3GPP TSG-RAN WG4 Meeting #111 R4-2409491

Fukuoka City, Fukuoka, Japan, May 20 – 24, 2024 (revision of RP-240166)

**Source: ZTE Corporation**

**Title: Revised WID: Rel-18 NR Inter-band Carrier Aggregation/Dual Connectivity for 3 bands DL with x bands UL (x=1,2)**

**Document for: Approval**

**Agenda Item: 6.11.1**

3GPP™ Work Item Description

Information on Work Items can be found at <http://www.3gpp.org/Work-Items>
See also the [3GPP Working Procedures](http://www.3gpp.org/specifications-groups/working-procedures), article 39 and the TSG Working Methods in [3GPP TR 21.900](http://www.3gpp.org/ftp/Specs/html-info/21900.htm)

# Title: Rel-18 NR Inter-band Carrier Aggregation/Dual Connectivity for 3 bands DL with x bands UL (x=1,2)

## Acronym: NR\_CADC\_R18\_3BDL\_xBUL

## Unique identifier: 961011

 NOTE: For new WIs/SIs leave the Unique identifier empty or you can make a proposal for an Acronym.

 If this is a RAN WID including Core and Perf. part, then Title, Acronym and Unique identifier refer to the feature WI.

 Please tick (X) the applicable box(es) in the table below:

 Either:

|  |  |
| --- | --- |
| **This WID includes a Core part** | **X** |
| **This WID includes a Performance part** | **X** |

Potential target Release: Rel-18

Note that this field above indicates the proposed Release at the time of submission of the WID to TSG approval. It can later be changed without a need to revise the WID. The updated target Release is indicated in the Work Plan. NOTE: In case of contradiction with the target dates of clause 5, clause 5 determines the target release.

## 1 Impacts

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Affects:** | UICC apps | ME | AN | CN | Others (specify) |
| **Yes** |  | X | X |  |  |
| **No** | X |  |  | X | X |
| **Don't know** |  |  |  |  |  |

## 2 Classification of the Work Item and linked work items

### 2.1 Primary classification

This work item is a … *{Tick one box. "***Feature** */* **Building Block** */ Work Task" form a hierarchical structure. E.g. no Building Block can be proposed without a corresponding parent Feature. The full structure of all existing Work Items is shown in the 3GPP Work Plan in* *ftp://ftp.3gpp.org/Information/WORK\_PLAN* *}*

|  |  |
| --- | --- |
|  | Feature |
| X | Building Block |
|  | *Work Task* |
|  | Study Item |

NOTE: Normally, Core/Perf./Testing parts in RAN WIDs are Building Blocks. Only if they are under an SA or CT umbrella, we define them as work tasks. If you are in doubt, please contact MCC.

### 2.2 Parent and child Work Items

|  |
| --- |
| Parent Work / Study Items  |
| Acronym | Working Group | Unique ID | Title (as in 3GPP Work Plan) |
| NR\_CADC\_R18\_3BDL\_xBUL | RAN4 | 961011 | Rel-18 NR Inter-band Carrier Aggregation/Dual Connectivity for 3 bands DL with x bands UL (x=1,2)  |

NOTE: RAN agreed some time ago, that it describes the feature WI + Core/Perf. part WI or Testing part WI in one WID. Therefore the table above should just include the feature WI Unique ID and title and Nature of relationship is "parent WID".

### 2.3 Other related Work Items and dependencies

*{List here other Work Items which relate to the proposed one but are not part of the hierarchical structure, such as preceding SI or a preceding WI (e.g. if you further enhance a topic).}*

|  |
| --- |
| Other related Work Items (if any) |
|  | Unique ID | Title | Nature of relationship |
| NR\_CADC\_R18\_3BDL\_xBUL | 961111 | Core part: Rel-18 NR Inter-band Carrier Aggregation/Dual Connectivity for 3 bands DL with x bands UL (x=1,2)  | Child WID |
| NR\_CADC\_R18\_3BDL\_xBUL | 961211 | Perf. part: Rel-18 NR Inter-band Carrier Aggregation/Dual Connectivity for 3 bands DL with x bands UL (x=1,2)  | Child WID |

NOTE: Also related or dependent WIs in other TSGs should be indicated.

## 3 Justification

For NR CA, all new NR CA configurations including Intra band CA for 3 different bands DL with up to 2 different bands UL will be defined under this WI. New configurations still emerge from exiting bands and whenever new band is specified, it will create a potential for several new NR CA configurations including Intra band CA for 3 different bands DL with up to x different bands UL(x=1,2).

The NR CA configurations will be introduced in a release independent manner based on TS38.307, which will be updated depending on newly introduced NR CA configurations.

Request for additions of band combinations to this WI shall be provided using an agreed template and sent to the 3GPP\_TSG\_RAN\_WG4\_NR\_BANDS email reflector before a RAN4 Tdoc submission deadline and no new band combinations are allowed to be requested after the deadline except to correct the missing fallback and add more supporting companies for the proposed band combinations..

When a proponent requests a new band combination, all the next level fallback configurations shall be listed and recorded in the request template and the status (“New”, “Ongoing”, “Completed”) of all the fallback configurations shall be declared accurately and clearly. For “New” fallback configurations, the proponent shall ensure these fallback configurations are also requested together with the higher order band combination in the same meeting.

A band combination configuration can only be considered as completed when all of the fallback configurations are completed and specified in advance or at the same meeting. It is the responsibility of the proponent to ensure the status of all of the fallback mode configurations. Rapporteurs and other companies are encouraged to check the status of all of the fallback configurations once the higher order band combinations are declared as completed.

The preconditions to propose NR CA configurations including Intra band CA for 3 different bands DL with up to 2 different bands UL in Rel-18 are as follows.

- Requirements for all concerning bands shall be completed and specified in advanced.

- Fallback modes such as 2UL/2DL inter-band NR CA/DC and 1UL/3DL inter-band NR CA shall be completed and specified in advance.

Constituent NR band and NR Intra band CA shall be completed and specified in advance. Example 1: If the following configuration is proposed,

|  |  |
| --- | --- |
| CA configuration | Uplink CA configuration |
| CA\_n1A-n2A-n3A | CA\_n1A-n2A, CA\_n1A-n3A\_CA\_n2A-n3A |

Example 2: If the following configuration is proposed,

|  |  |
| --- | --- |
| CA configuration | Uplink CA configuration |
| CA\_n1C-n2A-n3A | CA\_n1C-n2A, CA\_n1C-n3A, CA\_n2A-n3A |

For NR DC, all new NR DC configurations including Intra band CA for 3 different bands DL with 2 different bands UL will be defined under this WI.

Example 3: If the following configuration is proposed,

|  |  |
| --- | --- |
| NR DC configuration | Uplink NR DC configuration |
| DC\_n1A-n2A-n3A | DC\_n1A-n3A, DC\_n2A-n3A |

* NR CA of 2 different bands DL with 1 band UL of CA\_n1A-n2A shall be specified in advance.
* NR DC of 2 different bands DL with 2 different bands UL of DC\_n1A-n3A, DC\_n2A-n3A shall be completed and specified in advance.

## 4 Objective

### 4.1 Objective of SI or Core part WI or Testing part WI

* Specify the band-combination specific RF requirements for all listed NR CA/DC configurations including inter band CA for 3 different bands DL with x different bands UL(x=1,2) including at least
	+ Applicable frequencies if necessary
	+ Applicable bandwidths and bandwidth sets if necessary
* Specify the band-combination specific RF requirements for these NR CA/DC configurations, i.e.
	+ Analyse combinations that have self-desensitization due to following reasons:
		- TX Harmonic and/or intermodulation overlap of receive band
		- TX signal overlap of receiver harmonic frequency
		- TX frequency being in close proximity of one of the receive bands
		- Any other identified reasons such that insufficient cross band isolation, harmonic mixing
	+ For the combination where self-desensitization exists, specify at least needed
		- ∆TIB, c and ∆RIB, c
		- Reference sensitivity exceptions including MSD test cases

of all Rel-18 NR CA and NR DC configurations including inter band CA for 3 different bands DL with x different bands UL(x=1,2) that fall into the category is defined by the WI title.

An overview table of these NR CA and NR DC configurations are provided in the EXCEL file zipped together with WORD file WID.

Unless stated otherwise, the release independent for NR CA and NR DC configurations are from Rel-15, except for the NR DC configurations within FR1 and NR CA configurations including NR-U band, where the release independent are from Rel-16.

### 4.2 Objective of Performance part WI

NOTE: Leave empty if the WI proposal does not contain a RAN performance part.

This Perf. Part WI has to standardize the Perf. Part requirements:

* Required changes to be added to release independence TS 38.307.

of all Rel-18 NR CA and NR DC combinations that fall into the category is defined by the WI title. See overview table in the EXCEL file zipped together with WORD file WID.

### 4.3 RAN time budget request (not applicable to RAN5 WIs/SIs)

NOTE: For all new RAN related WIs/SIs which are not led by RAN WG5 the WI/SI rapporteur has to fill out the attached Excel table to request time budgets for corresponding RAN WG meetings.
The Excel table has to be filled out for all affected RAN WGs and up to the target date of the WI/SI.
One time unit (TU) corresponds to ~ 2 hours in the meeting.
If no TU is needed leave the field empty otherwise enter a number >0 in the field.

 For revisions of already approved WI/SI descriptions: Please remove the Excel table from the WID/SID's zip file. The time budgets are already recorded. If you want to modify them, then this has to be done via the status report and not via a revised WID/SID.

 If this WID is covering Core and Performance part, then please fill out one line for each part in the attached Excel table.

**additional comments to the time budget request in the attached Excel table:**

## 5 Expected Output and Time scale

|  |
| --- |
| **New specifications** *{One line per specification. Create/delete lines as needed}* |
| Type  | Series | Title | For info at TSG#  | For approval at TSG# | Remarks |
| *Internal TR* | *TR 38.718-03-01* | *NR Inter-band Carrier Aggregation/Dual Connectivity for 3 bands DL with x bands UL(x=1,2)* |  | *TSG#104* | *Core part**Zhifeng Ma,* *ZTE, ma.zhifeng@zte.com.cn* |

*{Note 1: Only TSs may contain normative provisions. Study Items shall create or impact only TRs.
"Internal TR" is intended for 3GPP internal use only whereas "External TR" may be transposed by OPs.}*

NOTE: If this is a RAN WID including Core and Perf. part, then all new Core part specs have to be listed first and then all new Perf. part specs. Indicate "Core part" or "Perf. part" under Remarks for each spec.
By default a new specs can only be new for one of both parts.

|  |
| --- |
| **Impacted existing TS/TR** *{One line per specification. Create/delete lines as needed}* |
| TS/TR No. | Description of change  | Target completion plenary# | Remarks |
| 38.101-1 | User Equipment (UE) radio transmission and reception;Part 1: Range 1 Standalone | *TSG#104* | Core part |
|  |  |  |  |
| 38.101-3 | User Equipment (UE) radio transmission and reception; Part 3: Range 1 and Range 2 Interworking operation with other radios | *TSG#104* | Core part |
| 38.307 | Release independent manner will be applied to all new NR CA and NR DC band combinations according to each NR CA and NR DC band combination | *TSG#104* | Perf. part |

NOTE: If this is a RAN WID including Core and Perf. part, then all new Core part specs have to be listed first and then all new Perf. part specs. Indicate "Core part" or "Perf. part" under Remarks for each spec.
If an existing spec is affected by both (Core part and Perf. part), then it has to be listed twice with appropriate approval dates.

## 6 Work item Rapporteur(s)

*Zhifeng Ma, ZTE, ma.zhifeng@zte.com.cn*

## 7 Work item leadership

RAN WG4

## 8 Aspects that involve other WGs

 *None*

NOTE: For RAN WIDs: Section 8 applies only to WGs outside of TSG RAN because RAN WG aspects have to be covered in section 4.

## 9 Supporting Individual Members

|  |
| --- |
| Supporting IM name |
| CMCC |
| China Telecom |
| China Unicom |
| CATT |
| Huawei |
| HiSilicon |
| Samsung |
| ZTE |
| Sanechips |
| AT&T |
| T-Mobile USA |
|  |
|  |