3GPP TSG-RAN WG4 Meeting #99-e R4-2109768

Electronic Meeting, 19th May - 27th May, 2021

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| *CR-Form-v12.0* | | | | | | | | |
| **CHANGE REQUEST** | | | | | | | | |
|  | | | | | | | | |
|  | **38.101-1** | **CR** | **0787** | **rev** | **-** | **Current version:** | **17.1.0** |  |
|  | | | | | | | | |
| *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:*** | CR on Introduction of completed SUL band combinations into TS 38.101-1 | | | | | | | | | |
|  |  | | | | | | | | | |
| ***Source to WG:*** | Huawei, HiSilicon | | | | | | | | | |
| ***Source to TSG:*** | R4 | | | | | | | | | |
|  |  | | | | | | | | | |
| ***Work item code:*** | NR\_SUL\_combos\_R17-Core | | | | |  | ***Date:*** | | | 2021-05-28 |
|  |  | | | |  | |  | | |  |
| ***Category:*** | **B** |  | | | | | ***Release:*** | | | Rel-17 |
|  | *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:*** | | This CR is to introduce the SUL band combinations as below:  SUL\_n24A-n99A  SUL\_n41A-n97A  SUL\_n41A-n99A  SUL\_n48A-n99A  SUL\_n77A-n99A  SUL\_n41(2A)-n99A  SUL\_n48(2A)-n99A  SUL\_n77(2A)-n99A  UL configurations:  SUL\_n41C-n80A  SUL\_n41C-n83A  SUL\_n78C-n84A  CA\_n1A\_SUL\_n78C-n84A  CA\_n3A\_SUL\_n41A-n80A  CA\_n3A\_SUL\_n41C-n80A  CA\_n3A\_SUL\_n78C-n80A  CA\_n3A\_SUL\_n79A-n80A  CA\_n3A\_SUL\_n79C-n80A  CA\_n28A\_SUL\_n41C-n83A  CA\_n28A\_SUL\_n79C-n83A | | | | | | | | |
|  | |  | | | | | | | | |
| ***Summary of change:*** | | The specific RF requirements for the following SUL band combinations have been specified.  SUL\_n24A-n99A  SUL\_n41A-n97A  SUL\_n41A-n99A  SUL\_n48A-n99A  SUL\_n77A-n99A  SUL\_n41(2A)-n99A  SUL\_n48(2A)-n99A  SUL\_n77(2A)-n99A  UL configurations:  SUL\_n41C-n80A  SUL\_n41C-n83A  SUL\_n78C-n84A  CA\_n1A\_SUL\_n78C-n84A  CA\_n3A\_SUL\_n41A-n80A  CA\_n3A\_SUL\_n41C-n80A  CA\_n3A\_SUL\_n78C-n80A  CA\_n3A\_SUL\_n79A-n80A  CA\_n3A\_SUL\_n79C-n80A  CA\_n28A\_SUL\_n41C-n83A  CA\_n28A\_SUL\_n79C-n83A | | | | | | | | |
|  | |  | | | | | | | | |
| ***Consequences if not approved:*** | | The new SUL band combinations can’t be supported in RF spec. | | | | | | | | |
|  | |  | | | | | | | | |
| ***Clauses affected:*** | | 5.2C, 5.5C, 6.2C, 7.3C, 7.3C.3.2.1, 7.3C.3.2.2 | | | | | | | | |
|  | |  | | | | | | | | |
|  | | **Y** | **N** |  | | | |  | | |
| ***Other specs*** | |  | **X** | Other core specifications | | | | TS/TR ... CR ... | | |
| ***affected:*** | | **X** |  | Test specifications | | | | TS 38.521-1 | | |
| ***(show related CRs)*** | |  | **X** | O&M Specifications | | | | TS/TR ... CR ... | | |
|  | |  | | | | | | | | |
| ***Other comments:*** | |  | | | | | | | | |
|  | |  | | | | | | | | |
| ***This CR's revision history:*** | |  | | | | | | | | |

## **<<Start of Change1>>**

## 5.2C Operating band combination for SUL

NR operation is designed to operate in the operating band combination defined in Table 5.2C-1, Table 5.2C-2, Table 5.2C-3 and Table 5.2C-4, where all operating bands are within FR1.

Table 5.2C-1: Operating band combination for SUL in FR1

|  |  |
| --- | --- |
| NR Band combination for SUL | NR Band  (Table 5.2-1) |
| SUL\_n24-n992 | n24, n99 |
| SUL\_n41-n80 | n41, n80 |
| SUL\_n41-n81 | n41, n81 |
| SUL\_n41-n832 | n41, n83 |
| SUL\_n41-n95 | n41, n95 |
| SUL\_n41-n972 | n41, n97 |
| SUL\_n41-n98 | n41, n98 |
| SUL\_n41-n992 | n41, n99 |
| SUL\_n48-n992 | n48, n99 |
| SUL\_n77-n802 | n77, n80 |
| SUL\_n77-n842 | n77, n84 |
| SUL\_n77-n99 | n77, n99 |
| SUL\_n78-n802 | n78, n80 |
| SUL\_n78-n812 | n78, n81 |
| SUL\_n78-n822 | n78, n82 |
| SUL\_n78-n832 | n78, n83 |
| SUL\_n78-n842 | n78, n84 |
| SUL\_n78-n862 | n78, n86 |
| SUL\_n79-n802 | n79, n80 |
| SUL\_n79-n812 | n79, n81 |
| SUL\_n79-n832 | n79, n83 |
| SUL\_n79-n84 | n79, n84 |
| SUL\_n79-n95 | n79, n95 |
| SUL\_n79-n972 | n79, n97 |
| SUL\_n79-n98 | n79, n98 |
| NOTE 1: If a UE is configured with both NR UL and NR SUL carriers in a cell, the switching time between NR UL carrier and NR SUL carrier is 0 us.  NOTE 2: For UE supporting SUL band combination simultaneous Rx/Tx capability is mandatory. | |

Table 5.2C-2: Operating SUL band combination with intra-band non-contiguous CA in FR1

|  |  |
| --- | --- |
| NR Band combination for SUL | NR Band  (Table 5.2-1) |
| SUL\_n41(\*)-n992 | n41, n99 |
| SUL\_n48(\*)-n992 | n48, n99 |
| SUL\_n77(\*)-n99 | n77, n99 |
| SUL\_n78(\*)-n862 | n78, n86 |
| NOTE 1: If a UE is configured with both NR UL and NR SUL carriers in a cell, the switching time between NR UL carrier and NR SUL carrier is 0 us.  NOTE 2: For UE supporting SUL band combination simultaneous Rx/Tx capability is mandatory.  NOTE 3: The notation CA\_nX(\*) in this table indicates intra-band non-contiguous CA for band nX. The configurations for each band are in table 5.5C-2. | |

Table 5.2C-3: Operating SUL band combination with intra-band contiguous CA in FR1

|  |  |
| --- | --- |
| NR Band combination for SUL | NR Band  (Table 5.2-1) |
| SUL\_n41-n80 | n41, n80 |
| SUL\_n41-n83 | n41, n83 |
| SUL\_n41-n95 | n41, n95 |
| SUL\_n78-n80 | n78, n80 |
| SUL\_n78-n84 | n78, n84 |
| SUL\_n79-n80 | n79, n80 |
| SUL\_n79-n83 | n79, n83 |
| SUL\_n79-n95 | n79, n95 |
| NOTE 1: If a UE is configured with both NR UL and NR SUL carriers in a cell, the switching time between NR UL carrier and NR SUL carrier is 0 us.  NOTE 2: For UE supporting SUL band combination simultaneous Rx/Tx capability is mandatory. | |

Table 5.2C-4: Operating SUL band combination with inter-band CA in FR1

|  |  |
| --- | --- |
| NR Band combination for SUL | NR Band  (Table 5.2-1) |
| CA\_n1\_SUL\_n78-n80 | n1, n78, n80 |
| CA\_n1\_SUL\_n78-n84 | n1, n78, n84 |
| CA\_n3\_SUL\_n41-n80 | n3, n41, n80 |
| CA\_n3\_SUL\_n78-n80 | n3, n78, n80 |
| CA\_n3\_SUL\_n79-n80 | n3, n79, n80 |
| CA\_n28\_SUL\_n41-n83 | n28, n41, n83 |
| CA\_n28\_SUL\_n79-n83 | n28, n79, n83 |
| CA\_n41\_SUL\_n79-n80 | n41, n79, n80 |
| CA\_n41\_SUL\_n79-n83 | n41, n79, n83 |
| CA\_n79\_SUL\_n41-n80 | n41, n79, n80 |
| CA\_n79\_SUL\_n41-n83 | n41, n79, n83 |
| NOTE 1: If a UE is configured with both NR UL and NR SUL carriers in a cell, the switching time between NR UL carrier and NR SUL carrier is 0 us.  NOTE 2: For UE supporting SUL band combination simultaneous Rx/Tx capability is mandatory. | |

## **<<End of Change1>>**

## **<<Start of Change2>>**

## 5.5C Configurations for SUL

Table 5.5C-1: Supported channel bandwidths per SUL band combination

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| SUL configuration | NR Band | Channel bandwidth (MHz) (NOTE 1) | | | | | | | | | | | | | Bandwidth combination set |
|  |  | 5 | 10 | 15 | 20 | 25 | 30 | 40 | 50 | 60 | **70**  MHz | 80 | 90 | 100 |  |
| SUL\_n24A-n99A | n24 | 5 | 10 |  |  |  |  |  |  |  |  |  |  |  | 0 |
|  | n99 | 5 | 10 |  |  |  |  |  |  |  |  |  |  |  |  |
| SUL\_n41A-n80A | n41 |  | 10 | 15 | 20 |  |  | 40 | 50 | 60 |  | 80 | 90 | 100 | 0 |
|  | n80 | 5 | 10 | 15 | 20 | 25 | 30 |  |  |  |  |  |  |  |  |
|  | n41 |  | 10 | 15 | 20 |  | 30 | 40 | 50 | 60 |  | 80 | 90 | 100 | 1 |
|  | n80 | 5 | 10 | 15 | 20 | 25 | 30 | 40 |  |  |  |  |  |  |  |
| SUL\_n41A-n81A | n41 |  | 10 | 15 | 20 |  |  | 40 | 50 | 60 |  | 80 | 90 | 100 | 0 |
|  | n81 | 5 | 10 | 15 | 20 |  |  |  |  |  |  |  |  |  |  |
| SUL\_n41A-n83A | n41 |  | 10 | 15 | 20 |  | 30 | 40 | 50 | 60 |  | 80 | 90 | 100 | 0 |
|  | n83 | 5 | 10 | 15 | 20 |  | 30 |  |  |  |  |  |  |  |  |
| SUL\_n41A-n95A | n41 |  | 10 | 15 | 20 |  | 30 | 40 | 50 | 60 |  | 80 | 90 | 100 | 0 |
|  | n95 | 5 | 10 | 15 |  |  |  |  |  |  |  |  |  |  |  |
| SUL\_n41A-n97A | n41 |  | 10 | 15 | 20 |  | 30 | 40 | 50 | 60 |  | 80 | 90 | 100 | 0 |
|  | n97 | 5 | 10 | 15 | 20 | 25 | 30 | 40 | 50 | 60 |  | 80 |  |  |  |
| SUL\_n41A-n98A | n41 |  | 10 | 15 | 20 |  | 30 | 40 | 50 | 60 |  | 80 | 90 | 100 | 0 |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|  | n98 | 5 | 10 | 15 | 20 | 25 | 30 | 40 |  |  |  |  |  |  |  |
| SUL\_n41A-n99A | n41 |  | 10 | 15 | 20 |  | 30 | 40 | 50 | 60 |  | 80 | 90 | 100 | 0 |
|  | n99 | 5 | 10 |  |  |  |  |  |  |  |  |  |  |  |  |
| SUL\_n48A-n99A | n48 | 5 | 10 | 15 | 20 |  |  | 40 | 50 | 60 |  | 80 | 90 | 100 | 0 |
|  | n99 | 5 | 10 |  |  |  |  |  |  |  |  |  |  |  |  |
| SUL\_n77A-n80A | n77 |  | 10 | 15 | 20 |  |  | 40 | 50 | 60 |  | 80 | 90 | 100 | 0 |
|  | n80 | 5 | 10 | 15 | 20 | 25 | 30 |  |  |  |  |  |  |  |  |
| SUL\_n77A-n84A | n77 |  | 10 | 15 | 20 |  |  | 40 | 50 | 60 |  | 80 | 90 | 100 | 0 |
|  | n84 | 5 | 10 | 15 | 20 |  |  |  |  |  |  |  |  |  |  |
| SUL\_n77A-n99A | n77 |  | 10 | 15 | 20 |  |  | 40 | 50 | 60 |  | 80 | 90 | 100 | 0 |
|  | n99 | 5 | 10 |  |  |  |  |  |  |  |  |  |  |  |  |
| SUL\_n78A-n80A | n78 |  | 10 | 15 | 20 |  |  | 40 | 50 | 60 |  | 80 | 90 | 100 | 0 |
|  | n80 | 5 | 10 | 15 | 20 | 25 | 30 |  |  |  |  |  |  |  |  |
|  | n78 |  | 10 | 15 | 20 | 25 | 30 | 40 | 50 | 60 | 70 | 80 | 90 | 100 | 1 |
|  | n80 | 5 | 10 | 15 | 20 | 25 | 30 | 40 |  |  |  |  |  |  |  |
| SUL\_n78A-n81A | n78 |  | 10 | 15 | 20 |  |  | 40 | 50 | 60 |  | 80 | 90 | 100 | 0 |
|  | n81 | 5 | 10 | 15 | 20 |  |  |  |  |  |  |  |  |  |  |
| SUL\_n78A-n82A | n78 |  | 10 | 15 | 20 |  |  | 40 | 50 | 60 |  | 80 | 90 | 100 | 0 |
|  | n82 | 5 | 10 | 15 | 20 |  |  |  |  |  |  |  |  |  |  |
| SUL\_n78A-n83A | n78 |  | 10 | 15 | 20 |  |  | 40 | 50 | 60 |  | 80 | 90 | 100 | 0 |
|  | n83 | 5 | 10 | 15 | 20 |  |  |  |  |  |  |  |  |  |  |
|  | n78 |  | 10 | 15 | 20 | 25 | 30 | 40 | 50 | 60 | 70 | 80 | 90 | 100 | 1 |
|  | n83 | 5 | 10 | 15 | 20 |  | 30 |  |  |  |  |  |  |  |  |
| SUL\_n78A-n84A | n78 |  | 10 | 15 | 20 |  |  | 40 | 50 | 60 |  | 80 | 90 | 100 | 0 |
|  | n84 | 5 | 10 | 15 | 20 |  |  |  |  |  |  |  |  |  |  |
|  | n78 |  | 10 | 15 | 20 | 25 | 30 | 40 | 50 | 60 | 70 | 80 | 90 | 100 | 1 |
|  | n84 | 5 | 10 | 15 | 20 | 25 | 30 | 40 | 50 |  |  |  |  |  |  |
| SUL\_n78A-n86A | n78 |  | 10 | 15 | 20 |  |  | 40 | 50 | 60 | 70 | 80 | 90 | 100 | 0 |
|  | n86 | 5 | 10 | 15 | 20 |  |  |  |  |  |  |  |  |  |  |
| SUL\_n79A-n80A | n79 |  |  |  |  |  |  | 40 | 50 | 60 |  | 80 |  | 100 | 0 |
|  | n80 | 5 | 10 | 15 | 20 | 25 | 30 |  |  |  |  |  |  |  |  |
|  | n79 |  |  |  |  |  |  | 40 | 50 | 60 |  | 80 |  | 100 | 1 |
|  | n80 | 5 | 10 | 15 | 20 | 25 | 30 | 40 |  |  |  |  |  |  |  |
| SUL\_n79A-n81A | n79 |  |  |  |  |  |  | 40 | 50 | 60 |  | 80 |  | 100 | 0 |
|  | n81 | 5 | 10 | 15 | 20 |  |  |  |  |  |  |  |  |  |  |
| SUL\_n79A-n83A | n79 |  |  |  |  |  |  | 40 | 50 | 60 |  | 80 |  | 100 | 0 |
|  | n83 | 5 | 10 | 15 | 20 |  | 30 |  |  |  |  |  |  |  |  |
| SUL\_n79A-n84A | n79 |  |  |  |  |  |  | 40 | 50 | 60 |  | 80 |  | 100 | 0 |
|  | n84 | 5 | 10 | 15 | 20 |  |  |  |  |  |  |  |  |  |  |
| SUL\_n79A-n95A | n79 |  |  |  |  |  |  | 40 | 50 | 60 |  | 80 |  | 100 | 0 |
|  | n95 | 5 | 10 | 15 |  |  |  |  |  |  |  |  |  |  |  |
| SUL\_n79A-n97A | n79 |  |  |  |  |  |  | 40 | 50 | 60 |  | 80 |  | 100 | 0 |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|  | n97 | 5 | 10 | 15 | 20 | 25 | 30 | 40 | 50 | 60 |  | 80 |  |  |  |
| SUL\_n79A-n98A | n79 |  |  |  |  |  |  | 40 | 50 | 60 |  | 80 |  | 100 | 0 |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|  | n98 | 5 | 10 | 15 | 20 | 25 | 30 | 40 | 50 | 60 |  | 80 |  |  |  |
| NOTE 1: The SCS of each channel bandwidth for NR band refers to Table 5.3.5-1. | | | | | | | | | | | | | | | |

Table 5.5C-2: Supported channel bandwidths per SUL band combination with intra-band non-contiguous CA

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| SUL band combination with intra-band non-contiguous CA | | SUL configuration | NR Band | Channel bandwidth (MHz) (NOTE 1) | | | | | | | | | | | | | Bandwidth combination set |
|  | |  |  | 5 | 10 | 15 | 20 | 25 | 30 | 40 | 50 | 60 | 70 | 80 | 90 | 100 |  |
| SUL\_n41(2A)-n99A | | SUL\_n41A-n99A | n41 | See CA\_n41(2A) Bandwidth Combination Set 0 in Table 5.5A.2-1 | | | | | | | | | | | | | 0 |
|  | |  | n99 | 5 | 10 |  |  |  |  |  |  |  |  |  |  |  |  |
| SUL\_n48(2A)-n99A | | SUL\_n48A-n99A | n48 | See CA\_n48(2A) Bandwidth Combination Set 0 in Table 5.5A.2-1 | | | | | | | | | | | | | 0 |
|  | |  | n99 | 5 | 10 |  |  |  |  |  |  |  |  |  |  |  |  |
| SUL\_n77(2A)-n99A | | SUL\_n77A-n99A | n77 | See CA\_n77(2A) Bandwidth Combination Set 0 in Table 5.5A.2-1 | | | | | | | | | | | | | 0 |
|  | |  | n99 | 5 | 10 |  |  |  |  |  |  |  |  |  |  |  |  |
| SUL\_n78(2A)-n86A | | SUL\_n78A-n86A | n78 | See CA\_n78(2A) Bandwidth Combination Set 0 in Table 5.5A.2-1 | | | | | | | | | | | | | 0 |
|  | |  | n86 | 5 | 10 | 15 | 20 |  |  |  |  |  |  |  |  |  |  |
|  | NOTE 1: The SCS of each channel bandwidth for NR band refers to Table 5.3.5-1. | | | | | | | | | | | | | | | | |

Table 5.5C-3: Supported channel bandwidths per SUL band combination with intra-band contiguous CA

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| SUL band combination with CA | UL configuration | NR Band | 5  MHz | 10  MHz | 15  MHz | 20  MHz | 25 MHz | 30 MHz | 40  MHz | 50  MHz | 60  MHz | 70  MHz | 80  MHz | 90  MHz | 100 MHz | Bandwidth combination set |
| SUL\_n41C-n80A | SUL\_n41A-n80A | n41 | See CA\_n41C Bandwidth Combination Set 1 in Table 5.5A.1-1 | | | | | | | | | | | | | 0 |
|  | SUL\_n41C-n80A | n80 | 5 | 10 | 15 | 20 | 25 | 30 | 40 |  |  |  |  |  |  |  |
| SUL\_n41C-n83A | SUL\_n41A-n83A | n41 | See CA\_n41C Bandwidth Combination Set 1 in Table 5.5A.1-1 | | | | | | | | | | | | | 0 |
|  | SUL\_n41C-n83A | n83 | 5 | 10 | 15 | 20 |  | 30 |  |  |  |  |  |  |  |  |
| SUL\_n41C-n95A | SUL\_n41A-n95A | n41 | See CA\_n41C Bandwidth Combination Set 1 in Table 5.5A.1-1 | | | | | | | | | | | | | 0 |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|  |  | n95 | 5 | 10 | 15 |  |  |  |  |  |  |  |  |  |  |  |
| SUL\_n78C-n80A | SUL\_n78A-n80A | n78 | See CA\_n78C Bandwidth Combination Set 1 in Table 5.5A.1-1 | | | | | | | | | | | | | 0 |
|  |  | n80 | 5 | 10 | 15 | 20 | 25 | 30 | 40 |  |  |  |  |  |  |  |
| SUL\_n78C-n84A | SUL\_n78A-n84A | n78 | See CA\_n78C Bandwidth Combination Set 1 in Table 5.5A.1-1 | | | | | | | | | | | | | 0 |
|  | SUL\_n78C-n84A | n84 | 5 | 10 | 15 | 20 | 25 | 30 | 40 | 50 |  |  |  |  |  |  |
| SUL\_n79C-n80A | SUL\_n79A-n80A | n79 | See CA\_n79C Bandwidth Combination Set 0 in Table 5.5A.1-1 | | | | | | | | | | | | | 0 |
|  |  | n80 | 5 | 10 | 15 | 20 | 25 | 30 | 40 |  |  |  |  |  |  |  |
| SUL\_n79C-n83A | SUL\_n79A-n83A | n79 | See CA\_n79C Bandwidth Combination Set 0 in Table 5.5A.1-1 | | | | | | | | | | | | | 0 |
|  |  | n83 | 5 | 10 | 15 | 20 |  | 30 |  |  |  |  |  |  |  |  |
| SUL\_n79C-n95A | SUL\_n79A-n95A | n79 | See CA\_n79C Bandwidth Combination Set 0 in Table 5.5A.1-1 | | | | | | | | | | | | | 0 |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|  |  | n95 | 5 | 10 | 15 |  |  |  |  |  |  |  |  |  |  |  |
| NOTE 1: The SCS of each channel bandwidth for NR band refers to Table 5.3.5-1. | | | | | | | | | | | | | | | | |

Table 5.5C-4: Supported channel bandwidths per SUL band combination with inter-band CA

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| SUL band combination with CA | SUL configuration | NR Band | 5  MHz | 10  MHz | 15  MHz | 20  MHz | 25 MHz | 30 MHz | 40  MHz | 50  MHz | 60  MHz | 70  MHz | 80  MHz | 90  MHz | 100 MHz | Bandwidth combination set |
| CA\_n1A\_SUL\_n78A-n80A | SUL\_n78A-n80A | n1 | 5 | 10 | 15 | 20 | 25 | 30 | 40 | 50 |  |  |  |  |  | 0 |
|  |  | n78 |  | 10 | 15 | 20 | 25 | 30 | 40 | 50 | 60 | 70 | 80 | 90 | 100 |  |
|  |  | n80 | 5 | 10 | 15 | 20 | 25 | 30 | 40 |  |  |  |  |  |  |  |
| CA\_n1A\_SUL\_n78A-n84A | SUL\_n78A-n84A | n1 | 5 | 10 | 15 | 20 | 25 | 30 | 40 | 50 |  |  |  |  |  | 0 |
|  |  | n78 |  | 10 | 15 | 20 | 25 | 30 | 40 | 50 | 60 | 70 | 80 | 90 | 100 |  |
|  |  | n84 | 5 | 10 | 15 | 20 | 25 | 30 | 40 | 50 |  |  |  |  |  |  |
| CA\_n1A\_SUL\_n78C-n84A | SUL\_n78A-n84A | n1 | 5 | 10 | 15 | 20 | 25 | 30 | 40 | 50 |  |  |  |  |  | 0 |
|  |  | n78 | See CA\_n78C Bandwidth Combination Set 1 in Table 5.5A.1-1 | | | | | | | | | | | | |  |
|  |  | n84 | 5 | 10 | 15 | 20 | 25 | 30 | 40 | 50 |  |  |  |  |  |  |
| CA\_n3A\_SUL\_n41A-n80A | SUL\_n41A-n80A | n3 | 5 | 10 | 15 | 20 | 25 | 30 | 40 |  |  |  |  |  |  | 0 |
|  |  | n41 |  | 10 | 15 | 20 |  | 30 | 40 | 50 | 60 |  | 80 | 90 | 100 |  |
|  |  | n80 | 5 | 10 | 15 | 20 | 25 | 30 | 40 |  |  |  |  |  |  |  |
| CA\_n3A\_SUL\_n41C-n80A | SUL\_n41A-n80A | n3 | 5 | 10 | 15 | 20 | 25 | 30 | 40 |  |  |  |  |  |  | 0 |
|  |  | n41 | See CA\_n41C Bandwidth Combination Set 1 in Table 5.5A.1-1 | | | | | | | | | | | | |  |
|  |  | n80 | 5 | 10 | 15 | 20 | 25 | 30 | 40 |  |  |  |  |  |  |  |
| CA\_n3A\_SUL\_n78A-n80A | SUL\_n78A-n80A | n3 | 5 | 10 | 15 | 20 | 25 | 30 | 40 |  |  |  |  |  |  | 0 |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|  |  | n78 |  | 10 | 15 | 20 | 25 | 30 | 40 | 50 | 60 | 70 | 80 | 90 | 100 |  |
|  |  | n80 | 5 | 10 | 15 | 20 | 25 | 30 | 40 |  |  |  |  |  |  |  |
| CA\_n3A\_SUL\_n78C-n80A | SUL\_n78A-n80A | n3 | 5 | 10 | 15 | 20 | 25 | 30 | 40 |  |  |  |  |  |  | 0 |
|  |  | n78 | See CA\_n78C Bandwidth Combination Set 1 in Table 5.5A.1-1 | | | | | | | | | | | | |  |
|  |  | n80 | 5 | 10 | 15 | 20 | 25 | 30 | 40 |  |  |  |  |  |  |  |
| CA\_n3A\_SUL\_n79A-n80A | SUL\_n79A-n80A | n3 | 5 | 10 | 15 | 20 | 25 | 30 | 40 |  |  |  |  |  |  | 0 |
|  |  | n79 |  |  |  |  |  |  | 40 | 50 | 60 |  | 80 |  | 100 |  |
|  |  | n80 | 5 | 10 | 15 | 20 | 25 | 30 | 40 |  |  |  |  |  |  |  |
| CA\_n3A\_SUL\_n79C-n80A | SUL\_n79A-n80A | n3 | 5 | 10 | 15 | 20 | 25 | 30 | 40 |  |  |  |  |  |  | 0 |
|  |  | n79 | See CA\_n79C Bandwidth Combination Set 0 in Table 5.5A.1-1 | | | | | | | | | | | | |  |
|  |  | n80 | 5 | 10 | 15 | 20 | 25 | 30 | 40 |  |  |  |  |  |  |  |
| CA\_n28A\_SUL\_n41A-n83A | SUL\_n41A-n83A | n28 | 5 | 10 | 15 | 20 |  | 30 |  |  |  |  |  |  |  | 0 |
|  |  | n41 |  | 10 | 15 | 20 |  | 30 | 40 | 50 | 60 |  | 80 | 90 | 100 |  |
|  |  | n83 | 5 | 10 | 15 | 20 |  | 30 |  |  |  |  |  |  |  |  |
| CA\_n28A\_SUL\_n41C-n83A | SUL\_n41A-n83A | n28 | 5 | 10 | 15 | 20 |  | 30 |  |  |  |  |  |  |  | 0 |
|  |  | n41 | See CA\_n41C Bandwidth Combination Set 1 in Table 5.5A.1-1 | | | | | | | | | | | | |  |
|  |  | n83 | 5 | 10 | 15 | 20 |  | 30 |  |  |  |  |  |  |  |  |
| CA\_n28A\_SUL\_n79A-n83A | SUL\_n79A-n83A | n28 | 5 | 10 | 15 | 20 |  | 30 |  |  |  |  |  |  |  | 0 |
|  |  | n79 |  |  |  |  |  |  | 40 | 50 | 60 |  | 80 |  | 100 |  |
|  |  | n83 | 5 | 10 | 15 | 20 |  | 30 |  |  |  |  |  |  |  |  |
| CA\_n28A\_SUL\_n79C-n83A | SUL\_n79A-n83A | n28 | 5 | 10 | 15 | 20 |  | 30 |  |  |  |  |  |  |  | 0 |
|  |  | n79 | See CA\_n79C Bandwidth Combination Set 0 in Table 5.5A.1-1 | | | | | | | | | | | | |  |
|  |  | n83 | 5 | 10 | 15 | 20 |  | 30 |  |  |  |  |  |  |  |  |
| CA\_n41A\_SUL\_n79A-n80A | SUL\_n79A-n80A | n41 |  | 10 | 15 | 20 |  | 30 | 40 | 50 | 60 |  | 80 | 90 | 100 | 0 |
|  |  | n79 |  |  |  |  |  |  | 40 | 50 | 60 |  | 80 |  | 100 |  |
|  |  | n80 | 5 | 10 | 15 | 20 | 25 | 30 | 40 |  |  |  |  |  |  |  |
| CA\_n41A\_SUL\_n79A-n83A | SUL\_n79A-n83A | n41 |  | 10 | 15 | 20 |  | 30 | 40 | 50 | 60 |  | 80 | 90 | 100 | 0 |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|  |  | n79 |  |  |  |  |  |  | 40 | 50 | 60 |  | 80 |  | 100 |  |
|  |  | n83 | 5 | 10 | 15 | 20 |  | 30 |  |  |  |  |  |  |  |  |
| CA\_n79A\_SUL\_n41A-n80A | SUL\_n41A-n80A | n41 |  | 10 | 15 | 20 |  | 30 | 40 | 50 | 60 |  | 80 | 90 | 100 | 0 |
|  |  | n79 |  |  |  |  |  |  | 40 | 50 | 60 |  | 80 |  | 100 |  |
|  |  | n80 | 5 | 10 | 15 | 20 | 25 | 30 | 40 |  |  |  |  |  |  |  |
| CA\_n79A\_SUL\_n41A-n83A | SUL\_n41A-n83A | n41 |  | 10 | 15 | 20 |  | 30 | 40 | 50 | 60 |  | 80 | 90 | 100 | 0 |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|  |  | n79 |  |  |  |  |  |  | 40 | 50 | 60 |  | 80 |  | 100 |  |
|  |  | n83 | 5 | 10 | 15 | 20 |  | 30 |  |  |  |  |  |  |  |  |
| NOTE 1: The SCS of each channel bandwidth for NR band refers to Table 5.3.5-1. | | | | | | | | | | | | | | | | |

## **<<End of Change2>>**

## **<<Start of Change3>>**

6.2C Transmitter power for SUL

6.2C.1 Configured transmitted power for SUL

When a UE is configured with both NR UL and NR SUL carriers in a serving cell with active transmission either on the UL carrier(s) or SUL carrier, the configured transmit power requirements specified in clause 6.2.4 and 6.2A.4 are applicable for the UL carrier(s) and the SUL carrier, respectively.

6.2C.2 ΔTIB,c

For the UE which supports SUL band combination, ΔTIB,c in Tables below applies. Unless otherwise stated, ΔTIB,c is set to zero.

**Table 6.2C.2-1: ΔTIB,c due to SUL**

|  |  |  |
| --- | --- | --- |
| **Band combination for SUL** | **NR Band** | **ΔTIB,c (dB)** |
| SUL\_n41-n80 | n41 | 0.31 |
|  |  | 0.82 |
|  | n80 | 0.5 |
| SUL\_n41-n81 | n41 | 0.3 |
|  | n81 | 0.3 |
| SUL\_n41-n83 | n41 | 0.3 |
|  | n83 | 0.3 |
| SUL\_n41-n97 | n41 | 0.5 |
|  | n97 | 0.5 |
| SUL\_n41-n98 | n41 | 0.5 |
|  | n98 | 0.5 |
| SUL\_n41-n99 | n41 | 0.41 |
|  |  | 0.92 |
|  | n99 | 0.3 |
| SUL\_n48-n99 | n48 | 0.6 |
|  | n99 | 0.8 |
| SUL\_n77-n80 | n77 | 0.8 |
|  | n80 | 0.6 |
| SUL\_n77-n84 | n77 | 0.8 |
|  | n84 | 0.6 |
| SUL\_n77-n99 | n77 | 0.6 |
|  | n99 | 0.8 |
| SUL\_n78-n80 | n78 | 0.8 |
|  | n80 | 0.6 |
| SUL\_n78-n81 | n78 | 0.8 |
|  | n81 | 0.6 |
| SUL\_n78-n82 | n78 | 0.8 |
|  | n82 | 0.6 |
| SUL\_n78-n83 | n78 | 0.8 |
|  | n83 | 0.5 |
| SUL\_n78-n84 | n78 | 0.8 |
|  | n84 | 0.3 |
| SUL\_n78-n86 | n78 | 0.8 |
|  | n86 | 0.6 |
| SUL\_n79-n83 | n79 | 0.8 |
|  | n83 | 0.5 |
| SUL\_n79-n97 | n79 | 0.8 |
|  | n98 | 0.3 |
| SUL\_n79-n98 | n79 | 0.8 |
|  | n98 | 0.3 |
| NOTE 1: The requirement is applied for UE transmitting on the frequency range of 2515 – 2690 MHz.  NOTE 2: The requirement is applied for UE transmitting on the frequency range of 2496 - 2515 MHz. | | |

**Table 6.2C.2-2: ΔTIB,c for SUL band combination (Three bands)**

|  |  |  |
| --- | --- | --- |
| **Band combination for SUL** | **NR Band** | **ΔTIB,c (dB)** |
| CA\_n1\_SUL\_n78-n80 | n1 | 0.6 |
|  | n78 | 0.8 |
|  | n80 | 0.6 |
| CA\_n1\_SUL\_n78-n84 | n1 | 0.6 |
|  | n78 | 0.8 |
|  | n84 | 0.6 |
| CA\_n3\_SUL\_n41-n80 | n3 | 0.5 |
|  | n41 | 0.31 |
|  |  | 0.82 |
|  | n80 | 0.5 |
| CA\_n3\_SUL\_n78-n80 | n3 | 0.6 |
|  | n78 | 0.8 |
|  | n80 | 0.6 |
| CA\_n3\_SUL\_n79-n80 | n3 | 0.3 |
|  | n79 | 0.8 |
|  | n80 | 0.3 |
| CA\_n28\_SUL\_n41-n83 | n28 | 0.3 |
|  | n41 | 0.3 |
|  | n83 | 0.3 |
| CA\_n28\_SUL\_n79-n83 | n28 | 0.5 |
|  | n79 | 0.8 |
|  | n83 | 0.5 |
| CA\_n41\_SUL\_n79-n80 | n41 | 0.31 |
|  |  | 0.82 |
|  | n79 | 0.8 |
|  | n80 | 0.3 |
| CA\_n41\_SUL\_n79-n83 | n41 | 0.3 |
|  | n79 | 0.8 |
|  | n83 | 0.5 |
| CA\_n79\_SUL\_n41-n80 | n41 | 0.31 |
|  |  | 0.82 |
|  | n79 | 0.8 |
|  | n80 | 0.3 |
| CA\_n79\_SUL\_n41-n83 | n41 | 0.3 |
|  | n79 | 0.8 |
|  | n83 | 0.5 |
| NOTE 1: The requirement is applied for UE transmitting on the frequency range of 2515-2690 MHz.  NOTE 2: The requirement is applied for UE transmitting on the frequency range of 2496-2515 MHz. | | |

## **<<End of Change3>>**

## **<<Start of Change4>>**

## 7.3C Reference sensitivity for SUL

### 7.3C.1 General

The reference sensitivity power level REFSENS is the minimum mean power applied to each one of the UE antenna ports for all UE categories, at which the throughput shall meet or exceed the requirements for the specified reference measurement channel.

### 7.3C.2 Reference sensitivity power level for SUL

For SUL operation, the reference receive sensitivity (REFSENS) requirement for downlink bands specified in Table 7.3.2-1 and Table 7.3.2-2 shall be met for an uplink transmission bandwidth less than or equal to that specified in Table 7.3.2-3 or supplementary uplink transmission bandwidth less than or equal to that specified in Table 7.3C.2-1 with reference measurement channels as specified in Annexes A.2.2.2, A.2.3.2, A.3.2, and A.3.3 (with one sided dynamic OCNG Pattern OP.1 FDD/TDD for the DL-signal as described in Annex A.5.1.1/A.5.2.1), unless sensitivity degradation is allowed in this clause of this specification. These exceptions also apply to any higher order CA or DC combination containing one of the exception combinations in this clause as subset.

For SUL operation with downlink CA, the reference receive sensitivity (REFSENS) requirement for downlink bands specified in clause 7.3A.2 shall be met for an uplink transmission bandwidth less than or equal to that specified in Table 7.3.2-3 or supplementary uplink transmission bandwidth less than or equal to that specified in Table 7.3C.2-1 with reference measurement channels as specified in Annexes A.2.2.2, A.2.3.2, A.3.2, and A.3.3 (with one sided dynamic OCNG Pattern OP.1 FDD/TDD for the DL-signal as described in Annex A.5.1.1/A.5.2.1), unless sensitivity degradation is allowed in this clause of this specification. These exceptions also apply to any higher order CA or DC combination containing one of the exception combinations in this clause as subset.

Table 7.3C.2-1: Supplementary uplink configuration for reference sensitivity

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| NR Band / SCS of SUL band / Channel bandwidth of the DL band / NRB | | | | | | | | | | | | | | | |
| DL band | SUL band | SCS of SUL band  (kHz) | 5  MHz | 10 MHz | 15 MHz | 20 MHz | 25 MHz | 30 MHz | 40 MHz | 50 MHz | 60 MHz | 70  MHz | 80 MHz | 90 MHz | 100 MHz |
| n1 | n80 | 15 | 160 | 160 | 160 | 160 | 160 | 160 | 160 |  |  |  |  |  |  |
| n1 | n841 | 15 | 25 | 50 | 75 | 100 | 128 | 128 | 128 | 128 |  |  |  |  |  |
| n3 | n801 | 15 | 25 | 50 | 50 | 50 | 50 | 50 | 50 |  |  |  |  |  |  |
| n24 | n99 | 15 | 25 | 50 |  |  |  |  |  |  |  |  |  |  |  |
| n28 | n831 | 15 | 25 | 25 | 25 | 25 |  | 25 |  |  |  |  |  |  |  |
| n41 | n80 | 15 |  | 160 | 160 | 160 |  | 160 | 160 | 160 | 160 |  | 160 | 160 | 160 |
| n41 | n81 | 15 |  | 100 | 100 | 100 |  |  | 100 | 100 | 100 |  | 100 | 100 | 100 |
| n41 | n83 | 15 |  | 100 | 100 | 100 |  | 100 | 100 | 100 | 100 |  | 100 | 100 | 100 |
|  |  | 30 |  | 50 | 50 | 50 |  | 50 | 50 | 50 | 50 |  | 50 | 50 | 50 |
| n41 | n95 | 15 |  | 75 | 75 | 75 |  | 75 | 75 | 75 | 75 |  | 75 | 75 | 75 |
| n41 | n97 | 30 |  | 216 | 216 | 216 |  | 216 | 216 | 216 | 216 |  | 216 | 216 | 216 |
| n41 | n98 | 15 |  | 216 | 216 | 216 |  | 216 | 216 | 216 | 216 |  | 216 | 216 | 216 |
| n41 | n99 | 15 |  | 50 | 50 | 50 |  | 50 | 50 | 50 | 50 |  | 50 | 50 | 50 |
| n48 | n99 | 15 |  | 50 | 50 | 50 |  | 50 | 50 | 50 | 50 |  | 50 | 50 | 50 |
| n77 | n80 | 15 |  | 160 | 160 | 160 |  |  | 160 | 160 | 160 |  | 160 | 160 | 160 |
| n77 | n84 | 15 |  | 100 | 100 | 100 |  |  | 100 | 100 | 100 |  | 100 | 100 | 100 |
| n77 | n99 | 15 |  | 50 | 50 | 50 | 50 | 50 | 50 | 50 | 50 | 50 | 50 | 50 | 50 |
| n78 | n80 | 15 |  | 160 | 160 | 160 | 160 | 160 | 160 | 160 | 160 | 160 | 160 | 160 | 160 |
| n78 | n81 | 15 |  | 100 | 100 | 100 |  |  | 100 | 100 | 100 |  | 100 | 100 | 100 |
| n78 | n82 | 15 |  | 100 | 100 | 100 |  |  | 100 | 100 | 100 |  | 100 | 100 | 100 |
| n78 | n83 | 15 |  | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 |
| n78 | n84 | 15 |  | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 |
| n78 | n86 | 15 |  | 216 | 216 | 216 |  |  | 216 | 216 | 216 |  | 216 | 216 | 216 |
| n79 | n80 | 15 |  |  |  |  |  |  | 160 | 160 | 160 |  | 160 |  | 160 |
| n79 | n83 | 15 |  |  |  |  |  |  | 100 | 100 | 100 |  | 100 |  | 100 |
|  |  | 30 |  |  |  |  |  |  | 50 | 50 | 50 |  | 50 |  | 50 |
| n79 | n81 | 15 |  |  |  |  |  |  | 100 | 100 | 100 |  | 100 |  | 100 |
| n79 | n84 | 15 |  |  |  |  |  |  | 100 | 100 | 100 |  | 100 |  | 100 |
| n79 | n95 | 15 |  |  |  |  |  |  | 75 | 75 | 75 |  | 75 |  | 75 |
| n79 | n97 | 15 |  |  |  |  |  |  | 270 | 270 | 270 |  | 270 |  | 270 |
| n79 | n98 | 15 |  |  |  |  |  |  | 216 | 216 | 216 |  | 216 |  | 216 |
| NOTE 1: The Tx-Rx carrier center frequency separation between SUL band and DL band is the same as the Tx-Rx carrier center frequency separation of DL band specified in table 5.4.4-1 from TS 38.101-1. The channel bandwidth of SUL band is the same as DL band. | | | | | | | | | | | | | | | |

For the UE that supports any of the SUL operation given in Table 7.3C.2-2, exceptions to the requirements specified in Table 7.3.2-1are allowed when the uplink is active in a lower frequency band and is within a specified frequency range such that transmitter harmonics fall within the downlink transmission bandwidth assigned in a higher band as noted in Table 7.3C.2-2. For these exceptions, the UE shall meet the requirements specified in Table 7.3C.2-2 and Table 7.3C.2-3.

Table 7.3C.2-2: Reference sensitivity for SUL operation (exceptions due to harmonic issue)

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| NR Band / Channel bandwidth of the high band | | | | | | | | | | | | | | |
| UL band | DL band | 5 MHz | 10 MHz | 15 MHz | 20 MHz | 25 MHz | 30 MHz | 40 MHz | 50 MHz | 60 MHz | 70 MHz | 80 MHz | 90 MHz | 100 MHz |
| dB | dB | dB | dB | dB | dB | dB | dB | dB |  | dB | dB | dB |
| n80 | n771,2 |  | 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 |  |  |  |  |  |  |  |  |  |
| n80 | n781,2 |  | 23.9 | 22.1 | 20.9 |  |  | 17.9 | 16.8 | 16.0 | 15.5 | 14.8 | 14.3 | 13.8 |
|  | n783 |  | 1.1 | 0.8 | 0.3 |  |  |  |  |  |  |  |  |  |
| n81 | n418,9 |  | 13 | 11.3 | 10.1 |  |  | 7.0 | 6.1 | 5.5 |  | 4.3 | 3.9 | 3.5 |
|  | n784,5 |  | 10.8 | 9.1 | 8 |  |  | 5.1 | 4.2 | 3.5 |  | 2.3 | 1.5 | 1.4 |
|  | n796,7 |  |  |  |  |  |  | 6.8 | 6.2 | 5.6 |  | 4.9 |  | 4.4 |
| n82 | n784,5 |  | 10.8 | 9.1 | 8 |  |  | 6 | 4.0 | 3.2 |  | 2.0 | 1.5 | 1.0 |
| n83 | n786,7 |  | 10.4 | 8.9 | 7.8 |  |  | 4.7 | 3.7 | 3 |  | 1.7 | 1.2 | 0.7 |
| n84 | n771,2 |  | 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 |  |  |  |  |  |  |  |  |  |
| n86 | n781,2 |  | 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 |  |  |  |  |  |  |  |  |  |
| n97 | n791,2 |  |  |  |  |  |  | 29.4 | 28.4 | 27.6 |  | 26.3 |  | 25.3 |
| n99 | n771,2 |  | 23.9 | 22.1 | 20.9 | 19.8 | 19.0 | 17.9 | 16.8 | 16.0 | 15.3 | 14.8 | 14.3 | 13.8 |
|  | n773 |  | 1.1 | 0.8 | 0.3 | 0.1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| NOTE 1: 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 band combination: ∆FHD = 10 MHz for SUL\_n78-n80, SUL\_n78-n86.  NOTE 2: 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 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 4th 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 5th transmitter harmonic is within the downlink transmission bandwidth of a victim (higher) band.  NOTE 7: The requirements should be verified for UL 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 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. | | | | | | | | | | | | | | |

Table 7.3C.2-3: Supplementary uplink configuration (exceptions due to harmonic issue)

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| NR Band / Channel bandwidth of the high band | | | | | | | | | | | | | | |
| UL band | DL band | 5 MHz (NRB) | 10 MHz (NRB) | 15 MHz (NRB) | 20 MHz (NRB) | 25 MHz (NRB) | 30 MHz (NRB) | 40 MHz (NRB) | 50 MHz (NRB) | 60 MHz (NRB) | 70 MHz (NRB) | 80 MHz (NRB) | 90 MHz (NRB) | 100 MHz (NRB) |
| n80 | n77 |  | 25 | 36 | 50 |  |  | 50 | 50 | 50 |  | 50 | 50 | 50 |
| n80 | n78 |  | 25 | 36 | 50 |  |  | 50 | 50 | 50 | 50 | 50 | 50 | 50 |
| n81 | n41 |  | 16 | 25 | 25 |  |  | 25 | 25 | 25 |  | 25 | 25 | 25 |
| n81 | n78 |  | 16 | 25 | 25 |  |  | 25 | 25 | 25 |  | 25 | 25 | 25 |
| n81 | n79 |  |  |  |  |  |  | 25 | 25 | 25 |  | 25 |  | 25 |
| n82 | n78 |  | 16 | 20 | 20 |  |  | 20 | 20 | 20 |  | 20 | 20 | 20 |
| n83 | n78 |  | 10 | 15 | 20 |  |  | 25 | 25 | 25 |  | 25 | 25 | 25 |
| n84 | n77 |  | 25 | 36 | 50 |  |  | 100 | 100 | 100 |  | 100 | 100 | 100 |
| n86 | n78 |  | 25 | 36 | 50 |  |  | 100 | 100 | 100 |  | 100 | 100 | 100 |
| n97 | n79 |  |  |  |  |  |  | 100 | 135 | 160 |  | 216 |  | 270 |
| n99 | n77 |  | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 |
| NOTE 1: 15 kHz SCS is assumed for UL band.  NOTE 2: The UL configuration applies regardless of the channel bandwidth of the low band  NOTE 3: Unless stated otherwise, UL resource blocks shall be centered within the transmission bandwidth configuration for the channel bandwidth. | | | | | | | | | | | | | | |

Sensitivity degradation is allowed for a band if it is impacted by UL of another band part of the same SUL configuration due to cross band isolation issues. Reference sensitivity exceptions are specified in Table 7.3C.2-4 with uplink configuration specified in Table 7.3C.2-5.

Table 7.3C.2-4: Reference sensitivity exceptions due to cross band isolation

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| UL band | DL band | 5 MHz  (dBm) | 10 MHz  (dBm) | 15 MHz  (dBm) | 20 MHz  (dBm) | 25 MHz  (dBm) | 30 MHz  (dBm) | 40 MHz  (dBm) | 50 MHz  (dBm) | 60 MHz  (dBm) | 70 MHz  (dBm) | 80 MHz  (dBm) | 90 MHz  (dBm) | 100 MHz  (dBm) |
| n80 | n41 |  | 4.3 | 4.0 | 3.9 |  | 3.9 | 3.9 | 3.5 | 3.3 |  | 3.2 | 3.1 | 3.0 |
| n95 | n41 |  | 6.1 | 6.1 | 6.1 |  | 6.1 | 6.1 | 6.1 | 6.1 |  | 6.1 | 6.1 | 6.1 |
| n97 | n41 |  | [20.7] | [18.9] | [17.7] |  | [15.8] | [14.5] | [13.5] | [12.8] |  | [11.5] | [11.0] | [10.6] |
| NOTE 1: The B41 requirements are modified by -0.5dB when carrier frequency of the assigned E-UTRA channel bandwidth is within 2515 – 2690 MHz. | | | | | | | | | | | | | | |

Table 7.3C.2-5: Uplink configuration for reference sensitivity exceptions due to cross band isolation

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| UL band | DL band | 5 MHz  (dBm) | 10 MHz  (dBm) | 15 MHz  (dBm) | 20 MHz  (dBm) | 25 MHz  (dBm) | 30 MHz  (dBm) | 40 MHz  (dBm) | 50 MHz  (dBm) | 60 MHz  (dBm) | 70 MHz  (dBm) | 80 MHz  (dBm) | 90 MHz  (dBm) | 100 MHz  (dBm) |
| n801 | n41 |  | 50 | 50 | 50 |  | 50 | 50 | 50 | 50 |  | 50 | 50 | 50 |
| n951 | n41 |  | 75 | 75 | 75 |  | 75 | 75 | 75 | 75 |  | 75 | 75 | 75 |
| n972 | n41 |  | 216 | 216 | 216 |  | 216 | 216 | 216 | 216 |  | 216 | 216 | 216 |
| NOTE 1: 15 kHz SCS is assumed for UL band.  NOTE 2: 30 kHz SCS is assumed for UL band. | | | | | | | | | | | | | | |

## **<<End of Change4>>**

## **<<Start of Change5>>**

##### 7.3C.3.2.1 ΔRIB,c for two bands

Table 7.3C.3.2.1-1: ΔRIB,c due to SUL (two bands)

|  |  |  |
| --- | --- | --- |
| Band combination for SUL | NR Band | ΔRIB,c (dB) |
| SUL\_n41-n80 | n41 | 0.5 (note) |
| SUL\_n41-n95 | n41 | 0.2 |
| SUL\_n41-n98 | n41 | 0.2 |
| SUL\_n48-n99 | n48 | 0.5 |
| SUL\_n77-n80 | n77 | 0.5 |
| SUL\_n77-n84 | n77 | 0.5 |
| SUL\_n77-n99 | n77 | 0.5 |
| SUL\_n78-n80 | n78 | 0.5 |
| SUL\_n78-n81 | n78 | 0.5 |
| SUL\_n78-n82 | n78 | 0.5 |
| SUL\_n78-n83 | n78 | 0.5 |
| SUL\_n78-n84 | n78 | 0.5 |
| SUL\_n78-n86 | n78 | 0.5 |
| SUL\_n79-n83 | n79 | 0.5 |
| SUL\_n79-n97 | n79 | 0.5 |
| SUL\_n79-n98 | n79 | 0.5 |
| NOTE: The requirement is applied for UE transmitting on the frequency range of 2496 – 2515 MHz. | | |

## **<<End of Change5>>**

## **<<Start of Change6>>**

##### 7.3C.3.2.2 ΔRIB,c for three bands

Table 7.3C.3.2.2-1: ΔRIB,c due to SUL (three bands)

|  |  |  |
| --- | --- | --- |
| Band combination for SUL | NR Band | ΔRIB,c (dB) |
| CA\_n1\_SUL\_n78-n80 | n1 | 0.2 |
|  | n78 | 0.5 |
| CA\_n1\_SUL\_n78-n84 | n1 | 0.2 |
|  | n78 | 0.5 |
| CA\_n3\_SUL\_n41-n80 | n41 | 0.5 (note) |
| CA\_n3\_SUL\_n78-n80 | n3 | 0.2 |
|  | n78 | 0.5 |
| CA\_n3\_SUL\_n79-n80 | n79 | 0.5 |
| CA\_n28\_SUL\_n41-n83 | n28 | 0.2 |
| CA\_n28\_SUL\_n79-n83 | n28 | 0.2 |
|  | n79 | 0.5 |
| CA\_n41\_SUL\_n79-n80 | n41 | 0.5 |
|  | n79 | 0.5 |
| CA\_n41\_SUL\_n79-n83 | n41 | 0.5 |
|  | n79 | 0.5 |
| CA\_n79\_SUL\_n41-n80 | n41 | 0.5 |
|  | n79 | 0.5 |
| CA\_n79\_SUL\_n41-n83 | n41 | 0.5 |
|  | n79 | 0.5 |
| NOTE: The requirement is applied for UE transmitting on the frequency range of 2496 – 2515 MHz. | | |

## **<<End of Change6>>**