**3GPP TSG- Meeting # *Draft R4-22xxxxx***

**Online, 9th - 20th May 2022**

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| *CR-Form-v12.2* | | | | | | | | |
| **CHANGE REQUEST** | | | | | | | | |
|  | | | | | | | | |
|  |  | **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)*.* | | | | | | | | |
|  | | | | | | | | |

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| ***Proposed change affects:*** | UICC apps |  | ME | **X** | Radio Access Network |  | Core Network |  |

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | | | | | | | | | | |
| ***Title:*** | R17 FR2 Draft CR on separate REFSENS tables for different power classes | | | | | | | | | |
|  |  | | | | | | | | | |
| ***Source to WG:*** | Nokia, OPPO | | | | | | | | | |
| ***Source to TSG:*** | R4 | | | | | | | | | |
|  |  | | | | | | | | | |
| ***Work item code:*** | NR\_RF\_FR2\_req\_enh2-Core | | | | |  | ***Date:*** | | |  |
|  |  | | | |  | |  | | |  |
| ***Category:*** | **F** |  | | | | | ***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-16 (Release 16) Rel-17 (Release 17) Rel-18 (Release 18) Rel-19 (Release 19)* | |
|  |  | | | | | | | | | |
| ***Reason for change:*** | | Inclusion of endorsed draftCRs at RAN4#104-e for NR\_RF\_FR2\_req\_enh2-Core. | | | | | | | | |
|  | |  | | | | | | | | |
| ***Summary of change:*** | | Inclusion of endorsed draftCRs at RAN4#104-e:  R4-2215120 R17 FR2 Draft CR on separate REFSENS tables for different power classes OPPO Rel-17 38.101-2 17.6.0 NR\_RF\_FR2\_req\_enh2-Core  R4-2212587 Draft CR for Rel-17 38.101-2 to correct the configured transmitted power for CA Xiaomi Rel-17 38.101-2 17.6.0 NR\_RF\_FR2\_req\_enh2-Core F  R4-2212795 draft CR on beam management type capability vivo Rel-17 38.101-2 17.6.0 NR\_RF\_FR2\_req\_enh2-Core | | | | | | | | |
|  | |  | | | | | | | | |
| ***Consequences if not approved:*** | | The endorsed draftCR will not be introduced correctly in Rel-17 specification. | | | | | | | | |
|  | |  | | | | | | | | |
| ***Clauses affected:*** | | 5.2A.2, 6.2A.4.2, 7.3A.2.3, 7.3A.3 | | | | | | | | |
|  | |  | | | | | | | | |
|  | | **Y** | **N** |  | | | |  | | |
| ***Other specs*** | |  | **X** | Other core specifications | | | | TS/TR ... CR ... | | |
| ***affected:*** | |  | **X** | Test specifications | | | | TS/TR ... CR ... | | |
| ***(show related CRs)*** | |  | **X** | O&M Specifications | | | | TS/TR ... CR ... | | |
|  | |  | | | | | | | | |
| ***Other comments:*** | |  | | | | | | | | |
|  | |  | | | | | | | | |
| ***This CR's revision history:*** | |  | | | | | | | | |

## **<Start of Change>**

### 5.2A.2 Inter-band CA

NR inter-band carrier aggregation is designed to operate in the operating bands defined in Table 5.2A.2-1, where all operating bands are within FR2.

Beam management type is according to UE capability declaration *IE beamManagementType-r16 or beamManagementType-CBM-r17*. The requirements in the following clauses are only applicable to inter-band CA with IBM type.

Table 5.2A.2-1: Inter-band CA operating bands in FR2

|  |  |
| --- | --- |
| NR CA Band | NR Band  (Table 5.2-1) |
| CA\_n257-n2591 | n257, n259 |
| CA\_n258-n2601 | n258, n260 |
| CA\_n258-n2611 | n258, n261 |
| CA\_n260-n2611 | n260, n261 |
| NOTE 1: The minimum requirements apply only when there is non-simultaneous Rx/Tx operation between inter-band NR carriers in the current version of this specification. | |

## **<Unchanged Clauses Skipped>**

#### 6.2A.4.2 Configured transmitted power for inter-band UL CA

A UE can configure its maximum output power for each uplink band when it is configured for inter-band UL carrier aggregation with two NR bands each with a single UL CC. For each uplink band *n*, the configured UE maximum output power PCMAX,f,c,n for carrier *f* of a serving cell *c* is defined as that available to the reference point of a given transmitter branch that corresponds to the reference point of the higher-layer filtered RSRP measurement as specified in TS 38.215 [11].

The configured UE maximum output power PCMAX,f,c,n for carrier *f* of a serving cell *c* in band *n* shall be set such that the corresponding measured peak EIRP PUMAX,f,c,n is within the following bounds

PPowerclass + DPIBE – MAX(MAX(MPRf,c,n, A- MPRf,c,n) + ΔTIB,P,n, P-MPRf,c,n) – MAX{T(MAX(MPRf,c,n, A- MPRf,c,n,)), T(P-MPRf,c,n)} ≤ PUMAX,f,c,n ≤ EIRPmax,n

while the corresponding measured total radiated power in uplink band *n,* PTMAX,f,c,n , is bounded by

PTMAX,f,c,n ≤ TRPmax,n

with PPowerclass the UE minimum peak EIRP as specified in sub-clause 6.2A.1, EIRPmax,n the applicable maximum EIRP as specified in sub-clause 6.2A.1 for uplink band *n* andTRPmax,n the applicable maximum TRP as specified in sub-clause 6.2A.1 for uplink band *n*. MPRf,c,n as specified in sub-clause 6.2A.2 for uplink band *n*, A-MPRf,c,n as specified in sub-clause 6.2A.3 for uplink band *n*, ΔTIB,P,n the peak EIRP relaxation as specified in clause 6.2A.1. The requirement is verified in beam peak direction.

DPIBE, *mpr-PowerBoost-FR2-r16* and *maxUplinkDutyCycle-FR2* are described in clause 6.2.4.

P-MPRf,c,n is the power management maximum output power reduction P-MPRf,c in band *n.* P-MPRf,c is defined in clause 6.2.4.

The tolerance T(∆P) for applicable values of ∆P (values in dB) in each band is specified in Table 6.2.4-1.

## **<Unchanged Clauses Skipped>**

#### 7.3A.2.3 Inter-band CA

The inter-band requirement applies for all active component carriers. The throughput for each component carrier shall be ≥ 95 % of the maximum throughput of the reference measurement channels as specified in Annexes A.2.3.2 and A.3.3.2 (with one sided dynamic OCNG Pattern OP.1 TDD for the DL-signal as described in Annex A.5.2.1) with peak reference sensitivity for each carrier specified in section 7.3.2, and relaxation ΔRIB,P,napplied to peak reference sensitivity requirement. ΔRIB,P,nis specified in Table 7.3A.2.3-1. The requirement on each component carrier shall be met when the power in the component carrier in the other band is set to its EIS spherical coverage requirement for inter-band CA specified in sub-clause 7.3A.3.3.

For the combination of intra-band and inter-band carrier aggregation, the intra-band CA relaxation, ΔRIB, is also applied according to the clause 7.3A.2.1 and 7.3A.2.2.

Table 7.3A.2.3-1: ΔRIB,P,n reference sensitivity relaxation for inter-band CA

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **NR CA band combinations** | **NR band** | **ΔRIB,P,n (dB)** | | | |
|  |  | **PC1** | **PC2** | **PC3** | **PC5** |
| CA\_n257-n259 | n257 |  | [3.5] | 4.0 | 3.0 |
|  | n259 |  | [3.5] | 4.0 | 3.0 |
| CA\_n258-n260 | n258 |  |  | 3.5 |  |
|  | n260 |  |  | 3.5 |  |
| CA\_n258-n261 | n258 |  |  | 3.5 |  |
|  | n261 |  |  | 3.5 |  |
| CA\_n260-n261 | n260 | 2.5 |  | 3.5 |  |
|  | n261 | 2.5 |  | 3.5 |  |
| Note: For each power class, band combinations without specified ΔRIB,P,n are not enabled for inter-band downlink carrier aggregation in this release. | | | | | |

### 7.3A.3 EIS spherical coverage for DL CA

#### 7.3A.3.1 Void

#### 7.3A.3.2 Void

#### 7.3A.3.3 EIS spherical coverage for inter-band CA

The inter-band CA requirement applies per operating band, for all active component carriers with UL assigned to one band and one DL component carrier per band. The requirement on each component carrier shall be met when the power in the component carrier in the other band is set to its EIS spherical coverage requirement for inter-band CA specified in this sub-clause.

The inter-band CA spherical coverage requirement for each power class will be satisfied if the intersection set of spherical coverage areas exceeds the common coverage requirement. Intersection set of spherical coverage areas is defined as a fraction of area of full sphere measured around the UE where both bands meet their defined individual EIS spherical coverage requirements for inter-band CA operation. The common coverage requirement is determined as <100-percentile rank> %, where ‘percentile rank’ is the percentile value in the specification of spherical coverage for that power class from clause 7.3.4.The requirement is verified with the test metric of EIS (Link=Beam peak search grids, Meas=Link angle).

The reference measurement channels and throughput criterion shall be as specified in clause 7.3A.2.3. The requirement shall be met for an uplink transmission using QPSK DFT-s-OFDM waveforms and for uplink transmission bandwidth less than or equal to that specified in clause 7.3.2.

Unless otherwise specified, the minimum requirements for reference sensitivity shall be verified with the network signalling value NS\_200 (Table 6.2.3.1-1) configured.

The required spherical coverage EIS for each band in inter-band CA operation is given in clause 7.3.4 and modified by ΔRIB,S,n. The value of ∆RIB,S,n is defined in Table 7.3A.3.3-1.

Table 7.3A.3.3-1: ΔRIB,S,n EIS spherical coverage requirement relaxation for inter-band CA

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **NR CA band combination** | **NR band** | **ΔRIB,S,n (dB)** | | | |
|  |  | **PC1** | **PC2** | **PC3** | **PC5** |
| CA\_n257-n259 | n257 |  | [3.5] | 3.5 | [2.5] |
|  | n259 |  | [3.5] | 3.5 | [2.5] |
| CA\_n258-n260 | n258 |  |  | 3.5 |  |
|  | n260 |  |  | 3.5 |  |
| CA\_n258-n261 | n258 |  |  | 3.5 |  |
|  | n261 |  |  | 3.5 |  |
| CA\_n260-n261 | n260 | [2.5] |  | 3.5 |  |
|  | n261 | [2.5] |  | 3.5 |  |
| Note: For each power class, band combinations without specified ΔRIB,S,n are not enabled for inter-band downlink carrier aggregation in this release. | | | | | |

## **<End of Change>**