**3GPP TSG-RAN WG4 Meeting #103-e *R4-22xxxxx***

**Electronic meeting, May 09 - May 20, 2022**

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| *CR-Form-v12.2* | | | | | | | | |
| **CHANGE REQUEST** | | | | | | | | |
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|  |  | **CR** |  | **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:*** |  | | | | | | | | | |
| ***Source to TSG:*** | R4 | | | | | | | | | |
|  |  | | | | | | | | | |
| ***Work item code:*** | NR\_CA\_R16\_intra, NR\_RF\_FR1 | | | | |  | ***Date:*** | | | 2022-05-24 |
|  |  | | | |  | |  | | |  |
| ***Category:*** | **A** |  | | | | | ***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-16 (Release 16) Rel-17 (Release 17) Rel-18 (Release 18) Rel-19 (Release 19)* | |
|  |  | | | | | | | | | |
| ***Reason for change:*** | | This big CRs merge the mutiple endorsed draft CRs. The reason for change in each endorsed draft CR is copied below.  R4-2209628  For NR intra-band contiguous CA configurations within FR1, the CA BW class “F” is invalid in the current RAN4 spec and should be removed from the release independent feature table for additional NR CA configurations. Furthermore, the intra-band contiguous CA BW classes “M”, “N” and “O” are missing in Table 5.2.1-1. In addition, some terms such as “inter-band” instead of “interband” should be unified in notaion in the specification.  R4-2209630  Table B.4.3-1 is for the common UE RF requirements for a release independent SUL. In Table 5.1-2 for NR UE power class, there is no requirement for FDD duplex-mode in PC1 UE. | | | | | | | | |
|  | |  | | | | | | | | |
| ***Summary of change:*** | | The summary of change in each endorsed draft CR is copied below.  R4-2209628  (1) Remove the invalid CA BW class “F” for intra-band contiguous CA configurations within FR1.  (2) Add classes “M”, “N” and “O” in Table 5.2.1-1.  (3) Unify the notations for different types of configurations.  R4-2209630  Remove the requirements of Table B.4.3-1 for PC1 UE in Table 5.1-2 for duplex-mode FDD. | | | | | | | | |
|  | |  | | | | | | | | |
| ***Consequences if not approved:*** | | The consequences if not approved for each endorsed draft CR are coppied below.  R4-2209628  The CA BW class for NR intra-band contiguous CA configurations within FR1 is incorrect.  R4-2209630  The requirements for NR FR1 UE power class are inaccurate. | | | | | | | | |
|  | |  | | | | | | | | |
| ***Clauses affected:*** | | 5.1, 5.2.1, 5.2.2, 6.2.1, 7.1, 8.1.1, 8.1.2, 8.1.2.1, 8.1.2.2, 8.1.2.3 | | | | | | | | |
|  | |  | | | | | | | | |
|  | | **Y** | **N** |  | | | |  | | |
| ***Other specs*** | |  |  | Other core specifications | | | | TS/TR ... CR ... | | |
| ***affected:*** | |  |  | Test specifications | | | | 38.521-1, 38.521-2, 38.521-3 | | |
| ***(show related CRs)*** | |  |  | O&M Specifications | | | | TS/TR ... CR ... | | |
|  | |  | | | | | | | | |
| ***Other comments:*** | |  | | | | | | | | |
|  | |  | | | | | | | | |
| ***This CR's revision history:*** | |  | | | | | | | | |

**<<Start of Change>>**

5.1 Additional NR operating bands and UE power classes for NR frequency range 1

Requirements for a Rel-17 UE for additional NR operating bands and power classes compared to TS 38.101-1 of Rel-17 [2] are introduced via this clause.

**Table 5.1-1: NR operating bands**

|  |  |  |  |
| --- | --- | --- | --- |
| **Feature** | **Duplex-mode** | **Release**  **independent from** | **Requirements to be fulfilled**  **(see TS 38.307 of the release in which the band was introduced)** |
| Operating bands | FDD, TDD, SDL, SUL | Rel-15 | Table B.4.1-1, Table B.4.3-1 |
| Shared spectrum access operating bands | TDD | Rel-16 | Table B.4.7-1 |

**Table 5.1-2: NR UE power class**

|  |  |  |  |
| --- | --- | --- | --- |
| **Feature** | **Duplex-mode** | **Release**  **independent from** | **Requirements to be fulfilled**  **(see TS 38.307 of the release in which the power class was introduced)** |
| Power Class 1 | FDD | Rel-15 | Table B.4.1-1 |
| Power Class 1.5 | TDD | Rel-15 | Table B.4.1-1, Table B.4.3-1 |
| Power Class 2 | FDD, TDD | Rel-15 | Table B.4.1-1, Table B.4.3-1 |
| Power Class 3 | FDD, TDD, SUL | Rel-15 | Table B.4.1-1, Table B.4.3-1 |

**<<Next of Change>>**

5.2.1 Intra-band CA

Requirements for a Rel-16 UE for additional NR intraband CA configurations within FR1 compared to TS 38.101-1 of Rel-16 [2] are introduced via this clause.

**Table 5.2.1-1: NR intra-band CA within FR1**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Feature** | **DL/UL** | **CA BW Class** | **Duplex-mode** | **Release**  **independent from** | **requirements to be fulfilled**  **(see 38.307 of the REL in which the CA configuration was introduced)** |
| Intra-band contiguous CA configurations within FR1 | DL | B, C, D, E, G, H, I, J, K, L, M, N, O | FDD,TDD | Rel-15 | Table B.4.2-1 |
|  | UL | A,B,C | FDD,TDD | Rel-15 |  |

**Table 5.2.1-2: NR intra-band non-contiguous CA within FR1**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Feature** | **DL/UL** | **number of sub-blocks** | **maximum number of CCs within a sub-block** | **Duplex-mode** | **Release**  **independent from** | **requirements to be fulfilled**  **(see 38.307 of the REL in which the CA configuration was introduced)** |
| Intra-band non-contiguous CA configurations within FR1 | DL | 2 | 1 | FDD, TDD | Rel-15 | Table B.4.2-1 |
| 3 | 1 | TDD | Rel-15 |
| 4 | 1 | TDD | Rel-15 |

5.2.2 Inter-band CA

Requirements for a Rel-16 UE for additional NR inter-band CA configurations within FR1 compared to TS 38.101-1 of Rel-16 [2] are introduced via this clause.

**Table 5.2.2-0: NR inter-band CA UE power class within FR1**

|  |  |  |  |
| --- | --- | --- | --- |
| **Feature** | **Duplex-mode** | **Release**  **independent from** | **Requirements to be fulfilled**  **(see TS 38.307 of the release in which the power class was introduced)** |
| Inter-band CA Power Class 2 | TDD, FDD and TDD | Rel-15 | Table B.4.2-1 |
| Inter-band CA Power Class 3 | FDD, TDD, SDL and TDD, FDD and TDD | Rel-15 |  |

**Table 5.2.2-1: NR inter-band CA within FR1**

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Feature** | **DL/UL** | **Maximum number of bands** | **number of CCs** | **CA BW Classes** | **Duplex-mode** | **Release**  **independent from** | **requirements to be fulfilled**  **(see 38.307 of the REL in which the CA configuration was introduced)** |
| Inter-band CA configurations within NR FR1 | DL | 4 | 5 | A, B, C | TDD, FDD, SDL and FDD, SDL and TDD, FDD and TDD | Rel-15 | Table B.4.2-1 |
|  | UL | 2 | 2 | A | TDD, FDD, FDD and TDD | Rel-15 |  |

**<<Next of Change>>**

6.2.1 Intra-band CA

Requirements for a Rel-16 UE for additional NR intra-band CA configurations within FR2 compared to TS 38.101-2 of Rel-16 [3] are introduced via this clause.

**Table 6.2.1-1: NR intra-band contiguous CA within FR2**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Feature** | **DL/UL** | **CA BW Class** | **Duplex-mode** | **Release**  **independent from** | **requirements to be fulfilled**  **(see 38.307 of the REL in which the CA configuration was introduced)** |
| Intra-band contiguous CA configurations within FR2 | DL | B, C, D, E, F, G, H, I, J, K, L, M, O, P, Q | TDD | Rel-15 | Table B.4.2-1 |
|  | UL | B, D, E, F, G, H, I, J, K, L, M, O, P, Q | TDD | Rel-15 |  |

**Table 6.2.1-3: NR inter-band CA within FR2**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Feature** | **DL/UL** | **Maximum number of bands** | **CA BW Classes** | **Duplex-mode** | **Release**  **independent from** | **requirements to be fulfilled**  **(see 38.307 of the REL in which the CA configuration was introduced)** |
| Inter-band CA configurations within NR FR2 | DL | 2 | B, C, D, E, F, G, H, I, J, K, L, M, O, P, Q | TDD | Rel-16 | Table B.4.2-1 |
|  | UL | 1 | B, C, D, E, F, G, H, I, J, K, L, M, O, P, Q | TDD | Rel-16 |  |

**Table 6.2.1-2: NR non-contiguous intra-band CA within FR2**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Feature** | **DL/UL** | **number of sub-blocks** | **maximum number of CCs within a sub-block** | **Duplex-mode** | **Release**  **independent from** | **requirements to be fulfilled**  **(see 38.307 of the REL in which the CA configuration was introduced)** |
| Intra-band non- contiguous CA configurations within | DL | 2 | 4 | TDD | Rel-15 | Table B.4.2-1 |
| FR2 |  | 3 | 1 | TDD | Rel-15 |  |
|  |  | 4 | 1 | TDD | Rel-15 |  |
|  |  | 5 | 2 | TDD | Rel-15 |  |
|  |  | 6 | 2 | TDD | Rel-15 |  |
|  |  | 7 | 2 | TDD | Rel-15 |  |
|  |  | 8 | 1 | TDD | Rel-15 |  |
|  |  | 9 | 1 | TDD | Rel-15 |  |
|  |  | 10 | 1 | TDD | Rel-15 |  |

**<<Next of Change>>**

7.1 Additional NR inter-band CA configurations between frequency range 1 and frequency range 2

Requirements for a Rel-16 UE for additional NR inter-band CA configurations between FR1 and FR2 compared to TS 38.101-3 of Rel-16 [4] are introduced via this clause.

**Table 7.1-1: NR inter-band CA between FR1 and FR2**

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Feature** | **DL/UL** | **number of bands** | **maximum number of CCs** | **CA BW Classes** | **Duplex-mode** | **Release**  **independent from** | **requirements to be fulfilled**  **(see 38.307 of the REL in which the CA configuration was introduced)** |
| Inter-band CA configurations for NR interworking between FR1 and FR2 | DL FR1 | 3 | 4 | A, C | FDD, TDD, FDD and TDD | Rel-15 | Table B.4.4-1 |
|  | DL FR2 | 1 | 4 | A, D, E, F, G, H, I, J, K, L, M | TDD | Rel-15 |  |
|  | UL FR1 | 1 | 1 | A | FDD, TDD | Rel-15 |  |
|  | UL FR2 | 1 | 1 | A, D, G, H, I, J, K, L,M | TDD | Rel-15 |  |

**<<Next of Change>>**

8.1.1 Intra-band EN-DC

Requirements for a Rel-16 UE for additional EN-DC intra-band configurations within FR1 compared to TS 38.101-3 of Rel-16 [4] are introduced via this clause.

**Table 8.1.1-0: EN-DC intra-band UE power class**

|  |  |  |  |
| --- | --- | --- | --- |
| **Feature** | **Duplex-mode** | **Release**  **independent from** | **Requirements to be fulfilled**  **(see TS 38.307 of the release in which the band was introduced)** |
| Intra-band contiguous EN-DC power class 1.5 | TDD | Rel-15 | Table B.4.6-1 |
| Intra-band contiguous EN-DC power class 2 | TDD | Rel-15 |  |
| Intra-band contiguous EN-DC power class 3 | FDD, TDD | Rel-15 |  |
| Intra-band non-contiguous EN-DC power class 1.5 | TDD | Rel-15 |  |
| Intra-band non-contiguous EN-DC power class 2 | TDD | Rel-15 |  |
| Intra-band non-contiguous EN-DC power class 3 | FDD, TDD | Rel-15 |  |

**Table 8.1.1-1: EN-DC contiguous intra-band configurations within FR1**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Feature** | **DL/UL** | **maximum number of E-UTRA CCs** | **maximum number of NR CCs** | **Duplex-mode** | **Release**  **independent from** | **requirements to be fulfilled**  **(see 38.307 of the REL in which the CA configuration was introduced)** |
| Intra-band contiguous EN-DC | DL | 3 | 2 | FDD, TDD | Rel-15 | Table B.3.2-1, Table B.4.6-1 |
|  | UL | 1 | 1 | FDD, TDD | Rel-15 |  |

**Table 8.1.1-2: EN-DC non-contiguous intra-band configurations within FR1**

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Feature** | **DL/UL** | **maximum number of sub-blocks** | **maximum number of E-UTRA CCs** | **maximum number of NR CCs** | **Duplex-mode** | **Release**  **independent from** | **requirements to be fulfilled**  **(see 38.307 of the REL in which the CA configuration was introduced)** |
| Intra-band non-contiguous EN-DC | DL | 3 | 3 | 1 | FDD, TDD | Rel-15 | Table B.3.2-2, Table B.4.6-1 |
|  | UL | 2 | 1 | 1 | FDD, TDD | Rel-15 |  |

**<<Next of Change>>**

8.1.2 Inter-band EN-DC

8.1.2.1 Inter-band EN-DC within frequency range 1

Requirements for a Rel-16 UE for additional EN-DC inter-band configurations within FR1 compared to TS 38.101-3 of Rel-16 [4] are introduced via this clause.

**Table 8.1.2.1-0: EN-DC inter-band UE power class**

|  |  |  |  |
| --- | --- | --- | --- |
| **Feature** | **Duplex-mode** | **Release**  **independent from** | **Requirements to be fulfilled**  **(see TS 38.307 of the release in which the band was introduced)** |
| Inter-band EN-DC Power Class 2 | TDD, FDD and TDD | Rel-15 | Table B.4.6-1 |
| Inter-band EN-DC Power Class 3 | FDD, TDD, FDD and TDD | Rel-15 |  |

**Table 8.1.2.1-1: EN-DC inter-band configurations without SUL within FR1**

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Feature** | **DL/UL** | **maximum number of E-UTRA bands** | **maximum number of E-UTRA CCs** | **maximum number of NR bands** | **maximum number of NR CCs** | **Duplex-mode** | **Release**  **independent from** | **requirements to be fulfilled**  **(see 38.307 of the REL in which the CA configuration was introduced)** |
| Inter-band EN-DC | DL | 6 | 6 | 2 | 3 | FDD, TDD,  FDD and TDD | Rel-15 | Table B.4.6-1 |
|  | UL | 1 | 2 | 1 | 2 | FDD, TDD, FDD and TDD | Rel-15 |  |

**Table 8.1.2.1-2: EN-DC inter-band configurations with SUL within FR1**

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Feature** | **DL/UL** | **maximum number of E-UTRA bands** | **maximum number of E-UTRA CCs** | **maximum number of NR bands** | **maximum number of NR CCs** | **Duplex-mode** | **Release**  **independent from** | **requirements to be fulfilled**  **(see 38.307 of the REL in which the CA configuration was introduced)** |
| Inter-band EN-DC | DL | 2 | 3 | 1 | 1 | FDD, TDD,  FDD and TDD | Rel-15 | Table B.4.6-1 |
|  | UL | 1 | 1 | 2 | 2 | FDD, TDD,  FDD and TDD and SUL | Rel-15 |  |

8.1.2.2 Inter-band EN-DC including frequency range 2

Requirements for a Rel-16 UE for additional EN-DC inter-band configurations including FR2 compared to TS 38.101-3 of Rel-16 [4] are introduced via this clause.

**Table 8.1.2.2-1: EN-DC inter-band configurations including FR2**

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Feature** | **DL/UL** | **number of E-UTRA bands** | **maximum number of E-UTRA CCs** | **number of NR bands** | **maximum number of NR CCs** | **Duplex-mode** | **Release**  **independent from** | **requirements to be fulfilled**  **(see 38.307 of the REL in which the CA configuration was introduced)** |
| Inter-band EN-DC | DL | 4 | 6 | 1 | 10 | TDD, FDD and TDD | Rel-15 | Table B.4.6-1 |
|  | UL | 1 | 4 | 1 | 8 | TDD, FDD and TDD | Rel-15 |  |

8.1.2.3 Inter-band EN-DC including frequency range 1 and frequency range 2

Requirements for a Rel-16 UE for additional EN-DC inter-band configurations including FR1 and FR2 compared to TS 38.101-3 of Rel-16 [4] are introduced via this clause.

**Table 8.1.2.3-1: EN-DC inter-band configurations including FR1 and FR2**

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Feature** | **DL/UL** | **maximum number of E-UTRA bands** | **maximum number of E-UTRA CCs** | **maximum number of NR**  **bands** | **maximum number of NR**  **CCs** | **Duplex-mode** | **Release**  **independent from** | **requirements to be fulfilled**  **(see 38.307 of the REL in which the CA configuration was introduced)** |
| Inter-band EN-DC | DL FR1 | 4 | 6 | 1 | 2 | TDD, FDD, FDD and TDD | Rel-15 | Table B.4.6-1 |
|  | DL FR2 | 1 | 8 | TDD | Rel-15 |  |
|  | UL FR1 | 1 | 2 | 1 | 1 | FDD, TDD, FDD and TDD | Rel-15 |  |
|  | UL FR2 | 1 | 3 | TDD, | Rel-15 |  |

**<<End of Change>>**