**3GPP T****SG-RAN WG4 Meeting#109 R4-2318727**

**Chicago, USA, 13-17 Nov, 2023**

**Source: Huawei, HiSilicon**

**Title:** **Revised WID Rel-18 LTE Advanced CA for x (x<=6) bands DL with y bands (y=1, 2) UL**

### Document for: Approval

**Agenda Item: 9.1.1**

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 LTE Advanced CA for x bands (x<= 6) DL with y bands (y=1, 2) UL

{Free text. It has to be the same as in the "Title:" section above. Studies have to start by "Study on"}

### Acronym: LTE\_CA\_R18\_xBDL\_yBUL

{Propose an acronym. The sign "-" is a level separator between (Feature)-(Building Block)-(Work Task). The sign "\_" can be freely used. Studies have to start by "FS\_". Each acronym level has to be simple and short, 7 characters max recommended}

### Unique identifier: 960199

{A number to be provided by MCC at the plenary}

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

 For a revised WI/SI: Take Unique identifier and acronym as shown in 3GPP workplan.

 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** |

 or:

|  |  |
| --- | --- |
| **This WID includes a Testing part** |  |
| **and it addresses the following 3GPP work area:** | **Radio Access** |  |
| **Core Network** |  |
| **Services** |  |

### 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

{For Normative work, identify the anticipated impacts. For a Study, identify the scope of the study}

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Affects:** | UICC apps | ME | AN | CN | Others (specify) |
| **Yes** |  | X |  |  |  |
| **No** | X |  | 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, they are defined as work tasks. If you are in doubt, please contact MCC.

### 2.2 Parent Work Item

{"Parent" Work Item refers to the related, earlier-Stage, Work Item, e.g. the related Stage 1 Work Item shall be indicated here when a Stage 2 normative Work Item or Study Item is presented. "Parent" Work Item can also refer to the related preceding Study Item e.g. the related Study Item and the earlier-stage Work Item shall be indicated here when a normative-work Work Items is started. List here all parent Work Items of which requirements are either fully or partially covered by the proposed Item. }

{This section is mandatory to be filled out by the rapporteur. This section is to be filled with care: it indicates to the companies monitoring the parent Work Item that it will be addressed in this study/work item.}

For a brand-new topic, use “N/A” in the table below. Otherwise indicate the parent Work Item.

|  |
| --- |
| Parent Work / Study Items  |
| Acronym | Working Group | Unique ID | Title (as in 3GPP Work Plan) |
|  | R4 | TBA | Rel-18 LTE-A CA for x bands (x <= 6) DL with y bands (y=1, 2) UL  |

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 include the feature WI data (In case the feature covers Core and Perf. part, please list under Working Group the leading WG of the Core part).

### 2.3 Other related Work Items and dependencies

*{List here other Work Items which relate to the proposed one, such as a Work Item in an earlier Release if further enhancing the feature from the previous Release)}*

|  |
| --- |
| Other related Work/Study Items (if any) |
| **Acronym** | Unique ID | Title | Nature of relationship |
|  | TBA | Core part: Rel-18 LTE Advanced CA for x bands (x <= 6) DL with y bands (y=1, 2) UL  | Child WID |
|  | TBA | Perf. part: Rel-18 LTE Advanced CA for x bands (x <= 6) DL with y bands (y=1, 2) UL  | Child WID |

NOTE: Also related or dependent WIs/SIs in other TSGs shall be indicated here.

**Dependency on non-3GPP (draft) specification**:

*{This section is to be typically used to identify the IETF dependencies. Delete the header "Dependency on non-3GPP (draft) specification:" if no such dependency.}*

# 3 Justification

All new LTE CA configurations for x bands (x<=6) DL with y bands (y=1, 2) 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 LTE inter band CA configurations for no more than 6 different bands DL with 1 or 2 different bands UL.

LTE CA configurations for x bands (x<=6) DL with y bands (y=1, 2) UL will be introduced in release independent manner based on TS 36.307 and the precondition for proposed LTE CA band combinations are as follows:

* Constituent LTE band and LTE Intra band CA shall be completed and specified in advance.

Example 1: If the following CA configuration is proposed,

|  |  |
| --- | --- |
| CA configuration | Uplink CA configuration |
| CA\_1A-2C-3A-4A |  |

* + LTE Band 1, 3 and 4 requirements shall be completed and specified in advanced.
	+ LTE intra band CA of DL\_2C requirements shall be completed and specified in advanced.

Example 2: If the following CA configuration is proposed,

|  |  |
| --- | --- |
| CA configuration | Uplink CA configuration |
| CA\_1A-2C-3A-4A | CA\_2C |

* + LTE Band 1, 3 and 4 requirements shall be completed and specified in advance.
	+ LTE intra band CA of DL\_2C\_UL\_2C requirements shall be completed and specified in advance.

Example 3: If the following configuration is proposed,

|  |  |
| --- | --- |
| CA configuration | Uplink CA configuration |
| CA\_1A-1A-2C-3A-4A | CA\_2C |

* + Any lower DL fallback modes requirements shall be completed and specified in advanced.
	+ UL CA of DL\_2C\_UL\_2C requirements shall be completed and specified in advance.

Example 4. If the following CA configuration is proposed and an operator requests to specify all possible UL CA configurations,

|  |  |
| --- | --- |
| CA Configuration | E-UTRA Uplink CA Configuration |
| CA\_1A-2A-3A | CA\_1A-2A, CA\_1A-3A, CA\_2A-3A |

* + LTE inter-band CA for 3 bands DL with 1 band UL of CA\_1A-2A-3A shall be specified in advance
	+ LTE inter-band CA for 2 bands DL with 2 bands UL of CA\_1A-2A, CA\_1A-3A, and CA\_2A-3A shall be specified in advance except for supplementary DL only band.
* A) Request for additions of band combinations to this WI shall be provided using an agreed template and sent to the 3GPP\_TSG\_RAN\_WG4\_CA 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..
* B) 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.
* C) 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.

# 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 LTE CA combinations for no more than 6 different bands DL with 1 or 2 different bands UL including at least
	+ Applicable frequencies
	+ Applicable bandwidths and bandwidth sets
* Analyse combinations that have self-desensitization due to following reasons:
	+ TX Harmonic and/or inter modulation 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
* For the combination where self-desensitization exists, specify at least needed
	+ ∆TIB and ∆RIB
	+ Reference sensitivity excerptions
	+ UL RB restrictions for REFSENS test
* Add conformance testing in RAN5 specifications (to follow at a later stage)

of all REL-18 CA combinations that fall into the category defined by the WI title.

An overview of these CA combinations is provided in the attached Excel.

### 4.2 Objective of Performance part WI

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

Required changes (if any) to be added to release independence TS 36.307.

### 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, then 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  | TS/TR number | Title | For info at TSG#  | For approval at TSG# | Remarks |
| Internal TR | 36.718-02-01 | LTE REL-18 CA for x bands (x<=6)DL with y bands (y=1,2) UL | TSG#102 | TSG#102 | *Core part**Mohammad Abdi Abyaneh, Huawei*Mohammad.abdi.abyaneh@huawei.com |
|  |  |  |  |  |  |

*{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 WI 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 |
| 36.101 | UE radio transmission and reception | TSG#102 | Core part |
| 36.307 | Release independent spec | TSG#102 | Perf part |

NOTE: If this is a RAN WI 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)

*Mohammad Abdi Abyaneh, Huawei,* *mohammad.abdi.abyaneh@huawei.com*

# 7 Work item leadership

R4

# 8 Aspects that involve other WGs

None

# 9 Supporting Individual Members

*{At least 4 supporting Individual Members are needed. There is an expectation that these companies will provide resources to progress the work. Note that having 4 supporting companies is a necessary but not sufficient condition: the usual TSG approval process by consensus is needed for the WID approval.}*

|  |
| --- |
| Supporting IM name |
| Huawei |
| HiSilicon |
| Nokia |
| Nokia Shanghai Bell |
| CATT |
| China Telecom |
| Samsung |
| Vodafone |
| Ericsson |
| NTT DOCOMO, INC. |
| LG Electronics |
| Qualcomm |