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| 3GPP TR 38.750 V0.0.1 (2024-08) | |
| Technical Report | |
| 3rd Generation Partnership Project;  Technical Specification Group Radio Access Network;  High power UE (power class 2) for NR Inter-band Carrier Aggregation (CA)/Dual connectivity (DC) with high power on FDD band(s);  (Release 19) | |
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# Foreword

This Technical Report has been produced by the 3rd Generation Partnership Project (3GPP).

The contents of the present document are subject to continuing work within the TSG and may change following formal TSG approval. Should the TSG modify the contents of the present document, it will be re-released by the TSG with an identifying change of release date and an increase in version number as follows:

Version x.y.z

where:

x the first digit:

1 presented to TSG for information;

2 presented to TSG for approval;

3 or greater indicates TSG approved document under change control.

y the second digit is incremented for all changes of substance, i.e. technical enhancements, corrections, updates, etc.

z the third digit is incremented when editorial only changes have been incorporated in the document.

In the present document, modal verbs have the following meanings:

**shall** indicates a mandatory requirement to do something

**shall not** indicates an interdiction (prohibition) to do something

The constructions "shall" and "shall not" are confined to the context of normative provisions, and do not appear in Technical Reports.

The constructions "must" and "must not" are not used as substitutes for "shall" and "shall not". Their use is avoided insofar as possible, and they are not used in a normative context except in a direct citation from an external, referenced, non-3GPP document, or so as to maintain continuity of style when extending or modifying the provisions of such a referenced document.

**should** indicates a recommendation to do something

**should not** indicates a recommendation not to do something

**may** indicates permission to do something

**need not** indicates permission not to do something

The construction "may not" is ambiguous and is not used in normative elements. The unambiguous constructions "might not" or "shall not" are used instead, depending upon the meaning intended.

**can** indicates that something is possible

**cannot** indicates that something is impossible

The constructions "can" and "cannot" are not substitutes for "may" and "need not".

**will** indicates that something is certain or expected to happen as a result of action taken by an agency the behaviour of which is outside the scope of the present document

**will not** indicates that something is certain or expected not to happen as a result of action taken by an agency the behaviour of which is outside the scope of the present document

**might** indicates a likelihood that something will happen as a result of action taken by some agency the behaviour of which is outside the scope of the present document

**might not** indicates a likelihood that something will not happen as a result of action taken by some agency the behaviour of which is outside the scope of the present document

In addition:

**is** (or any other verb in the indicative mood) indicates a statement of fact

**is not** (or any other negative verb in the indicative mood) indicates a statement of fact

The constructions "is" and "is not" do not indicate requirements.

# 1 Scope

The present document is one of four technical reports for High power UE (power class 1.5 or 2) for NR intra-band Carrier Aggregation (CA) or NR inter-band CA/Dual connectivity (DC) band combinations with/without NR SUL (supplementary uplink) under Rel-19 time frame. The objective is to gather the relevant background information and studies in order to complete the band-combination specific requirements for the newly requested band combinations for power class 2 UE. Table 1-1 lists the band combinations covered by this TR.

**Table 1-1 High power UE (power class 2) for NR Inter-band CA/DC with high power on FDD band(s)**

|  |  |  |
| --- | --- | --- |
| **#** | **Band combination List** | **Power class cases for uplink** |
| 1 | High power UE (power class 2) for NR Inter-band Carrier Aggregation (CA)/Dual connectivity (DC) with high power on FDD band(s)  Note: Including PC3 FDD+ PC3 FDD | 1UL(FDD): PC2 on FDD band  2UL (FDD+FDD): PC3 on FDD band |

# 2 References

The following documents contain provisions which, through reference in this text, constitute provisions of the present document.

- References are either specific (identified by date of publication, edition number, version number, etc.) or non‑specific.

- For a specific reference, subsequent revisions do not apply.

- For a non-specific reference, the latest version applies. In the case of a reference to a 3GPP document (including a GSM document), a non-specific reference implicitly refers to the latest version of that document *in the same Release as the present document*.

[1] 3GPP TR 21.905: "Vocabulary for 3GPP Specifications".

[2] 3GPP RP-241679: “Rel-19 High power UE (power class 1.5 or 2) for NR intra-band Carrier Aggregation (CA) or NR inter-band CA/Dual connectivity (DC) band combinations with/without NR Supplementary uplink (SUL)”.

# 3 Definitions of terms, symbols and abbreviations

## 3.1 Terms

For the purposes of the present document, the terms given in 3GPP TR 21.905 [1] and the following apply. A term defined in the present document takes precedence over the definition of the same term, if any, in 3GPP TR 21.905 [1].

**example:** text used to clarify abstract rules by applying them literally.

## 3.2 Symbols

For the purposes of the present document, the following symbols apply:

<symbol> <Explanation>

ΔRIB,c Allowed reference sensitivity relaxation due to support for inter-band CA operation, for serving cell *c*.

ΔTIB,c Allowed maximum configured output power relaxation due to support for inter-band CA operation, for serving cell *c*.

## 3.3 Abbreviations

For the purposes of the present document, the abbreviations given in 3GPP TR 21.905 [1] and the following apply. An abbreviation defined in the present document takes precedence over the definition of the same abbreviation, if any, in 3GPP TR 21.905 [1].

<ABBREVIATION> <Expansion>

BS Base Station

BCS Bandwidth Combination Set

CA Carrier Aggregation

CC Component Carriers

DC Dual Connectivity

DL Downlink

FDD Frequency Division Duplex

MPR Allowed maximum power reduction

MSD Maximum Sensitivity Degradation

REFSENS Reference Sensitivity power level

SCS Subcarrier spacing

SUL Supplementary uplink

TDD Time Division Duplex

UE User Equipment

UL Uplink

# 4 Background

At 3GPP RAN#104 meeting, a basket Work Item on “High power UE (power class 1.5 or 2) for NR intra-band Carrier Aggregation (CA) or NR inter-band CA/Dual connectivity (DC) band combinations with/without NR Supplementary uplink (SUL)” [2] was approved for Rel-19. There are four objectives of the core part of the basket work item. The objectives covered by this TR are as follows:

Specify the band-combination specific RF requirements for all band combinations cases captured in table 1-1. The band combinations are defined in the attached excel file of this WI.

The requirements that need to analyse and specify include

* + Maximum output power, Tx power tolerance and A-MPR (Additional Maximum Power Reduction) requirements if needed
  + Analysing combinations that have self-desensitization, applicable ∆TIB, c and ∆RIB, c and reference sensitivity exceptions including MSD test cases.
  + Other additional impact to the requirements due to the high power on UL, if necessary

The present document is a technical report for this basket Work Item.

## 4.1 TR Maintenance

A single company is responsible for introducing all approved TPs in the current TR, i.e. TR editor. However, it is the responsibility of the contact person of each band/band combination to ensure that the TPs related to the band/band combination have been implemented.

# 5 High Power UE for 2 bands DL Inter-band CA with high power on FDD band(s)

## 5.x CA\_nX-nY

### 5.x.1 UE maximum output power

Table 5.5A.3.1-1: NR CA configurations and bandwidth combinations sets defined for inter-band CA (two bands)

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| NR CA configuration | Uplink CA configuration or single uplink carrier10 | NR Band | Channel bandwidth (MHz)(NOTE 3) | Bandwidth combination set |
|  |  |  |  |  |
|  |  |  |  |  |

NOTE 3: For each channel bandwidth of each component carrier, refer to Table 5.3.5-1 for the applicable SCSs. For a given band, not all UE channel bandwidths support the same SCSs.

NOTE 8: Minimum requirements for Power Class 2 are applicable for this uplink combination with 1Tx antenna connector in each band or single uplink carrier with up to 2Tx antenna connectors in this downlink/uplink combination

NOTE 10: Only single uplink carriers with power class other than PC3 are listed.

### 5.x.2 Reference sensitivity requirements

*<Editor’s note: This agenda will capture the Reference sensitivity exceptions or MSD requirements due to higher power for CA carrier, please use the same table format as in 38101-1. >*

### 5.x.3 ∆TIB and ∆RIB values

*<Editor’s note: If no change by comparing to the values for power class 3 CA, this section will be void.>*

# 6 High Power UE for 3 bands DL Inter-band CA with high power on FDD band(s)

## 6.x CA\_nX-nY-nZ

### 6.x.1 UE maximum output power

Table 5.5A.3.2-1: NR CA configurations and bandwidth combinations sets defined for inter-band CA (three bands)

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| NR CA configuration | Uplink CA configuration or single uplink carrier10 | NR Band | Channel bandwidth (MHz)(NOTE 3) | Bandwidth combination set |
|  |  |  |  |  |
|  |  |  |  |  |
|  |  |  |  |  |

NOTE 3: For each channel bandwidth of each component carrier, refer to Table 5.3.5-1 for the applicable SCSs. For a given band, not all UE channel bandwidths support the same SCSs.

NOTE 6: Only single uplink carriers with power class other than PC3 are listed.

NOTE 7: Minimum requirements for Power Class 2 are applicable for this uplink combination or single uplink carrier in this downlink/uplink combination

### 6.x.2 Reference sensitivity requirements

*<Editor’s note: This agenda will capture the Reference sensitivity exceptions or MSD requirements due to higher power for CA carrier, please use the same table format as in 38101-1. >*

### 6.x.3 ∆TIB and ∆RIB values

*<Editor’s note: If no change by comparing to the values for power class 3 CA, this section will be void.>*

# Annex <A> (informative): Change history

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Change history** | | | | | | | |
| **Date** | **Meeting** | **TDoc** | **CR** | **Rev** | **Cat** | **Subject/Comment** | **New version** |
| 2024-08 | RAN4 #112 | R4-2414292 |  |  |  | TR skeleton | 0.0.1 |