**3GPP TSG- Meeting #**

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

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| *CR-Form-v12.0* | | | | | | | | |
| **CHANGE REQUEST** | | | | | | | | |
|  | | | | | | | | |
|  |  | **CR** | **0247** | **rev** |  | **Current version:** |  |  |
|  | | | | | | | | |
| *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:*** |  | | | | | | | | | |
|  |  | | | | | | | | | |
| ***Source to WG:*** | Apple Inc. | | | | | | | | | |
| ***Source to TSG:*** | R4 | | | | | | | | | |
|  |  | | | | | | | | | |
| ***Work item code:*** |  | | | | |  | ***Date:*** | | |  |
|  |  | | | |  | |  | | |  |
| ***Category:*** |  |  | | | | | ***Release:*** | | |  |
|  | *Use one of the following categories:* ***F*** *(correction)* ***A*** *(mirror corresponding to a change in an earlier release)* ***B*** *(addition of feature),* ***C*** *(functional modification of feature)* ***D*** *(editorial modification)*  Detailed explanations of the above categories can be found in 3GPP [TR 21.900](http://www.3gpp.org/ftp/Specs/html-info/21900.htm). | | | | | | | | *Use one of the following releases: Rel-8 (Release 8) Rel-9 (Release 9) Rel-10 (Release 10) Rel-11 (Release 11) Rel-12 (Release 12)* *Rel-13 (Release 13) Rel-14 (Release 14) Rel-15 (Release 15) Rel-16 (Release 16)* | |
|  |  | | | | | | | | | |
| ***Reason for change:*** | | We have identified missing MSD in the reference sensitivity exceptions for DC combinations and therefore, we are proposing to include these combinations in the specification. | | | | | | | | |
|  | |  | | | | | | | | |
| ***Summary of change:*** | | UL harmonics: Additions for Table 7.3B.2.3.1-1 and Table 7.3B.2.3.1-2  IMD: Table 7.3B.2.3.5.1-1 and Table 7.3B.2.3.5.2-1 | | | | | | | | |
|  | |  | | | | | | | | |
| ***Consequences if not approved:*** | | Missigin MSD due to UL harmonics and intermodulation interference | | | | | | | | |
|  | |  | | | | | | | | |
| ***Clauses affected:*** | | 7.3B.2.3 | | | | | | | | |
|  | |  | | | | | | | | |
|  | | **Y** | **N** |  | | | |  | | |
| ***Other specs*** | |  | **X** | Other core specifications | | | |  | | |
| ***affected:*** | | **X** |  | Test specifications | | | | TS38.521-3 | | |
| ***(show related CRs)*** | |  | **X** | O&M Specifications | | | |  | | |
|  | |  | | | | | | | | |
| ***Other comments:*** | |  | | | | | | | | |
|  | |  | | | | | | | | |
| ***This CR's revision history:*** | |  | | | | | | | | |

<< start of changes >>

#### 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 agressor 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 |  |  |  |  |  |
| 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 |
| 18，19 | n774,5  n784,5 |  | 10.4 | 8.9 | 7.8 |  |  | 4.7 | 3.7 | 3 | 1.7 | 1.2 | 0.7 |
| 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 | 2.7 |  |
| 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: Applicable for the operations with 2 or 4 antenna ports supported in the band with carrier aggregation configured.  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 and DC\_3\_n78 | | | | | | | | | | | | | |

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 | 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 |  | 25 | 36 | 50 |  |  | 100 | 100 | 100 | 100 | 100 | 100 |
| 2 | n78 |  | 25 | 36 | 50 |  |  | 50 | 50 | 50 | 50 | 50 | 50 |
| 3 | n77, n78 |  | 25 | 36 | 50 |  |  | 50 | 50 | 50 | 50 | 50 | 50 |
| 5 | n78 | 8 | 16 | 25 | 25 |  |  | 25 |  |  |  |  |  |
| 8 | n77  n78 |  | 16 | 25 | 25 |  |  | 25 | 25 | 25 | 25 | 25 | 25 |
| 8 | n79 |  |  |  |  |  |  | 25 | 25 | 25 | 25 |  | 25 |
| 18 | n77, n78 |  | 16 | 25 | 25 |  |  | 25 | 25 | 25 | 25 | 25 | 25 |
| 19 | n77, n78 |  | 16 | 25 | 25 |  |  | 25 | 25 | 25 | 25 | 25 | 25 |
| 20 | n77, n78 |  | 16 | 25 | 25 |  |  | 25 | 25 | 25 | 25 | 25 | 25 |
| 26 | n41 |  | 16 | 25 | 25 |  |  | 25 | 25 |  |  |  |  |
| 26 | n77,  n78 |  | 16 | 25 | 25 |  |  | 25 | 25 | 25 | 25 | 25 | 25 |
| n28 | 1 | 8 | 16 | 25 | 25 |  |  |  |  |  |  |  |  |
| 28 | n77,  n78 |  | 10 | 15 | 20 |  |  | 25 | 25 | 25 | 25 | 25 | 25 |
| 66 | n78 |  | 25 | 36 | 50 |  |  | 100 | 100 | 100 | 100 | 100 | 100 |
| n71 | 2 | 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. | | | | | | | | | | | | | |

##### 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. | | | | | | | | | | | | |

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. | | | | | | | | | | | | | |

##### 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) |
| 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 |
| 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 |  |  |  |  |  |  |  |  |
| 41 | n78 |  | 8.3 | 8.3 | 8.3 |  |  | 6.3 | 5.3 | 4.5 | 4.0 | 3.9 | 3.8 |
| 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. | | | | | | | | | | | | | |

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) |
| 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 |
| n78 | 7 | | 30 | 270 | 270 | 270 | 270 |  |  |  |  |  |  |  |  |
| n78 | 38 | | 30 | 270 | 270 | 270 | 270 |  |  |  |  |  |  |  |  |
| n78 | 41 | | 30 | 270 | 270 | 270 | 270 |  |  |  |  |  |  |  |  |
| 41 | n78 | | 15 |  | 100 | 100 | 100 |  |  | 100 | 100 | 100 | 100 | 100 | 100 |
| 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 | | | | | | | | | | | | | | | |

##### 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 |
| 32.54 |
| 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 |
| 10.74 |
| 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 |
| 28.74 |
| n78 | 3790 | 10 | 50 | 3790 | N/A | N/A |
| DC\_2A\_n78A | 2 | 1885 | 5 | 25 | 1965 | 8.0 | IMD43 |
| 10.74 |
| 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 |
| 28.74 |
| 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 |
| 10.74 |
| 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 | 10 | 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: Applicable only if operation with 4 antenna ports is supported in the band with EN‑DC configured.  NOTE 5: Void | | | | | | | |

###### 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 |  |

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 | 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-3C\_n78A | 1 | 1950 | 5 | 25 | 2140 | N/A | N/A |
| 3 | 1712.5 | 5 | 25 | 1807.5 | 31.2 | IMD2  |fB78-fB1| |
| n78 | 3757.5 | 10 | 50 | 3757.5 | N/A | N/A |
| 1 | 1935 | 5 | 25 | 2125 | 2.8 | IMD5  |2\*fB78-3\*fB3| |
| 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  |fB78-2\*fB5| |
| 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  |2\*fB78-3\*fB1| |
| 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  |fB78-3\*fB1| |
| n78 | 3305 | 10 | 50 | 3305 | N/A | N/A |
| 1 | 1950 | 5 | 25 | 2140 | 8.7 | IMD4  |2\*fB78-2\*fB7| |
| 7 | 2510 | 10 | 50 | 2630 | N/A | N/A |
| n78 | 3580 | 10 | 50 | 3580 | N/A | N/A |
| DC\_1A-8A\_n78A | 1 | 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 |
| 8 | N/A | N/A | N/A | N/A | N/A | IMD5 |
| 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 |  |
| 41 | 2510 | 5 | 25 | 2510 | 11.0 | IMD4 |
| 1 | N/A | N/A | N/A | N/A | N/A | IMD4 |
| n77 | N/A | N/A | N/A | N/A | N/A | N/A |
| 41 | N/A | N/A | N/A | N/A | N/A | N/A |
| 1 | 1930 | 5 | 25 | 2120 | N/A | N/A |
| n77 | 4150 | 10 | 50 | 4150 |  |
| 41 | 2510 | 5 | 25 | 2510 | 3.6 | IMD5 |
| DC\_1A-41A\_n78A | 1 | N/A | N/A | N/A | N/A | N/A | IMD4 |
| 41 | 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 |
| 1 | 1975 | 5 | 25 | 2165 | N/A | N/A |
| 41 |  | 5 | 25 | 2515 | 12 | IMD4 |
| n78 | 3410 | 10 | 50 | 3410 | N/A | N/A |
| DC\_1A-41A\_n79A | 1 | 1970 | 5 | 25 | 2160 | N/A | N/A |
| n79 | 4500 | 40 | 216 | 4500 |  |
| 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 |  |  |
| 42 | 3490 | 5 | 25 | 3490 | 4.8 | IMD5 |
| 42 | 3402.5 | 5 | 25 | 3402.5 | N/A | N/A |
| n79 | 4640 | 40 | 216 | 4640 |  |  |
| 1 | 1975 | 5 | 25 | 2165 | 15.5 | IMD3 |
| 42 | 3450 | 5 | 25 | 3450 | N/A | N/A |
| n79 | 4520 | 40 | 216 | 4520 |  |  |
| 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 |
| n79 | 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  |fB78-2\*fB7| |
| 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  |2\*fB78-2\*fB7| |
| 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 | 738 | 5 | 25 | 793 | N/A | N/A |
| 3 | 1723 | 5 | 25 | 1818 | 9.4 | IMD4 |
| DC\_3A-20A\_n78A  DC\_3C-20A\_n78A | 3 | 1725 | 5 | 25 | 1820 | 17.3 | IMD3  |fB78-2\*fB20| |
| 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 | 52 | 3400 | N/A | N/A |
| 3 | 1745 | 5 | 25 | 1840 | 16.4 | IMD3  |2\*fB41 – fn78| |
| 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  ꟾfB78-fb5ꟾ |
| n78 | 3489 | 10 | 50 | 3489 | N/A | N/A |
| 5 | 834 | 5 | 25 | 879 | 30.2 | IMD2  |fB78-fB7| |
| 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  |2\*fB78-3fB7| |
| 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 | 852 | 5 | 25 | 811 | N/A | N/A |
| n28 | 738 | 5 | 25 | 793 | N/A | N/A |
| 7 | 2550 | 10 | 50 | 2670 | 5.9 | IMD5 |
| DC\_7A-20A\_n78A | 7 | 2560 | 5 | 25 | 2680 | N/A | N/A |
| 20 | 851 | 5 | 25 | 810 | 30.5 | IMD2  |fB78-fB7| |
| 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  |2\*fB78-3\*fB7| |
| n78 | 3435 | 10 | 50 | 3435 | N/A | N/A |
| DC\_7A-20A\_n78A | 7 | 2555 | 5 | 25 | 2675 | 30.8 | IMD2  |fB78-fB20| |
| 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 | 8.3 | 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 |

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