**3GPP TSG-RAN WG4 Meeting #109 draft R4-2321732
Chicago, US, 13–17 Nov, 2023**

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| --- |
| *CR-Form-v12.2* |
| **CHANGE REQUEST** |
|  |
|  | **38.101-3** | **CR** | **1094** | **rev** |  | **Current version:** | **18.3.0** |  |
|  |
| *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:***  | Big CR for 3Tx NR inter-band UL CA and EN-DC basket WI 38.101-3 |
|  |  |
| ***Source to WG:*** | OPPO |
| ***Source to TSG:*** | R4 |
|  |  |
| ***Work item code:*** | R18\_3Tx\_NR\_CA\_ENDC-Core |  | ***Date:*** | 2023-11-21 |
|  |  |  |  |  |
| ***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:*** | Introduce band combination requirements for Inter-band ENDC with 3Tx. |
|  |  |
| ***Summary of change:*** | Introduce band combination requirements for Inter-band ENDC with 3Tx. |
|  |  |
| ***Consequences if not approved:*** | The band combination requirements for inter-band ENDC with 3Tx will not be defined. |
|  |  |
| ***Clauses affected:*** | 5.5B.4; 6.2H; 6.2L; 7.3B |
|  |  |
|  | **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 >>>

### 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 |  |
| Unchanged Sections Omit |
| DC\_7A-7A\_n77(2A)DC\_7A-7A\_n77(3A) | DC\_7A\_n77A | No |  |
| DC\_7A\_n78A7,XDC\_7C\_n78A7,21DC\_7A\_n78C7 | DC\_7A\_n78A21,XDC\_7C\_n78A | No |  |
| DC\_7A\_n78(2A)7,21DC\_7A\_n78(A-C)7DC\_7C\_n78(2A)7, 21 | DC\_7A\_n78A21DC\_7C\_n78A | No |  |
| DC\_7A-7A\_n78A7, 21DC\_7A-7A\_n78C7 | DC\_7A\_n78A21 | No |  |
| DC\_7A-7A\_n78(A-C)7 | DC\_7A\_n78A | No |  |
| DC\_7A\_n79ADC\_7A\_n79C | DC\_7A\_n79A | No |  |
| DC\_7A\_n105A | DC\_7A\_n105A | No |  |
| DC\_8A\_n1A | DC\_8A\_n1A | No |  |
| DC\_8A\_n2A | DC\_8A\_n2A | DC\_8\_n2 |  |
| DC\_8A\_n3A | DC\_8A\_n3A | No |  |
| DC\_8A\_n7A | DC\_8A\_n7A | No |  |
| DC\_8A\_n20A | DC\_8A\_n20A | Yes |  |
| DC\_8A\_n28A | DC\_8A\_n28A | No |  |
| DC\_8A\_n34A | DC\_8A\_n34A | No |  |
| DC\_8A\_n38A | DC\_8A\_n38A | No |  |
| DC\_8A\_n39A | DC\_8A\_n39A | No |  |
| DC\_8A\_n40A7 | DC\_8A\_n40A | No |  |
| DC\_8A\_n41A7DC\_8A\_n41C | DC\_8A\_n41A | No | No |
| DC\_8A\_n41(2A) | DC\_8A\_n41A | No | No |
| DC\_8A\_n77A7 | DC\_8A\_n77A | No | No |
| DC\_8A\_n77(2A)7,21DC\_8A\_n77(3A)7 | DC\_8A\_n77A21 | No | No |
| DC\_8A\_n78A7,XDC\_8B\_n78A7 | DC\_8A\_n78AX DC\_8B\_n78A | No | No |
| DC\_8A\_n78(2A)7, 21 | DC\_8A\_n78A21 | No | No |
| DC\_8A\_n79A7DC\_8A\_n79C | DC\_8A\_n79ADC\_8A\_n79C | No | No |
| DC\_8A\_n93A | DC\_8A\_n93A\_ULSUP-TDM | N/A |  |
| DC\_8A\_n94A | DC\_8A\_n94A\_ULSUP-TDM | N/A |  |
| DC\_11A\_n1A | DC\_11A\_n1A | No |  |
| DC\_11A\_n3A | DC\_11A\_n3A | No |  |
| DC\_11A\_n28A | DC\_11A\_n28A | No |  |
| DC\_11A\_n41A7 | DC\_11A\_n41A | No |  |
| DC\_11A\_n77A7 | DC\_11A\_n77A | No | No |
| DC\_11A\_n77(2A)7DC\_11A\_n77(3A)7 | DC\_11A\_n77A | No | No |
| DC\_11A\_n78A7 | DC\_11A\_n78A | No | No |
| DC\_11A\_n78(2A) | DC\_11A\_n78A | No | No |
| DC\_11A\_n79A7 | DC\_11A\_n79A | No |  |
| DC\_12A\_n2A | DC\_12A\_n2A | No |  |
| DC\_12A\_n2(2A) | DC\_12A\_n2A | No |  |
| DC\_12A\_n5A | DC\_12A\_n5A | No |  |
| DC\_12A\_n7A | DC\_12A\_n7A | No |  |
| DC\_12A\_n7(2A) | DC\_12A\_n7A | No |  |
| DC\_12A\_n25A | DC\_12A\_n25A | No |  |
| DC\_12A\_n30A | DC\_12A\_n30A | No |  |
| DC\_12A\_n38A | DC\_12A\_n38A | No |  |
| DC\_12A\_n41A | DC\_12A\_n41A | No |  |
| DC\_12A\_n66A | DC\_12A\_n66A | No |  |
| DC\_12A\_n66(2A) | DC\_12A\_n66A | No |  |
| DC\_12A\_n71A | DC\_12A\_n71A18,19 | DC\_12\_n71 |  |
| DC\_12A\_n77A | DC\_12A\_n77A | DC\_12\_n77 |  |
| DC\_12A\_n77(2A) 21 | DC\_12A\_n77A21 | DC\_12\_n77 |  |
| DC\_12A\_n78A | DC\_12A\_n78A | DC\_12\_n78 |  |
| DC\_12A\_n78(2A) | DC\_12A\_n78A | DC\_12\_n78 |  |
| DC\_13A\_n2A | DC\_13A\_n2A | No |  |
| DC\_13A\_n5A | DC\_13A\_n5A | DC\_13\_n5 |  |
| DC\_13A\_n7A | DC\_13A\_n7A | No |  |
| DC\_13A\_n7(2A) | DC\_13A\_n7A | No |  |
| DC\_13A\_n25A | DC\_13A\_n25A | No |  |
| DC\_13A\_n48ADC\_13A\_n48B | DC\_13A\_n48A | No |  |
| DC\_13A\_n66A | DC\_13A\_n66A | No |  |
| DC\_13A\_n71A | DC\_13A\_n71A | No |  |
| DC\_13A\_n77ADC\_13A\_n77C21 | DC\_13A\_n77A21 | No |  |
| DC\_13A\_n78A | DC\_13A\_n78A | No |  |
| DC\_13A\_n78(2A) 21 | DC\_13A\_n78A21 | No |  |
| DC\_14A\_n2A | DC\_14A\_n2A | No |  |
| DC\_14A\_n5A | DC\_14A\_n5A | DC\_14\_n5 |  |
| DC\_14A\_n30A | DC\_14A\_n30A | No |  |
| DC\_14A\_n66A | DC\_14A\_n66A | No |  |
| DC\_14A\_n77A | DC\_14A\_n77A | No |  |
| DC\_14A\_n77(2A) 21 | DC\_14A\_n77A21 | No |  |
| DC\_18A\_n3A | DC\_18A\_n3A | No |  |
| DC\_18A\_n28A | DC\_18A\_n28A | No |  |
| DC\_18A\_n41A16 | DC\_18A\_n41A | No |  |
| DC\_18A\_n77A7DC\_18A\_n77(2A)7 | DC\_18A\_n77A | No | No |
| DC\_18A\_n78A7 | DC\_18A\_n78A | No | No |
| DC\_18A\_n78(2A)7 | DC\_18A\_n78A | No | No |
| DC\_20A\_n91A | DC\_20A\_n91A\_ULSUP-TDM | N/A |  |
| DC\_20A\_n92A | DC\_20A\_n92A\_ULSUP-TDM | N/A |  |
| DC\_18A\_n79A7 | DC\_18A\_n79A | No |  |
| DC\_19A\_n1A | DC\_19A\_n1A | No |  |
| DC\_19A\_n77A7DC\_19A\_n77C7 | DC\_19A\_n77A | No |  |
| DC\_19A\_n77(2A)7, 21 | DC\_19A\_n77A, 21 | No |  |
| DC\_19A\_n78A7DC\_19A\_n78C7 | DC\_19A\_n78A | No | No |
| DC\_19A\_n78(2A)7, 21 | DC\_19A\_n78A, 21 | No | No |
| DC\_19A\_n79A7DC\_19A\_n79C7 | DC\_19A\_n79A | No | No |
| DC\_20A\_n1A | DC\_20A\_n1A | No |  |
| DC\_20A\_n3A | DC\_20A\_n3A | No |  |
| DC\_20A\_n7A | DC\_20A\_n7A | DC\_20\_n7 |  |
| DC\_20A\_n8A | DC\_20A\_n8A | DC\_20\_n8 |  |
| DC\_20A\_n28A8,11,13 | DC\_20A\_n28A | No |  |
| DC\_20A\_n38A | DC\_20A\_n38A | No |  |
| DC\_20A\_n41A | DC\_20A\_n41A | DC\_20\_n41 |  |
| DC\_20A\_n50A | DC\_20A\_n50A | No |  |
| DC\_20A\_n51A | DC\_20A\_n51A | No |  |
| DC\_20A\_n77A7 | DC\_20A\_n77A | No |  |
| DC\_20A\_n78A7,XDC\_20A\_n78C7 | DC\_20A\_n78AX | No |  |
| DC\_20A\_n78(2A)7 | DC\_20A\_n78A | No |  |
| DC\_21A\_n1A | DC\_21A\_n1A | No |  |
| DC\_21A\_n28A17 | DC\_21A\_n28A | DC\_21\_n28 |  |
| DC\_21A\_n77A7DC\_21A\_n77C7 | DC\_21A\_n77A | No |  |
| DC\_21A\_n77(2A)7,21 | DC\_21A\_n77A,21 | No |  |
| DC\_21A\_n78A7DC\_21A\_n78C7 | DC\_21A\_n78A | No | No |
| DC\_21A\_n78(2A)7,21 | DC\_21A\_n78A,21 | No | No |
| DC\_21A\_n79A7DC\_21A\_n79C7 | DC\_21A\_n79A | No | No |
| DC\_25A\_n41A | DC\_25A\_n41A | No |  |
| DC\_25A-25A\_n41A | DC\_25A\_n41A | No |  |
| DC\_25A\_n77A | DC\_25A\_n77A | DC\_25\_n77 |  |
| DC\_25A-25A\_n77A | DC\_25A\_n77A | DC\_25\_n77 |  |
| DC\_25A\_n78A | DC\_25A\_n78A | DC\_25\_n78 |  |
| DC\_25A-25A\_n78A | DC\_25A\_n78A | DC\_25\_n78 |  |
| DC\_26A\_n25A | DC\_26A\_n25A | No |  |
| DC\_26A\_n41A | DC\_26A\_n41A | No |  |
| DC\_26A\_n77A7 | DC\_26A\_n77A | No |  |
| DC\_26A\_n78A7 | DC\_26A\_n78A | No |  |
| DC\_26A\_n78(2A) | DC\_26A\_n78A | No |  |
| DC\_26A\_n79A7 | DC\_26A\_n79A | No |  |
| DC\_28A\_n1A | DC\_28A\_n1A | No |  |
| DC\_28A\_n2A | DC\_28A\_n2A | No |  |
| DC\_28A\_n3A | DC\_28A\_n3A | No |  |
| DC\_28A\_n5A | DC\_28A\_n5A | No |  |
| DC\_28A\_n7ADC\_28A\_n7B | DC\_28A\_n7ADC\_28A\_n7B | No |  |
| DC\_28A\_n51A | DC\_28A\_n51A | No |  |
| DC\_28A\_n8A | DC\_28A\_n8A | No |  |
| DC\_28A\_n20A8,11,13 | DC\_28A\_n20A | No |  |
| DC\_28A\_n38A | DC\_28A\_n38A | No |  |
| DC\_28A\_n40A | DC\_28A\_n40A | No |  |
| DC\_28A\_n41A7 | DC\_28A\_n41A | No |  |
| DC\_28A\_n50A | DC\_28A\_n50A | No |  |
| DC\_28A\_n66A | DC\_28A\_n66A | No |  |
| DC\_28A\_n77A7DC\_28A\_n77C7 | DC\_28A\_n77A | No | No |
| DC\_28A\_n77(2A)7 | DC\_28A\_n77A | No | No |
| DC\_28A\_n78A7,XDC\_28A\_n78C7 | DC\_28A\_n78AX | No | No |
| DC\_28A\_n78(2A)7 | DC\_28A\_n78A | No | No |
| DC\_28A\_n79A7DC\_28A\_n79C7 | DC\_28A\_n79A | No |  |
| DC\_30A\_n2A | DC\_30A\_n2A | No |  |
| DC\_30A\_n5A | DC\_30A\_n5A | No |  |
| DC\_30A\_n66A | DC\_30A\_n66A | No |  |
| DC\_30A\_n77A | DC\_30A\_n77A | No |  |
| DC\_30A\_n77(2A) 21 | DC\_30A\_n77A21 | No |  |
| DC\_38A\_n1A | DC\_38A\_n1A | No |  |
| DC\_38A\_n3A | DC\_38A\_n3A | No |  |
| DC\_38A\_n8A | DC\_38A\_n8A | No |  |
| DC\_38A\_n28A | DC\_38A\_n28A | No |  |
| DC\_38A\_n78A7 | DC\_38A\_n78A | No |  |
| DC\_38A\_n79ADC\_38A\_n79C | DC\_38A\_n79A | No |  |
| DC\_39A\_n40A3 | DC\_39A\_n40A | No |  |
| DC\_39A\_n41A3DC\_39C\_n41A3DC\_39A\_n41C3 | DC\_39A\_n41ADC\_39C\_n41A | No | No |
| DC\_39A\_n78A5,7 | DC\_39A\_n78A | No |  |
| DC\_39A\_n79A7DC\_39A\_n79C7 | DC\_39A\_n79A | No | No |
| DC\_40A\_n1ADC\_40C\_n1A | DC\_40A\_n1A | No |  |
| DC\_40A\_n41A3DC\_40A\_n41C3DC\_40C\_n41A3 | DC\_40A\_n41A | No |  |
| DC\_40A\_n41(2A)3 | DC\_40A\_n41A | No |  |
| DC\_40A\_n77ADC\_40A\_n77CDC\_40C\_n77ADC\_40C\_n77C | DC\_40A\_n77A | No |  |
| DC\_40A\_n78ADC\_40C\_n78ADC\_40A\_n78CDC\_40C\_n78C | DC\_40A\_n78ADC\_40C\_n78A | No |  |
| DC\_40A\_n78(2A)DC\_40C\_n78(2A) | DC\_40A\_n78ADC\_40C\_n78A | No |  |
| DC\_40A\_n79A7,12DC\_40A\_n79C7,12DC\_40C\_n79A7,12 | DC\_40A\_n79A | No | No |
| DC\_41A\_n1ADC\_41C\_n1A | DC\_41A\_n1ADC\_41C\_n1A | No | DC\_41A\_n1ADC\_41C\_n1A |
| DC\_41A\_n3A7DC\_41C\_n3A7 | DC\_41A\_n3ADC\_41C\_n3A | No |  |
| DC\_41A\_n28A7DC\_41C\_n28A7 | DC\_41A\_n28ADC\_41C\_n28A | No |  |
| DC\_41A\_n77ADC\_41C\_n77A | DC\_41A\_n77ADC\_41C\_n77A | No |  |
| DC\_41A\_n77(2A)DC\_41C\_n77(2A) | DC\_41A\_n77ADC\_41C\_n77A | No |  |
| DC\_41A\_n78AXDC\_41C\_n78ADC\_41D\_n78A | DC\_41A\_n78AXDC\_41C\_n78A | No |  |
| DC\_41A\_n78(2A)DC\_41C\_n78(2A) | DC\_41A\_n78ADC\_41C\_n78A | No |  |
| Unchanged Sections Omit |
| DC\_71A\_n78A | DC\_71A\_n78A | No |  |
| DC\_71A\_n78(2A) 21 | DC\_71A\_n78A21 | No |  |
| 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: Minimum requirements for PC2 are applicable for this uplink EN-DC configuration in this downlink/uplink EN-DC configuration.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 X: Minimum requirements for Power Class 2 are applicable for this EN-DC configuration with 1Tx antenna connector in one band and 2Tx antenna connectors in the other band. |

## <<< Unchanged sections omitted >>>

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\_7A\_n78A5,6 | 26 | +2/-3 | 23 | +2/-3 |
| DC\_8A\_n78A5,6 | 26 | +2/-3 | 23 | +2/-3 |
| DC\_20A\_n78A5,6 | 26 | +2/-3 | 23 | +2/-3 |
| DC\_28A\_n78A5,6 | 26 | +2/-3 | 23 | +2/-3 |
| DC\_41A\_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. |

## <<< Unchanged sections omitted >>>

Table 6.2L.1.3-1: Maximum output power for inter-band EN-DC with Tx Diversity (two bands)

| EN-DC configuration | Power class 2(dBm) | Tolerance(dB) | Power class 3(dBm) | Tolerance(dB) |
| --- | --- | --- | --- | --- |
| DC\_7A\_n78A5,6 | 26 | +2/-3 | 23 | +2/-3 |
| DC\_8A\_n78A5,6 | 26 | +2/-3 | 23 | +2/-3 |
| DC\_20A\_n78A5,6 | 26 | +2/-3 | 23 | +2/-3 |
| DC\_28A\_n78A5,6 | 26 | +2/-3 | 23 | +2/-3 |
| DC\_41A\_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 Tx Diversity in NR bandNOTE 6: The UE supports PC3 in E-UTRA band, and supports PC3 with Tx Diversity in NR bandNOTE 7: FWA form factor is targeted unless otherwise stated. |

## <<< Unchanged sections omitted >>>

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

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **UL band** | **DL band** | **UL BW** | **SCS of UL band** | **UL RB Allocation** | **DL BW** | **MSD** | **UL/DL fc condition** | **UL/DL harmonic order** |
| **(MHz)** | **(kHz)** | **LCRB** | **(MHz)** | **(dB)** |
| n41 | 18 | 5 | 15 | 25 (RBstart=0) | 5 | 27.3 | NOTE 4 | UL1/DL3 |
| n77 | 2 | 10 | 15 | 25 (RBstart=0) | 5 | 9.1 |  |  |
| n77 | 2 | 20 | 15 | 100 (RBstart=0) | 20 | 6.7 |  |  |
| n77 | 3 | 10 | 15 | 25 (RBstart=0) | 5 | 8.1 |  |  |
| n77 | 3 | 20 | 15 | 100 (RBstart=0) | 20 | 5.7 |  |  |
| n77 | 12 | 10 | 15 | 25 (RBstart=0) | 5 | 34 | NOTE 1 | UL1/DL5 |
| n77 | 12 | 10 | 15 | 50 (RBstart=0) | 10 | 31 | NOTE 1 | UL1/DL5 |
| n77 | 13 | 10 | 15 | 25 (RBstart=0) | 5 | 34 | NOTE 1 | UL1/DL5 |
| n77 | 13 | 10 | 15 | 50 (RBstart=0) | 10 | 31 | NOTE 1 | UL1/DL5 |
| n77 | 14 | 10 | 15 | 25 (RBstart=0) | 5 | 34 | NOTE 1 | UL1/DL5 |
| n77 | 14 | 10 | 15 | 50 (RBstart=0) | 10 | 31 | NOTE 1 | UL1/DL5 |
| n77 | 19 | 10 | 15 | 25 (RBstart=0) | 5 | 9.8 |  |  |
| n77 | 19 | 15 | 15 | 75 (RBstart=0) | 15 | 5.8 |  |  |
| n77 | 28 | 10 | 15 | 25 (RBstart=0) | 5 | 32 | NOTE 1 | UL1/DL5 |
| n77 | 28 | 20 | 15 | 100 (RBstart=0) | 20 | 25 | NOTE 1 | UL1/DL5 |
| n772 | 29 | 10 | 15 | 25 (RBstart=0) | 5 | 34 | NOTE 1 | UL1/DL5 |
| n772 | 29 | 10 | 15 | 50 (RBstart=0) | 10 | 31 | NOTE 1 | UL1/DL5 |
| n77 | 41 | 10 | 15 | 12 (RBstart=0) | 5 | 19.4 | NOTE 4 | UL2/DL3 |
| n77 | 41 | 20 | 15 | 50 (RBstart=0) | 20 | 19.4 | NOTE 4 | UL2/DL3 |
| n78 | 8 | 10 | 15 | 25 (RBstart=0) | 5 | 8.1 | NOTE 5 | UL1/DL4 |
| n78 | 8 | 20 | 15 | 20 (RBstart=0) | 20 | 4.3 | NOTE 5 | UL1/DL4 |
| n78 | 5 | 10 | 15 | 25 (RBstart=0) | 5 | 8.1 | NOTE 5 | UL1/DL4 |
| n78 | 13 | 10 | 15 | 25 (RBstart=0) | 5 | 34 | NOTE 1 | UL1/DL5 |
| n78 | 19 | 10 | 15 | 25 (RBstart=0) | 5 | 9.8 |  |  |
| n78 | 19 | 15 | 15 | 75 (RBstart=0) | 15 | 5.8 |  |  |
| n78 | 28 | 10 | 15 | 25 (RBstart=0) | 5 | 31 | NOTE 1 | UL1/DL5 |
| n78 | 28 | 20 | 15 | 100 (RBstart=0) | 20 | 25 | NOTE 1 | UL1/DL5 |
| n78 | 41 | 10 | 15 | 12 (RBstart=0) | 5 | 19.4 | NOTE 4 | UL2/DL3 |
| n78 | 41 | 20 | 15 | 50 (RBstart=0) | 20 | 19.4 | NOTE 4 | UL2/DL3 |
| n79 | 19 | 10 | 15 | 25 (RBstart=0) | 5 | 32.5 | NOTE 1 | UL1/DL5 |
| n79 | 19 | 15 | 15 | 75 (RBstart=0) | 15 | 27.7 | NOTE 1 | UL1/DL5 |
| n79 | 21 | 10 | 15 | 25 (RBstart=0) | 5 | 42.3 | NOTE 3 | UL1/DL3 |
| n79 | 21 | 15 | 15 | 75 (RBstart=0) | 15 | 37.5 | NOTE 3 | UL1/DL3 |
| 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.NOTE 5: The requirements should be verified for UL NR-ARFCN of the aggressor (higher) band (superscript HB) such that  in MHz and  with  the carrier frequency in the victim (lower) band and  the channel bandwidth configured in the higher band |

## <<< Unchanged sections omitted >>>

Table 7.3B.2.3.4-1a: Reference sensitivity exceptions (MSD) due to cross band isolation and uplink/downlink configurations for PC2 EN-DC in NR FR1

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **UL band** | **DL band** | **UL Fc** | **UL BW** | **SCS of UL band** | **UL RB Allocation** | **DL Fc** | **DL BW** | **MSD** | **Cross-band****Interference****source** |
| **(MHz)** | **(MHz)** | **(kHz)** | **LCRB** | **(MHz)** | **(MHz)** | **(dB)** |
| 3 | n41 | 1775 | 20 | 15 | 50 (RBstart=50) | 2501 | 10 | 0.7 | >ACLR2 |
| n41 | 1 | 2546 | 100 | 30 | 270 (RBstart=0) | 2167.5 | 5 | 12.4 | >ACLR2 |
| n41 | 2 | 2546 | 100 | 30 | 270 (RBstart=0) | 1987.5 | 5 | 1.6 | >ACLR2 |
| n41 | 3 | 2546 | 100 | 30 | 270 (RBstart=0) | 1877.5 | 5 | 2.3 | >ACLR2 |
| n41 | 66 | 2546 | 100 | 30 | 270 (RBstart=0) | 2197.5 | 5 | 12.4 | >ACLR2 |
| n77 | 2 | 3350 | 100 | 30 | 270 (RBstart=0) | 1987.5 | 5 | 1.0 | >ACLR2 |
| n77 | 30 | 3350 | 100 | 30 | 270 (RBstart=0) | 2357.5 | 5 | 1.0 | >ACLR2 |
| n77 | 411 | 3350 | 100 | 30 | 270 (RBstart=0) | 2687.5 | 5 | 6.5 | >ACLR2 |
| n77 | 66 | 3350 | 100 | 30 | 270 (RBstart=0) | 2197.5 | 5 | 1.0 | >ACLR2 |
| n78 | 7 | 3350 | 100 | 30 | 270 (RBstart=0) | 2687.5 | 5 | 6.5 | >ACLR2 |
| n78 | 411 | 3350 | 100 | 30 | 270 (RBstart=0) | 2687.5 | 5 | 6.5 | >ACLR2 |
| NOTE 1: Applicable only when harmonic mixing MSD for this combination is not applied. |

## <<< Unchanged sections omitted >>>

Table 7.3B.2.3.5.1-1a: MSD test points for PCell due to dual uplink operation for PC2 EN-DC in NR FR1 (two bands)

| NR or E-UTRA Band / Channel bandwidth / NRB / MSD |
| --- |
| EN-DCConfiguration | EUTRA or NR band | UL Fc (MHz) | UL/DL BW (MHz) | UL LCRB | DL Fc (MHz) | MSD (dB) | IMD order |
| DC\_1A\_n77ADC\_1A\_n77(2A) | 1 | 1950 | 5 | 25 | 2140 | 35.8 | IMD21 |
| n77 | 4090 | 10 | 50 | 4090 | N/A | N/A |
| 1 | 1950 | 5 | 25 | 2140 | 17.8 | IMD41 |
| n77 | 3710 | 10 | 50 | 3710 | N/A | N/A |
| DC\_3A\_n41A | 3 | 1740 | 5 | 25 | 1835 | 18.4 | IMD4 |
|  | n41 | 2657.5 | 10 | 50 | 2657.5 | N/A | N/A |
| DC\_3A\_n78A | 3 | 1740 | 5 | 25 | 1835 | 31.9 | IMD2 |
| DC\_3A-3A\_n78A | n78 | 3575 | 10 | 50 | 3575 | N/A | N/A |
| DC\_3A\_n78A | 3 | 1765 | 5 | 25 | 1860 | 18.5 | IMD4 |
| DC\_3A-3A\_n78ADC\_3A\_n78(2A)DC\_3C\_n78ADC\_3C\_n78(2A) | n78 | 3435 | 10 | 50 | 3435 | N/A | N/A |
| DC\_1A\_n78A | 1 | 1950 | 5 | 25 | 2140 | 17.8 | IMD4 |
| n78 | 3710 | 10 | 50 | 3710 | N/A | N/A |
| DC\_8A\_n78ADC\_8A\_n78(2A) | 8 | 897.5 | 5 | 25 | 942.5 | 15.5 | IMD4 |
|  | n78 | 3635 | 10 | 50 | 3635 | N/A | N/A |
| DC\_2A\_n77ADC\_2A-2A\_n77ADC\_2A\_n77CDC\_2A-2A\_n77CDC\_2A\_n77(2A)DC\_2A-2A\_n77(2A) | 2 | 1855 | 5 | 25 | 1935 | 32.10 | IMD2 |
|  |
| n77 | 3790 | 10 | 50 | 3790 | N/A | N/A |
| 2 | 1900 | 5 | 25 | 1980 | 19.10 | IMD41 |
|  |
| n77 | 3720 | 10 | 50 | 3720 | N/A | N/A |
| DC\_2A\_n78ADC\_2A\_n78(2A) | 2 | 1855 | 5 | 25 | 1935 | 32.10 | IMD2 |
| n78 | 3790 | 10 | 50 | 3790 | N/A | N/A |
| 2 | 1900 | 5 | 25 | 1980 | 19.10 | IMD4 |
| n78 | 3720 | 10 | 50 | 3720 | N/A | N/A |
| DC\_3A\_n77ADC\_3A\_n77(2A) | 3 | 1740 | 5 | 25 | 1835 | 31.9 | IMD21 |
| n77 | 3575 | 10 | 50 | 3575 | N/A | N/A |
| 3 | 1765 | 5 | 25 | 1860 | 18.5 | IMD41 |
| n77 | 3435 | 10 | 50 | 3435 | N/A | N/A |
| DC\_5A\_n77A3DC\_5A\_n77C3DC\_5A\_n77(2A)3 | 5 | 844 | 5 | 25 | 889 | 18.60 | IMD41 |
| n77 | 3421 | 10 | 50 | 3421 | N/A | N/A |
| DC\_13A\_n77ADC\_13A\_n77C | 13 | 782 | 5 | 20 | 751 | 15.37  | IMD5 |
| n77 | 3879 | 10 | 50 | 3879 | N/A | N/A |
| DC\_66A\_n77ADC\_66A-66A\_n77ADC\_66A-66A-66A\_n77ADC\_66A\_n77CDC\_66A-66A\_n77CDC\_66A-66A-66A\_n77CDC\_66A\_n77(2A)DC\_66A-66A\_n77(2A)DC\_66A-66A-66A\_n77(2A) | 66 | 1775 | 5 | 25 | 2175 | 34.33 | IMD2 |
| n77 | 3950 | 10 | 50 | 3950 | N/A | N/A |
| 66 | 1760 | 5 | 25 | 2160 | 11.27 | IMD5 |
| n77 | 3720 | 10 | 50 | 3720 | N/A | N/A |
| DC\_5A\_n78A | 5 | 844 | 5 | 25 | 889 | 17.5 | IMD4 |
|  | n78 | 3421 | 10 | 52 | 3421 | N/A | N/A |
| DC\_8A\_n77ADC\_8A\_n77(2A) | 8 | 897.5 | 5 | 25 | 942.5 | 15.5 | IMD4 |
| n77 | 3635 | 10 | 50 | 3635 | N/A | N/A |
| DC\_12A\_n77ADC\_12A\_n77(2A) | 12 | 702 | 5 | 20 | 732 | 11.7 | IMD5 |
|  | n77 | 3540 | 10 | 50 | 3540 | N/A | N/A |
| DC\_14A\_n77ADC\_14A\_n77(2A) | 14 | 795.5 | 5 | 15 | 765.5 | 11.7 | IMD5 |
|  | n77 | 3947.5 | 10 | 50 | 3947.5 | N/A | N/A |
| DC\_18A\_n77A5 | 18 | N/A | N/A | N/A | N/A | N/A | IMD4IMD5 |
|  | n77 | N/A | N/A | N/A | N/A | N/A | N/A |
| DC\_19A\_n77ADC\_19A\_n77(2A) | 19 | 836.5 | 5 | 25 | 881.5 | 25.3 | IMD4 |
| n77 | 3391 | 10 | 50 | 3391 | N/A | N/A |
| 19 | 832.5 | 5 | 25 | 877.5 | 8.1 | IMD5 |
| n77 | 4195 | 10 | 50 | 4195 | N/A | N/A |
| DC\_19A\_n78ADC\_19A\_n78(2A) | 19 | 836.5 | 5 | 25 | 881.5 | 25.3 | IMD4 |
|  | n78 | 3391 | 10 | 50 | 3391 | N/A | N/A |
| DC\_20A\_n78A | 20 | 850 | 5 | 25 | 809 | 18.8 | IMD4 |
|  | n78 | 3359 | 10 | 50 | 3359 | N/A | N/A |
| DC\_28A\_n77A | 28 | 705.5 | 5 | 25 | 760.5 | 19.2 | IMD5 |
|  | n77 | 3582.5 | 10 | 50 | 3582.5 | N/A | N/A |
| DC\_30A\_n77ADC\_30A\_n77(2A) | 30 | 2310 | 5 | 25 | 2355 | 17.6 | IMD4 |
|  | n77 | 3487.5 | 10 | 50 | 3487.5 | N/A | N/A |
| DC\_28A\_n78A | 28 | 705.5 | 5 | 25 | 760.5 | 11.7 | IMD5 |
|  | n78 | 3582.5 | 10 | 50 | 3582.5 | N/A | N/A |
| DC\_21A\_n79A | 21 | 1457.5 | 5 | 25 | 1505.5 | 33.4 | IMD3 |
|  | n79 | 4420.5 | 10 | 50 | 4420.5 | N/A | N/A |
| DC\_66A\_n78A | 66 | 1760 | 5 | 25 | 2160 | 11.27 | IMD5 |
|  | n77 | 3720 | 10 | 50 | 3720 | N/A | N/A |
| DC\_71A\_n77A3 | 71 | 681.5 | 5 | 25 | 635.5 | 11.4 | IMD5 |
|  | n77 | 3361.5 | 10 | 50 | 3361.5 | N/A | N/A |
| DC\_71A\_n78A  | 71 | 681.5 | 5 | 25 | 635.5 | 11.4 | IMD5 |
| DC\_71A\_n78(2A) | n78 | 3361.5 | 10 | 50 | 3361.5 | N/A | N/A |
| NOTE 1: This band is subject to IMD5 also which MSD is not specified.NOTE 2: VoidNOTE 3: 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 4: E-UTRA carrier shall be set to min(+23 dBm, PCMAX\_L\_E-UTRA,c) and NR carrier shall be set to min(+23 dBm, PCMAX\_L,f,c,NR) as defined in clause 6.2B.4.1.3.NOTE 5: There is no IMD4/5 products in band n18 downlink for n77 operating in 3520 – 3560 MHz, 3700 – 3800MHz and 4000 - 4100MHz frequency range. |

## <<< END OF CHANGES >>>