  |  |  |  |  |  |  |
| n78 | 12 | 15 | 25 | 50 |  |  |  |  |  |  |  |  |  |
| n78 | 13 | 15 | 25 | 50 |  |  |  |  |  |  |  |  |  |
| n78 | 19 | 15 | 25 | 50 | 75 |  |  |  |  |  |  |  |  |
| n78 | 28 | 15 | 25 | 50 | 75 | 100 |  |  |  |  |  |  |  |
| n78 | 29 | 15 | 25 | 50 |  |  |  |  |  |  |  |  |  |
| n78 | 40 | 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 |  |  |  |  |  |  |  |  |
| n79 | 8 | 15 | 25 | 50 |  |  |  |  |  |  |  |  |  |
| NOTE 1: VoidNOTE 2: VoidNOTE 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.NOTE 6: RBstart = 75 |

##### 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 and Table 7.3B.2.3.4-1a 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 PC3 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) | 70 MHz(dB) | 80 MHz(dB) | 90 MHz(dB) | 100 MHz(dB) |
| n13 | 3 | 3 | 2.3 | 2 | 1.8 |  |  |  |  |  |  |  |  |  |
| n1 | 40 | 6.6 | 6.6 | 6.6 | 6.6 |  |  |  |  |  |  |  |  |  |
| n1 | 41 | 6.1 | 6.1 | 6.1 | 6.1 |  |  |  |  |  |  |  |  |  |
| 13 | n3 | 3 | 2.2 | 1.9 | 1.7 | 1.6 | 1.5 | 1.4 | 1.3 |  |  |  |  |  |
| 1 | n40 | 6.6 | 6.6 | 6.6 | 6.6 | 6.6 | 6.6 | 6.6 | 6.6 | 6.6 | 6.6 | 6.6 | 6.6 | 6.6 |
| 1 | n41 |  | 6.1 | 6.1 | 6.1 |  | 6.1 | 6.1 | 6.1 | 6.1 | 6.1 | 6.1 | 6.1 | 6.1 |
| n3 | 11 | 6.4 | 6.1 |  |  |  |  |  |  |  |  |  |  |  |
| 3 | n41 |  | 0.7 | 0.7 | 0.7 |  | 0.7 | 0.7 | 0.7 | 0.7 | 0.7 | 0.7 | 0.7 | 0.7 |
| 3 | n51 | 6.4 |  |  |  |  |  |  |  |  |  |  |  |  |
| 30 | n66 | 8.3 | 8.3 | 8.3 | 8.3 | 8.3 | 8.3 | 8.3 |  |  |  |  |  |  |
| n3 | 41 | 0.7 | 0.7 | 0.7 | 0.7 |  |  |  |  |  |  |  |  |  |
| n5 | 28 | [17.5] | [15.8] | [14.0] | [11.7] |  |  |  |  |  |  |  |  |  |
| 7 | n40 | 3.7 | 3.4 | 3.2 | 3.1 | 3.1 | 3.1 | 3.1 | 3.1 | 3.1 | 3.1 | 3.1 | 3.1 | 3.1 |
| n12 | 71 | 3.8 |  |  |  |  |  |  |  |  |  |  |  |  |
| 18 | n287 | 31.3 | 28.7 | 26.9 | 24.3 |  | 12.4 |  |  |  |  |  |  |  |
| n25 | 2 | 33 | 33 | 33 | 33 |  |  |  |  |  |  |  |  |  |
| n34 | 3 | 3 | 2.2 | 1.9 | 1.7 |  |  |  |  |  |  |  |  |  |
| n38 | 1 | 1.9 | 1.9 | 1.9 | 1.9 |  |  |  |  |  |  |  |  |  |
| n38 | 2 | 0.6 | 0.6 | 0.6 | 0.6 |  |  |  |  |  |  |  |  |  |
| n38 | 4 | 1.9 | 1.9 | 1.9 | 1.9 |  |  |  |  |  |  |  |  |  |
| n38 | 66 | 1.9 | 1.9 | 1.9 | 1.9 |  |  |  |  |  |  |  |  |  |
| 38 | n1 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 |  |  |  |  |  |
| n1 | 38 | 2.9 | 2.9 | 2.9 | 2.9 |  |  |  |  |  |  |  |  |  |
| n40 | 1 | 8.3 | 8.3 | 8.3 | 8.3 |  |  |  |  |  |  |  |  |  |
| n41 | 4 | 3.5 | 3.5 | 3.5 | 3.5 |  |  |  |  |  |  |  |  |  |
| 40 | n1 | 8.3 | 8.3 | 8.3 | 8.3 | 8.3 | 8.3 | 8.3 | 8.3 |  |  |  |  |  |
| n40 | 7 | 3.7 | 3.7 | 3.7 | 3.7 |  |  |  |  |  |  |  |  |  |
| n41 | 1 | 9.1 | 9.1 | 9.1 | 9.1 |  |  |  |  |  |  |  |  |  |
| n41 | 2 | 0.6 | 0.6 | 0.6 | 0.6 |  |  |  |  |  |  |  |  |  |
| n41 | 3 | 0.6 | 0.6 | 0.6 | 0.6 |  |  |  |  |  |  |  |  |  |
| 41 | n1 | 9.1 | 9.1 | 9.1 | 9.1 | 9.1 | 9.1 | 9.1 | 9.1 |  |  |  |  |  |
| 41 | n3 | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 |  |  |  |  |  |
| n41 | 661 | 3.5 | 3.5 | 3.5 | 3.5 |  |  |  |  |  |  |  |  |  |
| n41 | 25 | 0.6 | 0.6 | 0.6 | 0.6 |  |  |  |  |  |  |  |  |  |
| n50 | 3 | 2.5 | 1.9 | 1.6 | 1.5 |  |  |  |  |  |  |  |  |  |
| n71 | 12 | 2.3 | 2.3 |  |  |  |  |  |  |  |  |  |  |  |
| 71 | n12 | 8.2 |  |  |  |  |  |  |  |  |  |  |  |  |
| n77 | 71 | 4.5 | 4.5 | 4.5 | 4.5 |  |  |  |  |  |  |  |  |  |
| n77 | 411 | 4.5 | 4.5 | 4.5 | 4.5 |  |  |  |  |  |  |  |  |  |
| 41 | n77 |  | 8.3 | 8.3 | 8.3 | 7.3 | 6.5 | 6.3 | 5.3 | 4.5 | 4.3 | 4.0 | 3.9 | 3.8 |
| n78 | 71 | 4.5 | 4.5 | 4.5 | 4.5 |  |  |  |  |  |  |  |  |  |
| n78 | 38 | 3.3 | 3.3 | 3.3 | 3.3 |  |  |  |  |  |  |  |  |  |
| n78 | 401 | 4.5 | 4.5 | 4.5 | 4.5 |  |  |  |  |  |  |  |  |  |
| n78 | 411 | 4.5 | 4.5 | 4.5 | 4.5 |  |  |  |  |  |  |  |  |  |
| n78 | 46 |  |  |  | 7 |  |  |  |  |  |  |  |  |  |
| 41 | n78 |  | 8.3 | 8.3 | 8.3 | 7.3 | 6.5 | 6.3 | 5.3 | 4.5 | 4.3 | 4.0 | 3.9 | 3.8 |
| n79 | 426 | 2.6 | 2.6 | 2.6 | 2.6 |  |  |  |  |  |  |  |  |  |
| n843 | 3 | 3 | 2.3 | 2 | 1.8 |  |  |  |  |  |  |  |  |  |
| 48 | n46 | - | - | - | 7 | - | - | 5.7 | - | 5.1 | - | 4.7 | - | - |
| n46 | 48 | 13.3 | 10.4 | 8.8 | 7.8 | - | - | 7.8 | 7 | 6.5 | - | 5.7 | 5.4 | 5.1 |
| NOTE 1: Applicable only when harmonic mixing MSD for this combination is not applied.NOTE 2: The B41 requirements are modified by -0.5dB when carrier frequency of the assigned E-UTRA channel bandwidth is within 2515 – 2690 MHz. NOTE 3: These requirements apply when the uplink is active in Band n1, n84 and the separation between the lower edge of the uplink channel in Band n1, n84 and the upper edge of the downlink channel in Band 3 is < 60 MHz. For each channel bandwidth in Band 3, the requirement applies regardless of channel bandwidth in Band n1, n84.NOTE 4: 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 5: MSD test point can be chosen according to supported BW and lowest SCS supported by the UE.NOTE 6: 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.NOTE 7: The MSD exceptions are applicable to the case that interference of UL band 3rd order IMD product falls into the affected DL channels. |

Table 7.3B.2.3.4-1a: Reference sensitivity exceptions (MSD) due to cross band isolation for PC2 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) | 70 MHz(dB) | 80 MHz(dB) | 90 MHz(dB) | 100 MHz(dB) |
| 3 | n41 |  | 0.7 | 0.7 | 0.7 |  | 0.7 | 0.7 | 0.7 | 0.7 | 0.7 | 0.7 | 0.7 | 0.7 |
| n41 | 1 | 11.8 | 11.8 | 11.8 | 11.8 |  |  |  |  |  |  |  |  |  |
| n41 | 3 | 2.3 | 2.3 | 2.3 | 2.3 |  |  |  |  |  |  |  |  |  |
| n78 | 7 | 6.4 | 6.4 | 6.4 | 6.4 |  |  |  |  |  |  |  |  |  |
| n41 | 2 | 1.6 | 1.6 | 1.6 | 1.6 |  |  |  |  |  |  |  |  |  |
| n41 | 66 | 5.4 | 5.4 | 5.4 | 5.4 |  |  |  |  |  |  |  |  |  |
| n77 | 2 | 1.0 | 1.0 | 1.0 | 1.0 |  |  |  |  |  |  |  |  |  |
| n77 | 411 |  | 11 | 11 | 11 | 9.9 | 9.0 | 8.8 | 7.6 | 6.7 | 6.4 | 6.0 | 5.9 | 5.8 |
| n77 | 30 | 1.0 | 1.0 |  |  |  |  |  |  |  |  |  |  |  |
| n77 | 66 | 1.0 | 1.0 | 1.0 | 1.0 |  |  |  |  |  |  |  |  |  |
| n78 | 401 | 11.6 | 11.5 | 11.5 | 11.5 |  |  |  |  |  |  |  |  |  |
| NOTE 1: Applicable only when harmonic mixing MSD for this combination is not applied. |

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) | 70 MHz(LCRB) | 80 MHz(LCRB) | 90 MHz(LCRB) | 100 MHz(LCRB) |
| n1 | 3 | 15 | 25 | 25 | 25 | 25 |  |  |  |  |  |  |  |  |  |
| n1 | 40 | 15 | 25 | 50 | 75 | 100 |  |  |  |  |  |  |  |  |  |
| n1 | 41 | 15 | 100 | 100 | 100 | 100 |  |  |  |  |  |  |  |  |  |
| 1 | n3 | 15 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 |  |  |  |  |  |
| 1 | n40 | 15 | 25 | 50 | 75 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 |
| 1 | n41 | 15 |  | 100 | 100 | 100 |  | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 |
| n3 | 11 | 15 | 25 | 50 |  |  |  |  |  |  |  |  |  |  |  |
| 3 | n41 | 15 |  | 50 | 50 | 50 |  | 50 | 50 | 50 | 50 | 50 | 50 | 50 | 50 |
| 3 | n51 | 15 | 25 |  |  |  |  |  |  |  |  |  |  |  |  |
| 30 | n66 | 15 | 25 | 25 | 25 | 25 | 25 | 25 | 25 |  |  |  |  |  |  |
| n3 | 41 | 15 | 25 | 502 | 502 | 502 |  |  |  |  |  |  |  |  |  |
| n5 | 28 | 15 | 20 | 20 | 20 | 20 |  |  |  |  |  |  |  |  |  |
| 7 | n40 | 15 | 25 | 50 | 75 | 75 | 75 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 |
| n12 | 71 | 15 |  |  | 20 |  |  |  |  |  |  |  |  |  |  |
| 18 | n286 | 15 | 25 | 25 | 25 | 25 |  | 25 |  |  |  |  |  |  |  |
| n25 | 2 | 15 | 40 | 40 | 40 | 40 |  |  |  |  |  |  |  |  |  |
| n34 | 3 | 15 | 25 | 25 | 25 | 25 |  |  |  |  |  |  |  |  |  |
| n38 | 1 | 15 | 100 | 100 | 100 | 100 |  |  |  |  |  |  |  |  |  |
| n38 | 2 | 15 | 100 | 100 | 100 | 100 |  |  |  |  |  |  |  |  |  |
| n38 | 4 | 15 | 100 | 100 | 100 | 100 |  |  |  |  |  |  |  |  |  |
| n38 | 66 | 15 | 100 | 100 | 100 | 100 |  |  |  |  |  |  |  |  |  |
| 38 | n1 | 15 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 |  |  |  |  |  |
| n1 | 38 | 15 | 100 | 100 | 100 | 100 |  |  |  |  |  |  |  |  |  |
| n40 | 1 | 15 | 25 | 50 | 75 | 100 |  |  |  |  |  |  |  |  |  |
| n41 | 4 | 30 | 128 | 128 | 128 | 128 |  |  |  |  |  |  |  |  |  |
| 40 | n1 | 15 | 25 | 50 | 75 | 100 |  |  |  |  |  |  |  |  |  |
| n40 | 7 | 30 | 216 | 216 | 216 | 216 |  |  |  |  |  |  |  |  |  |
| n41 | 1 | 30 | 128 | 128 | 128 | 128 |  |  |  |  |  |  |  |  |  |
| n41 | 2 | 30 | 160 | 160 | 160 | 160 |  |  |  |  |  |  |  |  |  |
| n41 | 3 | 30 | 160 | 160 | 160 | 160 |  |  |  |  |  |  |  |  |  |
| 41 | n1 | 15 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 |  |  |  |  |  |
| 41 | n3 | 15 | 25 | 50 | 75 | 100 | 100 | 100 | 100 | 100 |  |  |  |  |  |
| n41 | 66 | 30 | 128 | 128 | 128 | 128 |  |  |  |  |  |  |  |  |  |
| n41 | 25 | 30 | 160 | 160 | 160 | 160 |  |  |  |  |  |  |  |  |  |
| 41 | n77 | 15 |  | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 |
| n50 | 3 | 30 | 160 | 160 | 160 | 160 |  |  |  |  |  |  |  |  |  |
| n71 | 12 | 15 | 20 | 20 |  |  |  |  |  |  |  |  |  |  |  |
| 71 | n12 | 15 |  |  |  | 20 |  |  |  |  |  |  |  |  |  |
| n77 | 2 | 30 | 270 | 270 | 270 | 270 |  |  |  |  |  |  |  |  |  |
| n77 | 7 | 30 | 270 | 270 | 270 | 270 |  |  |  |  |  |  |  |  |  |
| n77 | 30 | 30 | 270 | 270 |  |  |  |  |  |  |  |  |  |  |  |
| n77 | 41 | 30 | 270 | 270 | 270 | 270 |  |  |  |  |  |  |  |  |  |
| n77 | 66 | 30 | 270 | 270 | 270 | 270 |  |  |  |  |  |  |  |  |  |
| 41 | n77 | 15 |  | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 |
| n78 | 7 | 30 | 270 | 270 | 270 | 270 |  |  |  |  |  |  |  |  |  |
| n78 | 38 | 30 | 270 | 270 | 270 | 270 |  |  |  |  |  |  |  |  |  |
| n78 | 40 | 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 | 100 | 100 | 100 |
| n79 | 42 | 30 | 2705 | 2705 | 2705 | 2705 |  |  |  |  |  |  |  |  |  |
| n84 | 3 | 15 | 25 | 25 | 25 | 25 |  |  |  |  |  |  |  |  |  |
| 48 | n46 | 15 |  |  |  | 216 |  |  | 216 |  | 216 |  | 216 |  |  |
| n46 | 48 | 30 | 216 | 216 | 216 | 216 |  |  | 216 | 216 | 216 |  | 216 | 216 | 216 |
| 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: The UL resource blocks shall be located as close as possible to the downlink operating band but confined within the transmission bandwidth configuration for the channel bandwidth. NOTE 3: 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 4: 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 5: 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.NOTE 6: The UL configuration are applicable to the case that interference of UL band 3rd order IMD product falls into the affected DL channels. |

## <<< END OF CHANGES >>>