3GPP TSG-RAN WG4 Meeting #104-eR4-221XXXX

**Electronic Meeting, 15th - 26th August, 2022**

**Source:** vivo, ZTE

**Title:** Revised SID for Study on simplification of band combination specification for NR and LTE

**Agenda Item:** 11.3.3

**Document for:** Approval

# Introduction

In this contribution, we provided a revised SID in the Annex for Revised SID for Study on simplification of band combination specification for NR and LTE based on [1][2]. This revision further clarifies the scope of PC5 and Uu band combinations in this SID FS\_SimBC.

# Conclusion

The proposed revision in Annex is for endorsement:

**Proposal 1: To endorse the Revised SID in the Annex as RAN4 recommendation for next RAN Plenary meeting (RAN#97-e).**

# References

[1] RP-221790, Revised SID: Study on simplification of band combination specification for NR and LTE, ZTE, RAN#96.

[2]R4-2212800, Considerations for simplification of specification structure for V2X band combinations, vivo, RAN4#104-e.

# Annex

**3GPP TSG RAN Meeting #96 RP-221790**

**Budapest, HU, June 6 – 9, 2022** (Revision of RP-220956)

**Source: ZTE Corporation, Deutsche Telekom, Volkwagen AG, Toyota ITC, Bosch, LGE, Huawei, Telecom Italia, Orange, T-Mobile USA, Vodafone, vivo**

**Title: Revised SID: Study on simplification of band combination specification for NR and LTE**

**Document for: Approval**

**Agenda Item: 9.2.14**

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: Study on simplification of band combination specification for NR and LTE

Acronym: FS\_SimBC

Unique identifier: xxxx

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

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 …

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

2.2 Parent Work Item

|  |
| --- |
| **Parent Work / Study Items**  |
| **Acronym** | **Working Group** | **Unique ID** | **Title (as in 3GPP Work Plan)** |
|  |  |  |  |

2.3 Other related Work Items and dependencies

|  |
| --- |
| **Other related Work Items (if any)** |
| **Unique ID** | **Title** | **Nature of relationship** |
|  |  |  |

3 Justification

Firstly, the huge number of band combinations and configurations with different downlink CC numbers and uplink CC numbers configured are specified since Rel-15. RAN4 spent lots of time to introduce band combinations following the current working procedure. It can be observed that the further optimization and improvement of the working procedure would be useful in order to improve the efficiency to specify band combinations and the quality of specifications.

And the current procedure also results in a lot of errors and workload like reviewing and flagging the documents with errors. The process can only be simplified to improve the efficiency if we develop guideline, rules and tools to ensure good quality of the submitted contributions.

Secondly, in the current specifications, the UE RF requirements are specified per feature (e.g., CA, DC, EN-DC, SUL) for a band combination (e.g., band A+B+C). But most of RF requirements depend on which spectrum are combined, how many Tx antennas are used, and on which spectrum UL will be transmitted, and are independent of those above features. As a result, there would be redundancy during the verification of RF requirements for a combination of bands. Currently, the UE needs to pass the similar CA and EN-DC RF requirements on the same combination of bands, e.g., CA\_nA-nB, EN-DC\_A\_nB, EN-DC\_B\_nA, where A and nA correspond to the same spectrum for LTE and NR separately. But the RF implementation under the verification for CA and EN-DC would be the same. It’s better to investigate the dependency and applicability for RF requirements among different features for the same spectrum combination to reduce the redundant tests.

Thirdly, in the current specification, most of RF requirements are band combination specific except for MSD. It’s better to study methodology to simplify RF requirements specifications for MSD requirement to reduce the test configurations with different bandwidth combinations. For the other band specific RF requirements including Delta\_TIB, Delta\_RIB and Delta\_TC,c, it’s better to further optimize the specification structure.

Finally, RAN4 defines band combinations of Uu and PC5 under the WI “NR\_LTE\_V2X\_PC5\_combos” [RP-213297], which required formal specification work as commercially relevant combinations need to be defined. Currently only single CC on Uu and PC5 is considered, and example combinations are defined.PC5 on CA is in the objective in Rel-18 SL evolution, which needs further confirmation in RAN#97. Also, LTE CA/DC, EN-DC, NR DC+PC5 band combinations are never studied in Rel-16/17/18 SL related WI. Therefore, the scope on Uu and PC5 combos should be restricted.. A simplified approach aiming to allow operation of the following PC5 configurations with Uu configurations should be investigated:

* *Inter-band con-current V2X operating bands (TS 38.101-1&3)*
	+ *NR Uu+NR PC5 (TS 38.101-1)*
	+ *LTE Uu+NR PC5(TS 38.101-3)*
	+ *NR Uu+LTE PC5(TS 38.101-3)*
* *Intra-band con-current V2X operating bands （TS 38.101-1）*

4 Objective

The objectives of SI are as follows:

* Investigate and simplify the working procedure for approving documents for TS and TR to improve the efficiency to specify band combinations and the quality of specifications
	+ Improve the efficiency considering
		- RAN4 reduces the redundant and unnecessary work for big CRs, draft CRs and/or TPs, if any
		- The following rules will be investigated and defined if necessary
			* Investigate whether the workflow can be improved under the condition that quality can be guaranteed.
			* Develop rules or guidelines covering the process of not for block approval.
		- Develop the necessary tools to reduce RAN4’s workloads if feasible
	+ Improve the quality considering
		- RAN4 improves the procedures for cross-checking to avoid conflict between big CR/CRs across basket WIs and other WIs
	+ RAN4 captures the agreements about the rules and guidelines including but not being limited to the outcome of the above sub-bullets in the corresponding TR
* Investigate the feasibility and optimize the specification structure and reduce the test burden
	+ Study the methodology to simplify the test efforts for a UE supporting multiple features, e.g., NR-CA, EN-DC on the same band combination
		- Study of similarity and dependency of RF requirements for different features on the same band combination
	+ Study the methodology to simplify RF requirement specifications for
		- MSD requirements in 38.101-1 and 38.101-3, e.g., reducing the test configurations with different bandwidth combinations
		- For Delta\_TIB and Delta\_RIB requirements, investigate and define the framework of the general principle or requirements with band-combination specific exceptions
		- For Delta\_TC,c, investigate whether it can be removed in low boundary formula for Pcmax
* A simplified approach aiming to allow operation of the following PC5 configurations with Uu configurations should be investigated in order to minimise the specification efforts for such automotive relevant combinations:
* *Inter-band con-current V2X operating bands (TS 38.101-1&3)*
	+ *NR Uu+NR PC5 (TS 38.101-1)*
	+ *LTE Uu+NR PC5(TS 38.101-3)*
	+ *NR Uu+LTE PC5(TS 38.101-3)*
* *Intra-band con-current V2X operating bands （TS 38.101-1）*
* NOTE 1: The requirements applicable to UE won’t be changed or increased.
* NOTE 2: The work should be applied to all the power classes

4.2 Objective of Performance part WI

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

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  | TS/TR number | Title | For info at TSG#  | For approval at TSG# | Remarks |
| *Internal TR* | *TR 38.846* | *Study on simplification of band combination specification for NR and LTE* | *TSG RAN#99* | *TSG RAN #100* |  |

*{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.}*

|  |
| --- |
| **Impacted existing TS/TR** *{One line per specification. Create/delete lines as needed}* |
| TS/TR No. | Description of change  | Target completion plenary# | Remarks |
|  |  |  |  |

6 Work item Rapporteur(s)

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

*{Mandatory: <FamilyName>, <GivenName>, <Company>, <email address>.}*

*{Optional: <FamilyName>, <GivenName>, <Company>, <email address>: Secondary task(s).}*

*{The first listed Rapporteur is the work item primary Rapporteur. The role of a Rapporteur is further described in* [*www.3gpp.org/specifications-groups/delegates-corner/writing-a-new-spec*](http://www.3gpp.org/specifications-groups/delegates-corner/writing-a-new-spec)*. Secondary Rapporteur(s) are possible for specific secondary task(s)}*.

7 Work item leadership

*Leading working group: R4*

*Secondary Working Group:*

8 Aspects that involve other WGs

*None*

9 Supporting Individual Members

|  |
| --- |
| **Supporting IM name** |
| ZTE Corporation |
| Sanechips |
| CMCC |
| China Telecom |
| China Unicom |
| Huawei |
| Samsung |
| Xiaomi |
| OPPO |
| vivo |
| CATT |
| GOHIGH |
| Qualcomm Incorporated |
| Apple Inc. |
| SoftBank Corp. |
| LG Electronics |
| Vodafone |
| AT&T |
| Nokia |
| Nokia Shanghai Bell |
| Deutsche Telekom |
| Volkswagen |
| Bosch |
| Telecom Italia |
| Orange |
| T-Mobile USA |
| Toyota ITC |