**3GPP TSG-RAN WG4 Meeting # 104-e R4-2214109**

**Electronic Meeting, 15– 26 August 2022**

**Agenda item:** 11.3

**Source:** Moderator (ZTE)

**Title:** Email discussion summary for [104-e][131] FS\_SimBC

**Document for:** Information

# Introduction

*In this email discussion we will handle following contributions submitted in AI 11.3: Study on simplification of band combination specification for NR and LTE [SID: FS\_SimBC].*

*Following three (sub-)topics are discussed in this summary:*

* *General and work plan*
	+ *R4-2213594, R4-2213595, R4-2212800*
* *Simplification of working procedure*
	+ *R4-2212736, R4-2213228, R4-2212614*
* *Simplification of specification structure for CA/DC/EN-DC/V2X combinations and reduction of test burden*
	+ *R4-2213163, R4-2212615, R4-2212357, R4-2213600, R4-2213596, R4-2213599*

*List of candidate target of email discussion for 1st round and 2nd round*

* 1st round: To kick-off the discussion on the new SI *FS\_SimBC* and collect the companies’ views on each topic.
* 2nd round: Try to reach agreements on general structure of the TR and handle WF if needed

|  |  |  |  |
| --- | --- | --- | --- |
| **Reference** | **TDoc** | **Title** | **Source** |
| [1] | **R4-2213594** | Work plan for R18 SI on simplification of band combination specification for NR and LTE | ZTE Corporation |
| [2] | **R4-2213595** | TR 38.846 v0.0.1\_Study on simplification of band combination specification for NR and LTE | ZTE Corporation |
| [3] | **R4-2212736** | EXCEL template for R18 PC3 ENDC NRCA SUL V2X band combinations | ZTE Corporation |
| [4] | **R4-2213228** | On simplification of band combination specification for NR and LTE | Nokia, Nokia Shanghai Bell |
| [5] | **R4-2212614** | Discussion on working procedure simplification | Xiaomi |
| [6] | **R4-2213163** | General discussion on Simplification of band combination specification | Huawei, HiSilicon |
| [7] | **R4-2212615** | Discussion on test burden reduction | Xiaomi |
| [8] | **R4-2212357** | On FR1 2UL inter-band CA coexistence requirements | Apple |
| [9] | **R4-2213600** | Simplification of templates for delta TIB and RIB for band combinations | ZTE Corporation |
| [10] | **R4-2212800** | Considerations for simplification of specification structure for V2X band combinations | vivo |
| [11] | **R4-2213596** | Guidelines on the band edge relaxation for MOP for CA and DC band combinations | ZTE Corporation |
| [12] | **R4-2213599** | Simplification on multiple UL CA configurations in CA configuration table | ZTE Corporation |

It is appreciated that the delegates for this topic put their contact information in the table below.

Contact information

|  |  |  |
| --- | --- | --- |
| **Company** | **Name** | **Email address** |
| ZTE | Zhifeng Ma | ma.zhifeng@zte.com.cn |
| Samsung | Yuanyuan(Tina) Zhang | Tina55.zhang@samsung.com |
| Xiaomi | Yuan Gao | Gaoyuan23@xiaomi.com |

Note:

1. Please add your contact information in above table once you make comments on this email thread.
2. If multiple delegates from the same company make comments on single email thread, please add you name as suffix after company name when make comments i.e. Company A (XX, XX)

# Topic #1: General and work plan

*Main technical topic overview. The structure can be done based on sub-agenda basis.*

## Companies’ contributions summary

|  |  |  |
| --- | --- | --- |
| **T-doc number** | **Company** | **Proposals / Observations** |
| R4-2213594 | ZTE | In this paper, we discuss the work plan for R18 FS\_SimBC. Based on the TU budget plan [RP-221060], the study for FS\_SimBC shall start from RAN4#104-e meeting. The following objectives will be studied during the RAN4 meetings targeting to be completed the SI in RAN4 #107 (May-2023).* Discussion on the working procedure and simplification to the band combinations.
* Investigate the feasibility and optimize the specification structure and reduce the test burden.
* Study the simplified approach aiming to allow operation of any PC5 configuration (LTE PC5, NR PC5, CA on PC5) with any Uu configuration.
* Capture the agreements about the rules and guidelines related to above sub-bullets into the TR.

**Proposal 1: Agree the work plan for R18 FS\_SimBC in this contribution.** |
| R4-2213595 | ZTE | **Proposal 1: Agree the skeleton for TR 38.846 in this contribution.** |
| R4-2212800 | vivo | ***Proposal 1***: The Uu and PC5 band combinations studied in SI FS\_SimBCs should be restricted as follows:* *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）*
 |

## Open issues summary

*Before e-Meeting, moderators shall summarize list of open issues, candidate options and possible WF (if applicable) based on companies’ contributions.*

### Sub-topic 1-1 Work plan of SI FS\_SimBC

*Sub-topic description: This sub-topic is to discuss the work plan of the SI FS\_SimBC based on the agreed SID [RP-221790] and the TU budget plan [RP-221060].*

*Open issues and candidate options before e-meeting:*

**Issue 1-1A: Is the work plan in R4-2213594 acceptable?**

* Proposals
	+ Option 1: Yes.
	+ Option 2: No (Please provide further comments).
* Recommended WF
	+ TBA

### Sub-topic 1-2 Skeleton for TR 38.846

*Sub-topic description: This sub-topic is to discuss the TR skeleton for TR 38.846. The discussion will be mainly focused on the structure of the TR and decides if the contents are reasonable or adequate.*

*Open issues and candidate options before e-meeting:*

**Issue 1-2A: Is the skeleton for TR 38.846 in R4-2213595 acceptable?**

* Proposals
	+ Option 1: Yes.
	+ Option 2: No (Please provide further comments).
* Recommended WF
	+ TBA

### Sub-topic 1-3 Work scope on Uu and PC5 combos

*Sub-topic description: This sub-topic is to discuss the work scope of Uu and PC5 related band combinations.*

*Open issues and candidate options before e-meeting:*

**Issue 1-3A: Should we restrict the scope of Uu and PC5 related BC as follows:**

* ***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）***
* Proposals
	+ Option 1: Yes.
	+ Option 2: No (Please provide further comments).
* Recommended WF
	+ TBA

## Companies views’ collection for 1st round

### Open issues

Sub topic 1-1: Work plan of SI FS\_SimBC

Sub topic 1-2: Skeleton for TR 38.846

Sub topic 1-3: Work scope on Uu and PC5 combos

|  |  |
| --- | --- |
| **Company** | **Comments** |
| Issue 1-1A: Is the work plan in R4-2213594 acceptable?Issue 1-2A: Is the skeleton for TR 38.846 in R4-2213595 acceptable?Issue 1-3A: Should we restrict the scope of Uu and PC5 related BC as follows? |
| Samsung | Issue 1-1A: Is the work plan in R4-2213594 acceptable?YesIssue 1-2A: Is the skeleton for TR 38.846 in R4-2213595 acceptable?Yes |

### CRs/TPs comments collection

*For close-to-finalize WIs and maintenance work, comments collections can be arranged for TPs and CRs. For ongoing WIs, suggest to focus on open issues discussion on 1st round.*

|  |  |
| --- | --- |
| **CR/TP number** | **Comments collection** |
| XXX | Company A |
| Company B |
|  |

## Summary for 1st round

### Open issues

*Moderator tries to summarize discussion status for 1st round, list all the identified open issues and tentative agreements or candidate options and suggestion for 2nd round i.e. WF assignment.*

|  |  |
| --- | --- |
|  | **Status summary**  |
| **Sub-topic #1-1** | *Tentative agreements:**Candidate options:**Recommendations for 2nd round:* |
| **Sub-topic #1-2** | *Tentative agreements:**Candidate options:**Recommendations for 2nd round:* |

### CRs/TPs

*Moderator tries to summarize discussion status for 1st round and provides recommendation on CRs/TPs Status update*

*Note: The tdoc decisions shall be provided in Section 3 and this table is optional in case moderators would like to provide additional information.*

|  |  |
| --- | --- |
| **CR/TP number** | **CRs/TPs Status update recommendation**  |
| XXX | *Based on 1st round of comments collection, moderator can recommend the next steps such as “agreeable”, “to be revised”* |

## Discussion on 2nd round (if applicable)

|  |  |  |
| --- | --- | --- |
| **R4-2213228** | On simplification of band combination specification for NR and LTE | Nokia, Nokia Shanghai Bell |
| **R4-2212614** | Discussion on working procedure simplification | Xiaomi |

# Topic #2: Simplification of working procedure

## Companies’ contributions summary

|  |  |  |
| --- | --- | --- |
| **T-doc number** | **Company** | **Proposals / Observations** |
| R4-2212736 | ZTE | ***Proposal 1***: Approve the EXCEL template for R18 PC3 ENDC NRCA SUL V2X band combinations. |
| R4-2213228 | Nokia, Nokia Shanghai Bell | ***Observation 1***: Band combinations shall be requested using a request sheet template send to an official RAN4 email reflector.***Observation 2***: Currently band combinations shall be requested one week prior to a RAN4 meeting submission deadline***Proposal 1***: RAN4 shall discuss if that new band combinations shall continue to be requested one week prior to the RAN4 submission deadline in this SI***Observation 3***: Band combinations shall not enter specification without all its fallbacks also specified.***Observation 4***: The proponent of a band combinations is obligated to check all required fallbacks and if needed request missing fallbacks together with the proposed new band combination.***Observation 5***: It is not clear who is responsible for checking all fallbacks have been completed.***Observation 6***: Thorough checking of fallback completion is in the best interest of the proponent since the discovery of a missing fallback would result in the combination having to be removed from the specification.***Proposal 2***: RAN4 shall confirm that the responsible for checking all fallbacks have been completed is the proponents. This noting that all reviewing companies also should aid in a thorough checking.***Proposal 3***: RAN4 shall discuss if band combinations and its fallbacks can be submitted for inclusion to the specification in the same RAN4 meeting or the fallbacks first shall be completed leading to a sequential introduction of band combinations. |
| R4-2212614 | Xiaomi | ***Observation 1***: The simplified approach and procedure to be agreed for normal CA/DC basket WI if any can be reused for V2X basket WI. Currently, the V2X sections specified in 38.101-1 and 38.101-3 should be updated based on the agreements captured in TR 38.862. It seems most of them are aligned with CA/DC template until the latest version v17.6.0.***Observation 2***: TP prepared by some companies do not use the latest templates of bandwidth table captured in the latest spec that would include the newly added channel bandwidth. It will cause redundant work of spec format adjustment for rapporteur when drafting big CR. So it is expected the TP author could use the latest template of bandwidth table as the latest spec. |

## Open issues summary

*Before e-Meeting, moderators shall summarize list of open issues, candidate options and possible WF (if applicable) based on companies’ contributions.*

### Sub-topic 2-1 Excel template for R18 BC request

*Sub-topic description: In this sub-topic, the excel template for R18 PC3 ENDC NRCA SUL V2X band combinations is discussed. Based on the agreements in WF R4-2206561, some further updates on the EXTEL templates for the approved R18 basket WID items in RAN#96 meeting have been provided.*

*Open issues and candidate options before e-meeting:*

**Issue 2-1A: Is the template for R18 PC3 ENDC, NR CA, SUL and V2X band combination in R4-2212736 acceptable?**

* Proposals
	+ Option 1: Yes.
	+ Option 2: No (Please provide further comments).
* Recommended WF
	+ TBA

### Sub-topic 2-2 Working procedure for BC basket WI

*Sub-topic description: This sub-topic is to discuss the guidance on the working procedure for band combination basket WIs.*

*Open issues and candidate options before e-meeting:*

**Issue 2-2A: About timeline for BC request.**

**When is the appropriate submission deadline for a new band combination request?**

* Proposals
	+ Option 1: One week prior to the RAN4 submission deadline.
	+ Option 2: Same deadline as RAN4 Tdoc submission.
	+ Option 3: Before the end of RAN4 meeting.
	+ Option 4: Others.
* Recommended WF
	+ TBA

**Issue 2-2B: About the responsible person for fallback BCs.**

**Who is the responsible person for checking the fallback BCs for a new BC request?**

* Proposals
	+ Option 1: The proponent of new BC request.
	+ Option 2: The rapporteur of the basket WI.
	+ Option 3: All interesting companies.
	+ Option 4: Others.
* Recommended WF
	+ TBA

**Issue 2-2C: About the order of the request BC and its fallbacks.**

**What is the order of the request BC and its fallbacks? Can the request BC and its fallbacks be applied in the same meeting? If yes, what is the guideline for the request in parallel?**

* Proposals
	+ Option 1: Strictly sequential introduction of BC (All fallbacks complete first).
	+ Option 2: BC and its fallbacks request in parallel.
	+ Option 3: Others.
* Recommended WF
	+ TBA

**Issue 2-2D: About the working procedure for V2X.**

**Can the working procedure agreed in normal CA/DC basket WIs also be applied to V2X basket WI?**

* Proposals
	+ Option 1: Yes.
	+ Option 2: No (Please provide further comments).
* Recommended WF
	+ TBA

## Companies views’ collection for 1st round

### Open issues

Sub-topic 2-1: Excel template for R18 BC request

Sub-topic 2-2: Working procedure for BC basket WI

|  |  |
| --- | --- |
| **Company** | **Comments** |
| Issue 2-1A: Is the template for R18 PC3 ENDC, NR CA, SUL and V2X band combination in R4-2212736 acceptable?Issue 2-2A: When is the appropriate submission deadline for a new band combination request?Issue 2-2B: Who is the responsible person for checking the fallback BCs for a new BC request?Issue 2-2C: What is the order of the request BC and its fallbacks? Can the request BC and its fallbacks be applied in the same meeting? If yes, what is the guideline for the request in parallel?Issue 2-2D: Can the working procedure agreed in normal CA/DC basket WIs also be applied to V2X basket WI? |
| Samsung | **Issue 2-1A: Is the template for R18 PC3 ENDC, NR CA, SUL and V2X band combination in R4-2212736 acceptable?**Yes, we are fine.**Issue 2-2A: When is the appropriate submission deadline for a new band combination request?**Option 1, follow the previous established rule is preferred**Issue 2-2B: Who is the responsible person for checking the fallback BCs for a new BC request?**Proponents, rapporteurs and supporting companies are obligated to check all the fallbacks for a new BC request, while proponent is the first person responsible. Furthermore, proponents should guarantee the quality of the drafts, please look through the principles captured in TR38.862-h10 if any uncertainty.**Issue 2-2C: What is the order of the request BC and its fallbacks? Can the request BC and its fallbacks be applied in the same meeting? If yes, what is the guideline for the request in parallel?**Option2. In our view, the fallbacks shall be specified in advance or at least in the same meeting, because sometimes the operators have urgent deployment demand, we shall allow the fallbacks proposed or requested at the same meeting with the higher order combination as usual, otherwise the higher order had to be put off for a meeting period. In addition, we suggest to add “or at least in the same meeting” to each basket WIs to make it clear. BTW, there is parallel discussion in thread [115].On the other hand, we understand that it costs rapporteurs a lot of time to check the fallbacks proposed in the same meeting which is an unpleasant work, hence we strongly recommend the proponents follow below approved rule which is captured in TR38.862-h10 to facilitate the rapporteur’s work and conduct self-inspection as well.*#4 Proponents should prepare and submit the corresponding contributions, e.g. draft CR, TP before RAN4#X meeting. If a draft CR or TP is depending on approval of lower order fallbacks submitted at the same meeting, this need to be clearly mentioned in the cover sheet of the draft CR or in the heading of the TP.***Issue 2-2D: Can the working procedure agreed in normal CA/DC basket WIs also be applied to V2X basket WI?**Option1 |
| CHTTL | **Issue 2-1A:** OK**Issue 2-2A:** Option 2Thanks for bringing this proposal, note that option 1, the one week before submission deadline is established a long time ago during 2016, and actually after several meetings, the RAN4 chair started to announced the request deadline to be same deadline as RAN4 Tdoc submission, i.e. option 2, if my memory is correct. So actually we already apply option 2 for several years, considering in some cases the time between two meetings is short and also to allow more time for the proponents to check the internal request and also to check the correctness of the requests, we suggest to set the deadline as same as the Tdoc submission deadline.**Issue 2-2B:** Option 1 (agree with the proposal that all reviewing companies also should aid in a thorough checking )**Issue 2-2C:** We think this topic is related to the preconditions to propose the new combinations, which are listed in each WID, and are different from different basket WIDs. For example, for x band LTE + 1 band NR, as stated in the WID:The preconditions to propose 4, 5 or 6 different bands DL with 2 different bands UL (3, 4 or 5 different LTE bands and 1 NR band) in Rel-18 are as follows.- Constituent LTE inter band CA including intra band CA for 3, 4 or 5 different bands DL with 1 band UL shall be completed and specified in advance.- Each of the four paired EN-DC configurations of 1 LTE band including intra band CA + 1 NR band used in a certain 4, 5 or 6 different bands DL with 2 different bands UL shall be completed and specified in advance.🡪 which means other fallbacks (not mentioned in the preconditions) can be request in the same meeting in our view.**Issue 2-2D:** Option 1 |
| Xiaomi | **Issue 2-1A: Is the template for R18 PC3 ENDC, NR CA, SUL and V2X band combination in R4-2212736 acceptable?**Option 1: Yes**Issue 2-2A: When is the appropriate submission deadline for a new band combination request?**OK with Option 1 and Option 2.**Issue 2-2B: Who is the responsible person for checking the fallback BCs for a new BC request?**We share the similar view as Samsung. The proponent should be the first responsible person but rapporteur and interesting companies are also obligated to double check.**Issue 2-2C: What is the order of the request BC and its fallbacks? Can the request BC and its fallbacks be applied in the same meeting? If yes, what is the guideline for the request in parallel?**Option 2. **Issue 2-2D: Can the working procedure agreed in normal CA/DC basket WIs also be applied to V2X basket WI?**Option 1. |
| SoftBank | **Issue 2-1A: Is the template for R18 PC3 ENDC, NR CA, SUL and V2X band combination in R4-2212736 acceptable?**Yes, we are OK. **Issue 2-2A: When is the appropriate submission deadline for a new band combination request?**Option 1 or Option 2 are fine with us. **Issue 2-2B: Who is the responsible person for checking the fallback BCs for a new BC request?**Option 1 or Option 3 are fine with us. We think that Option 2 is difficult considering the current workload of rapporteurs. **Issue 2-2C: What is the order of the request BC and its fallbacks? Can the request BC and its fallbacks be applied in the same meeting? If yes, what is the guideline for the request in parallel?**From operator’s perspective, we support Option2. |

### CRs/TPs comments collection

*Major close to finalize WIs and Rel-15 maintenance, comments collections can be arranged for TPs and CRs. For Rel-16 on-going WIs, suggest to focus on open issues discussion on 1st round.*

|  |  |
| --- | --- |
| **CR/TP number** | **Comments collection** |
| R4-2212736 | Company A |
| Company B |
|  |
|  |

## Summary for 1st round

### Open issues

*Moderator tries to summarize discussion status for 1st round, list all the identified open issues and tentative agreements or candidate options and suggestion for 2nd round i.e. WF assignment.*

|  |  |
| --- | --- |
|  | **Status summary**  |
| **Sub-topic#2-1** | *Tentative agreements:**Candidate options:**Recommendations for 2nd round:* |
| **Sub-topic#2-2** | *Tentative agreements:**Candidate options:**Recommendations for 2nd round:* |

### CRs/TPs

*Moderator tries to summarize discussion status for 1st round and provided recommendation on CRs/TPs Status update suggestion*

|  |  |
| --- | --- |
| **CR/TP number** | **CRs/TPs Status update recommendation**  |
| XXX | *Based on 1st round of comments collection, moderator can recommend the next steps such as “agreeable”, “to be revised”* |

## Discussion on 2nd round (if applicable)

*Moderator can provide summary of 2nd round here. Note that recommended decisions on tdocs should be provided in the section titled ”Recommendations for Tdocs”.*

*Simplification of specification structure for CA/DC/EN-DC/V2X combinations and reduction of test burden*

# Topic #3: Simplification of specification structure for CA/DC/EN-DC/V2X combinations and reduction of test burden

## Companies’ contributions summary

|  |  |  |
| --- | --- | --- |
| **T-doc number** | **Company** | **Proposals / Observations** |
| R4-2213163 | Huawei, HiSilicon | ***Proposal 1***: Generally, if CA\_nA-nB, DC\_A\_nB (DC\_A\_nD), DC\_B\_nA (DC\_B\_nC), DC\_nB\_A, DC\_nA\_B have same MOP requirements and spurious emission requirements for UE to UE coexistence, there is no need to test the MOP requirements and spurious emission requirements for UE to UE coexistence for each UL configuration again and again. Once one of these UL configurations is verified, the other UL configurations for different feature in same band combination can be considered as being capable of meeting these requirements.***Proposal 2***: reference sensitivity exception due to harmonic/harmonic mixing or cross band isolation specified for ENDC band combinations can be further simplified without considering different bandwidth combinations as what we have done for R17 NR CA band combinations.***Proposal 3***: since band nA=> band nB, band A=> band nB, band nA=> band B, band nC=> band nB, band nC=> band B have the same mechanism on UE in-device interference due to harmonic/harmonic mixing or cross band isolation, it’s recommended to test one of them in order to reduce the test burden.***Proposal 4***: Since ENDC combos DL\_A\_nB\_UL\_A\_nB and DL\_B\_nA\_UL\_B\_nA can share the same mechanism and principles with NR CA band combination DL\_nA-nB\_UL\_nA-nB which have MSD requirements due to two bands IMD interference, it’s recommended to test one of them in order to reduce the test burden.***Proposal 5***: Since DL\_A-C\_nB\_UL\_A\_nB/ DL\_A \_nB-nC \_UL\_A\_nB and DL\_B-C\_nA\_UL\_B\_nA/ DL\_B \_nA-nC \_UL\_B\_nA can share the same mechanism and principles with NR CA band combination DL\_nA-nB-nC\_UL\_nA-nB which has a sensitivity degradation on DL band nC due to three bands IMD interference, it’s recommended to test one of them in order to reduce the test burden.***Proposal 6***: Since ENDC combos DC\_ A\_nB-nC-nD / DC\_ B\_nA-nC-nD / DC\_ C\_nA-nB-nD / DC\_ D\_nA-nB-nC / DC\_ A-B\_nC-nD / DC\_ A-C\_nB-nD / DC\_ A-D\_nB-nC/ DC\_ B-C\_nA-nD/ DC\_ B-D\_nA-nC/ DC\_ C-D\_nA-nB / DC\_ A-B-C\_nD/ DC\_ A-B-D\_nC/ DC\_ A-C-D\_nB/ DC\_ B-C-D\_nA with NR CA band combination CA\_nA-nB-nC-nD which has RESENS requirements without degradation, it’s recommended to consider to test one of them in order to reduce the test burden. |
| R4-2212615 | Ximaomi | ***Proposal 1***: If the requirements of the same band combination, e.g. CA\_nA-nB, EN-DC\_A\_nB, EN-DC\_B\_nA, and V2X\_nA-nB for each feature are the same or within a small range, RAN4 could evaluate the feasibility of only testing the requirements for one feature and consider the requirement for other features as pass by default. There would be no need to test the same band combination for each feature.***Proposal 2***: If the requirements of the same band combinat, e.g. CA\_nA-nB, EN-DC\_A\_nB, EN-DC\_B\_nA, and V2X\_nA-nB for each feature are different, RAN4 could evaluate the feasibility of only testing the most stringent requirement for one feature and consider the requirement for other feature as pass by default. |
| R4-2212357 | Apple | ***Observation 1****: The protected bands and frequency ranges for a band combination in principle should be specified based on the intersection set from each constituent band coexistence requirements.****Observation 2****: If the* *principle for specifying the UE coexistence requirements for a band combination as stated in* ***Observation 1*** *can be agreed upon, formulating the requirements in a coexistence table in the technical specifications would not be necessary.****Observation 3****: The requirements for inter-band CA UE coexistence requirements can be specified with a normative text as “For inter-band carrier aggregation with uplink assigned to two NR bands, the requirements are the intersection set from each constituent band coexistence requirements as specified in Table 6.5.3.2-1.” without an explicit coexistence table.****Observation 4****: The benefits for not having an explicit coexistence table for band combinations can be perceptibly realized to not only simplify the contents of the technical specifications, but also to save time and efforts on manually checking the errors and the associated CR processes.****Observation 5****: IMD2 and IMD3 power level under worst-case UL configuration at the antenna port would not be higher than -56 dBm/MHz which is below the tightest spurious emission for UE coexistence requirement at -50 dBm/MHz.****Observation 6****: By fulfilling the 2UL MSD requirements, the UE coexistence requirements for UL inter-band CA are indirectly verified.****Observation 7****: The power for any unexpected spurs arising from the additional local oscillators (LOs) for DL CA mixing with UL transmission should not be higher than 2UL IMD as 2UL IMD for MSD is generated by both wanted signals at PCMAX whose power should be higher than any unexpected Rx spurious emission level.****Proposal****: RAN4 to consider the following two options on the handling of FR1 2UL inter-band CA coexistence requirements.****Option 1****: Remove the FR1 2UL inter-band CA coexistence requirements entirely.****Option 2****: The requirements for inter-band CA UE coexistence requirements is specified with a normative text as “For inter-band carrier aggregation with uplink assigned to two NR bands, the requirements are the intersection set from each constituent band coexistence requirements as specified in Table 6.5.3.2-1.” without an explicit coexistence table.* |
| R4-2213600 | ZTE | ***Proposal 1***: It is suggested to include the following ΔTIB,c and ΔRIB,c templates in the related TR for the Rel-18 basket WIDs.***Proposal 2***: It is supposed that only the configurations having the same component E-UTRA / NR bands can be grouped into one cell (row) for the new ΔTIB,c and ΔRIB,c templates.The related draft CRs of the optimized ΔTIB,c and ΔRIB,c tables for the NR CA/DC band combinations in current spec TS 38.101-1 and MRDC band combinations in current spec TS 38.101-3 have been proposed in the corresponding agenda item of Rel-18 basket WIDs (AI: 10.3 / 10.4 / 10.5 / 10.10 / 10.11 / 10.12) in this meeting. |
| R4-2213596 | ZTE | ***Guideline 1***: The superscript of the NOTE on band edge relaxation is not needed in the Tables for band configurations consisting of different bands in TS38.101-1 specification.***Guideline 2***: For intra-band contiguous CA or intra-band non-contiguous CA, apply band edge relaxation to the uplink configurations if this band has band edge relaxation for MOP as single band usage.***Proposal 1***: It is suggested to apply the Guideline 2 of band edge relaxation for MOP to intra-band contiguous / non-contiguous CA in TS 38.101-1 and intra-band contiguous / non-contiguous EN-DC in TS 38.101-3.According to Proposal 1, a companion CR to TS 38.101-1 and TS 38.101-3 will be provided in this meeting under AI 5.2.4.2 for Rel-17 maintenance. |
| R4-2213599 | ZTE | ***Observation 1***: The uplink CA configurations within FR2 in TS 38.101-2 and the uplink CA configurations between FR1 and FR2 in TS 38.101-3 list all possible UL configurations in the CA configuration table, which make the table quite redundant and inconsistent with rules for DC configurations.***Proposal 1***: For uplink CA configuration, it is suggested that the same rules as in DC configuration table be applied to CA configuration table, i.e. if multiple UL CA configurations are listed for multiple DL CA configurations, valid uplink CA configurations are such that uplink does not have more carriers than downlink.***Proposal 2***: It is proposed to apply the rules in Proposal 1 for uplink CA band combination request. |

## Open issues summary

*Before e-Meeting, moderators shall summarize list of open issues, candidate options and possible WF (if applicable) based on companies’ contributions.*

### Sub-topic 3-1 Reduction of test burden

*Sub-topic description: In this sub-topic, the issues of reduction of test burden for band combinations will be analyzed. The similarity and dependency of Tx RF requirements among different features and Rx RF requirements among different features have been considered.*

*Open issues and candidate options before e-meeting:*

**Issue 3-1A: About the similarity and dependency of Tx RF requirements.**

**If the BCs with the constituent bands in the same spectrum have same MOP requirements and spurious emission requirements for each UL configuration, does it still need to test BCs per feature (e.g., CA, DC, EN-DC and SUL)?**

* Proposals
	+ Option 1: Yes (Please provide further comments).
	+ Option 2: No (Please provide further comments).
	+ Option 3: Others (Please provide further comments).
* Recommended WF
	+ TBA

**Issue 3-1B: About MSD due to harmonic/harmonic mixing or cross band isolation.**

**Can reference sensitivity exception due to harmonic/harmonic mixing or cross band isolation specified for EN-DC be simplified without considering different bandwidth combinations?**

* Proposals
	+ Option 1: Yes (Please provide further comments).
	+ Option 2: No (Please provide further comments).
	+ Option 3: Others (Please provide further comments).
* Recommended WF
	+ TBA

**Issue 3-1C: About MSD due to IMD for two bands.**

**Can EN-DC combos DL\_A\_nB\_UL\_A\_nB and DL\_B\_nA\_UL\_B\_nA share the same mechanism with NR CA combos DL\_nA-nB\_UL\_nA-nB which have MSD requirements due to two bands IMD interference?**

* Proposals
	+ Option 1: Yes (Please provide further comments).
	+ Option 2: No (Please provide further comments).
	+ Option 3: Others (Please provide further comments).
* Recommended WF
	+ TBA

**Issue 3-1D: About MSD due to IMD for three bands.**

**Can EN-DC combos DL\_A-C\_nB\_UL\_A\_nB/ DL\_A \_nB-nC \_UL\_A\_nB and DL\_B-C\_nA\_UL\_B\_nA/ DL\_B \_nA-nC \_UL\_B\_nA share the same mechanism with NR CA combos DL\_nA-nB-nC\_UL\_nA-nB which has a sensitivity degradation on DL band nC due to three bands IMD interference?**

* Proposals
	+ Option 1: Yes (Please provide further comments).
	+ Option 2: No (Please provide further comments).
	+ Option 3: Others (Please provide further comments).
* Recommended WF
	+ TBA

**Issue 3-1E: About REFSENS without degradation for more than one DL band.**

**Can EN-DC combos DC\_ A\_nB-nC-nD / DC\_ B\_nA-nC-nD / DC\_ C\_nA-nB-nD / DC\_ D\_nA-nB-nC / DC\_ A-B\_nC-nD / DC\_ A-C\_nB-nD / DC\_ A-D\_nB-nC/ DC\_ B-C\_nA-nD/ DC\_ B-D\_nA-nC/ DC\_ C-D\_nA-nB / DC\_ A-B-C\_nD/ DC\_ A-B-D\_nC/ DC\_ A-C-D\_nB/ DC\_ B-C-D\_nA share the same mechanism with NR CA combos CA\_nA-nB-nC-nD which has RESENS requirements without degradation?**

* Proposals
	+ Option 1: Yes (Please provide further comments).
	+ Option 2: No (Please provide further comments).
	+ Option 3: Others (Please provide further comments).
* Recommended WF
	+ TBA

### Sub-topic 3-2 FR1 2UL inter-band CA coexistence

*Sub-topic description: This sub-topic is to discuss how to optimize FR1 2UL inter-band CA coexistence requirements. Two options on the handling have been provided.*

*Open issues and candidate options before e-meeting:*

**Issue 3-2A: How to handle the FR1 2UL inter-band CA coexistence requirements?**

* Proposals
	+ Option 1: Remove the FR1 2UL inter-band CA coexistence requirements entirely.
	+ Option 2: The requirements for inter-band CA UE coexistence requirements is specified with a normative text as “For inter-band carrier aggregation with uplink assigned to two NR bands, the requirements are the intersection set from each constituent band coexistence requirements as specified in Table 6.5.3.2-1.” without an explicit coexistence table.
	+ Option 3: Others.
* Recommended WF
	+ TBA

### Sub-topic 3-3 Simplification of delta TIB and RIB in Rel-18

*Sub-topic description: This sub-topic is to apply the optimized discuss how to optimize ΔTIB,c and ΔRIB,c tables for the NR CA/DC and MRDC band combinations in Rel-18.* *The related draft CRs of the optimized ΔTIB,c and ΔRIB,c tables for the NR CA/DC band combinations in current spec TS 38.101-1 and MRDC band combinations in current spec TS 38.101-3 have been proposed in the corresponding agenda item of Rel-18 basket WIDs (AI: 10.3 / 10.4 / 10.5 / 10.10 / 10.11 / 10.12) in this meeting.*

*Open issues and candidate options before e-meeting:*

**Issue 3-3A: Is it acceptable to include the new *ΔTIB,c and ΔRIB,c* templates in the related TR for the Rel-18 basket WIDs?.**

* Proposals
	+ Option 1: Yes.
	+ Option 2: No (Please provide reasons).
* Recommended WF
	+ TBA

**Issue 3-3B: Is the rule “only the configurations having the same component E-UTRA / NR bands can be grouped into one cell (row) for the new ΔTIB,c and ΔRIB,c templates” acceptable?**

* Proposals
	+ Option 1: Yes.
	+ Option 2: No (Please provide reasons).
* Recommended WF
	+ TBA

### Sub-topic 3-4 Guidelines on band edge relaxation for MOP

*Sub-topic description: This sub-topic is to discuss the band edge relaxation for MOP for intra-band contiguous / non-contiguous CA and intra-band contiguous / non-contiguous EN-DC band combinations. A companion CR to TS 38.101-1 and TS 38.101-3 has been provided in this meeting under AI 5.2.4.2 for Rel-17 maintenance.*

*Open issues and candidate options before e-meeting:*

**Issue 3-4A: Is it acceptable to apply the following guideline of band edge relaxation for MOP to intra-band contiguous / non-contiguous CA in TS 38.101-1 and intra-band contiguous / non-contiguous EN-DC in TS 38.101-3?**

* **Guideline: For intra-band contiguous CA or intra-band non-contiguous CA, apply band edge relaxation to the uplink configurations if this band has band edge relaxation for MOP as single band usage.**
* Proposals
	+ Option 1: Yes.
	+ Option 2: No (Please provide reasons).
* Recommended WF
	+ TBA

### Sub-topic 3-5 Simplification to multiple UL CA configuration in CA

*Sub-topic description: This sub-topic is to discuss how to simplify the multiple UL CA configurations in CA configuration tables. It is suggested to use the same rules as in DC configuration tables with multiple UL configurations.*

**Issue 3-5A: Is the following rule acceptable for CA configuration table and applicable to uplink CA band combination request?**

* **For uplink CA configuration, it is suggested that the same rules as in DC configuration table be applied to CA configuration table, i.e. if multiple UL CA configurations are listed for multiple DL CA configurations, valid uplink CA configurations are such that uplink does not have more carriers than downlink.**
* Proposals
	+ Option 1: Yes.
	+ Option 2: No (Please provide reasons).
* Recommended WF
	+ TBA

## Companies views’ collection for 1st round

### Open issues

*Sub-topic 3-1*: Excel template for R18 BC request Reduction of test burden

*Sub-topic 3-2*: Working procedure for BC basket WI FR1 2UL inter-band CA coexistence

*Sub-topic 3-3*: Simplification of delta TIB and RIB in Rel-18

*Sub-topic 3-4*: Guidelines on band edge relaxation for MOP

*Sub-topic 3-5*: Simplification to multiple UL CA configuration in CA

|  |  |
| --- | --- |
| **Company** | **Comments** |
| *Issue 3-1A*: About the similarity and dependency of Tx RF requirements.If the BCs with the constituent bands in the same spectrum have same MOP requirements and spurious emission requirements for each UL configuration, does it still need to test BCs per feature (e.g., CA, DC, EN-DC and SUL)?*Issue 3-1B*: About MSD due to harmonic/harmonic mixing or cross band isolation.Can reference sensitivity exception due to harmonic/harmonic mixing or cross band isolation specified for EN-DC be simplified without considering different bandwidth combinations? *Issue 3-1C*: About MSD due to IMD for two bands.Can EN-DC combos DL\_A\_nB\_UL\_A\_nB and DL\_B\_nA\_UL\_B\_nA share the same mechanism with NR CA combos DL\_nA-nB\_UL\_nA-nB which have MSD requirements due to two bands IMD interference? *Issue 3-1D*: About MSD due to IMD for three bands.Can EN-DC combos DL\_A-C\_nB\_UL\_A\_nB/ DL\_A \_nB-nC \_UL\_A\_nB and DL\_B-C\_nA\_UL\_B\_nA/ DL\_B \_nA-nC \_UL\_B\_nA share the same mechanism with NR CA combos DL\_nA-nB-nC\_UL\_nA-nB which has a sensitivity degradation on DL band nC due to three bands IMD interference? *Issue 3-1E*: About REFSENS without degradation for more than one DL band.Can EN-DC combos DC\_ A\_nB-nC-nD / DC\_ B\_nA-nC-nD / DC\_ C\_nA-nB-nD / DC\_ D\_nA-nB-nC / DC\_ A-B\_nC-nD / DC\_ A-C\_nB-nD / DC\_ A-D\_nB-nC/ DC\_ B-C\_nA-nD/ DC\_ B-D\_nA-nC/ DC\_ C-D\_nA-nB / DC\_ A-B-C\_nD/ DC\_ A-B-D\_nC/ DC\_ A-C-D\_nB/ DC\_ B-C-D\_nA share the same mechanism with NR CA combos CA\_nA-nB-nC-nD which has RESENS requirements without degradation? *Issue 3-2A*: How to handle the FR1 2UL inter-band CA coexistence requirements? *Issue 3-3A*: Is it acceptable to include the new ΔTIB,c and ΔRIB,c templates in the related TR for the Rel-18 basket WIDs?.*Issue 3-3B*: Is the rule “only the configurations having the same component E-UTRA / NR bands can be grouped into one cell (row) for the new ΔTIB,c and ΔRIB,c templates” acceptable?*Issue 3-4A*: Is it acceptable to apply the following guideline of band edge relaxation for MOP to intra-band contiguous / non-contiguous CA in TS 38.101-1 and intra-band contiguous / non-contiguous EN-DC in TS 38.101-3?* Guideline: For intra-band contiguous CA or intra-band non-contiguous CA, apply band edge relaxation to the uplink configurations if this band has band edge relaxation for MOP as single band usage.

*Issue 3-5A*: Is the following rule acceptable for CA configuration table and applicable to uplink CA band combination request?* For uplink CA configuration, it is suggested that the same rules as in DC configuration table be applied to CA configuration table, i.e. if multiple UL CA configurations are listed for multiple DL CA configurations, valid uplink CA configurations are such that uplink does not have more carriers than downlink.
 |
| Samsung | ***Issue 3-1A*: About the similarity and dependency of Tx RF requirements.**Option1. We think the proposal is justified. Counterpart band combinations share the same RF architecture could be tested just once which is enough to verify the RF chain performance.However we have one question for clarification, the outcome of the “methodology targets at simplifying the test efforts” is expected to be the guidelines to RAN5 or would be captured in RAN4 specs?***Issue 3-1B*: About MSD due to harmonic/harmonic mixing or cross band isolation.**Option1. Same approach as NR-CA could be adopted for EN-DC.***Issue 3-1C*: About MSD due to IMD for two bands.**Option1. Counterpart band combinations share the same RF architecture could be tested just once which is enough to verify the RF chain performance.***Issue 3-1D*: About MSD due to IMD for three bands.**Option1. Same comment as above.***Issue 3-1E*: About REFSENS without degradation for more than one DL band**Option1. Same comment as above.***Issue 3-2A*: How to handle the FR1 2UL inter-band CA coexistence requirements?** Option 2. We agree that spurious emissions (Table 6.5A.3.2.3-1) for UE co-existence for 2 bands inter-band CA are derived from the intersection part of each constituent band’s SE requirements. Replace the whole table with a general text is a promising approach to save the group’s time on manually checking when the combinations are introduced through the basket WIs, as well as guarantee the principle of deriving the 2bands SE requirements are implementable.***Issue 3-3A*: Is it acceptable to include the new ΔTIB,c and ΔRIB,c templates in the related TR for the Rel-18 basket WIDs?.**Option1***Issue 3-3B*: Is the rule “only the configurations having the same component E-UTRA / NR bands can be grouped into one cell (row) for the new ΔTIB,c and ΔRIB,c templates” acceptable?**Option1***Issue 3-4A*: Is it acceptable to apply the following guideline of band edge relaxation for MOP to intra-band contiguous / non-contiguous CA in TS 38.101-1 and intra-band contiguous / non-contiguous EN-DC in TS 38.101-3?**Option1, apply the band edge relaxation Note to intra-band CA is fine to us, which is aligned with inter-band CA approach.***Issue 3-5A*: Is the following rule acceptable for CA configuration table and applicable to uplink CA band combination request?**Option2. In our view the rule is not suitable for NR-CA configuration table, since in EN-DC configuration table, all the related DL configurations are integrated in a single cell while for NR-CA it is not. In terms of the revised table, it is unclear to me what the valid Uplink configurations are, take CA\_n257J as example, after the revision, it is uncertain whether CA\_n257A is a valid UL configuration. |
| CHTTL | ***Issue 3-1A*:** Option 3: we think this testing aspects are much more related to RAN5, so we would like to have clarification on what the RAN4 action is if RAN4 agree on this proposal, and also the impact to RAN4.***Issue 3-1B*:** Option 3: regarding the harmonic/harmonic mixing or cross band isolation, we are fine to apply the same approach as NR CA to EN-DC, but since in NR CA max and min channel BWs are still be considered, we feel like the proposal here mentioning “without considering different bandwidth combinations” is not exactly correct. Maybe we can just say applying the same approach as NR CA to EN-DC.***Issue 3-1C*:** Option 3: would like to clarify the meaning of “share the same mechanism”, and regarding the testing aspect, similar comment as Issue 3-1A that whether it is much related to RAN5, and would like to clarify the RAN4 impact before agreeing the option.***Issue 3-1D*:** same comment as 3-1C.***Issue 3-1E*:** same comment as 3-1C.***Issue 3-2A*:** Option 3: keep the current table. We cannot accept to remove the FR1 2UL inter-band CA coexistence table, the table is already there for several years, and it seems like the current table is not exactly derived from the “intersection part” of each constituent band’s SE requirements in some cases, so we think it’s premature to decide to remove the whole table.***Issue 3-3A*:** Option 1,***Issue 3-4A*:** Option 1, thanks for the proposal, agree to apply similar approach to intra-band contiguous / non-contiguous EN-DC.***Issue 3-5A*:** Option 2, we share the same view as Samsung, and this will create confusions on which combinations is supported/completed or not. |
| Xiaomi | **Issue 3-1A: About the similarity and dependency of Tx RF requirements.**Option1. We also have the same observation. It is adequate to test one feature for the same requirement for the BCs with the same spectrum.**Issue 3-1B: About MSD due to harmonic/harmonic mixing or cross band isolation.**Option1. It would be feasible to follow the principle already used for NR CA **Issue 3-1C: About MSD due to IMD for two bands.**Option1.**Issue 3-1D: About MSD due to IMD for three bands.**Option1. **Issue 3-1E: About REFSENS without degradation for more than one DL band**Option1.**Issue 3-2A: How to handle the FR1 2UL inter-band CA coexistence requirements?** OK with Option 2. If no special case for UE coexistence is identified for each 2UL inter-band CA, the principle, i.e. intersection set should be protected, can be applied. The existing table can be removed if the principle is agreed without any exception. If any exception is identified, they could be studied on a case-by-case basis.**Issue 3-3A: Is it acceptable to include the new ΔTIB,c and ΔRIB,c templates in the related TR for the Rel-18 basket WIDs?.**Option 1.**Issue 3-3B: Is the rule “only the configurations having the same component E-UTRA / NR bands can be grouped into one cell (row) for the new ΔTIB,c and ΔRIB,c templates” acceptable?**Option 1. |

### CRs/TPs comments collection

*Major close to finalize WIs and Rel-15 maintenance, comments collections can be arranged for TPs and CRs. For Rel-16 on-going WIs, suggest to focus on open issues discussion on 1st round.*

|  |  |
| --- | --- |
| **CR/TP number** | **Comments collection** |
| R4-22xxxx | Company A |
| Company B |
|  |
|  |

## Summary for 1st round

### Open issues

*Moderator tries to summarize discussion status for 1st round, list all the identified open issues and tentative agreements or candidate options and suggestion for 2nd round i.e. WF assignment.*

|  |  |
| --- | --- |
|  | **Status summary**  |
| **Sub-topic#3-1** | *Tentative agreements:**Candidate options:**Recommendations for 2nd round:* |
| **Sub-topic#3-2** | *Tentative agreements:**Candidate options:**Recommendations for 2nd round:* |
| **Sub-topic#3-3** | *Tentative agreements:**Candidate options:**Recommendations for 2nd round:* |
| **Sub-topic#3-4** | *Tentative agreements:**Candidate options:**Recommendations for 2nd round:* |
| **Sub-topic#3-5** | *Tentative agreements:**Candidate options:**Recommendations for 2nd round:* |

### CRs/TPs

*Moderator tries to summarize discussion status for 1st round and provided recommendation on CRs/TPs Status update suggestion*

|  |  |
| --- | --- |
| **CR/TP number** | **CRs/TPs Status update recommendation**  |
| XXX | *Based on 1st round of comments collection, moderator can recommend the next steps such as “agreeable”, “to be revised”* |

## Discussion on 2nd round (if applicable)

*Moderator can provide summary of 2nd round here. Note that recommended decisions on tdocs should be provided in the section titled ”Recommendations for Tdocs”.*

# Recommendations for Tdocs

## 1st round

**New tdocs**

|  |  |  |  |
| --- | --- | --- | --- |
| **New Tdoc number** | **Title** | **Source** | **Comments** |
|  | WF on … | YYY |  |
|  | LS on … | ZZZ | To: RAN\_X; Cc: RAN\_Y |
|  |  |  |  |

**Existing tdocs**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Tdoc number** | **Revised to** | **Title** | **Source** | **Recommendation**  | **Comments** |
| R4-22xxxxx |  | CR on … | XXX | Agreeable, Revised, Merged, Postponed, Not Pursued |  |
| R4-2213594 |  | Work plan for R18 SI on simplification of band combination specification for NR and LTE | ZTE Corporation |  |  |
| R4-2213595 |  | TR 38.846 v0.0.1\_Study on simplification of band combination specification for NR and LTE | ZTE Corporation |  |  |
| R4-2212736 |  | EXCEL template for R18 PC3 ENDC NRCA SUL V2X band combinations | ZTE Corporation |  |  |
| R4-2213228 |  | On simplification of band combination specification for NR and LTE | Nokia, Nokia Shanghai Bell |  |  |
| R4-2212614 |  | Discussion on working procedure simplification | Xiaomi |  |  |
| R4-2213163 |  | General discussion on Simplification of band combination specification | Huawei, HiSilicon |  |  |
| R4-2212615 |  | Discussion on test burden reduction | Xiaomi |  |  |
| R4-2212357 |  | On FR1 2UL inter-band CA coexistence requirements | Apple |  |  |
| R4-2213600 |  | Simplification of templates for delta TIB and RIB for band combinations | ZTE Corporation |  |  |
| R4-2212800 |  | Considerations for simplification of specification structure for V2X band combinations | vivo |  |  |
| R4-2213596 |  | Guidelines on the band edge relaxation for MOP for CA and DC band combinations | ZTE Corporation |  |  |
| R4-2213599 |  | Simplification on multiple UL CA configurations in CA configuration table | ZTE Corporation |  |  |

Notes:

1. Please include the summary of recommendations for all tdocs across all sub-topics incl. existing and new tdocs.
2. For the Recommendation column please include one of the following:
	1. CRs/TPs: Agreeable, Revised, Merged, Postponed, Not Pursued
	2. Other documents: Agreeable, Revised, Noted
3. For new LS documents, please include information on To/Cc WGs in the comments column
4. Do not include hyper-links in the documents

## 2nd round

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Tdoc number** | **Revised to** | **Title** | **Source** | **Recommendation**  | **Comments** |
| R4-22xxxxx |  | CR on … | XXX | Agreeable, Revised, Merged, Postponed, Not Pursued |  |
| R4-22xxxxx |  | WF on … | YYY | Agreeable, Revised, Noted |  |
| R4-22xxxxx |  | LS on … | ZZZ | Agreeable, Revised, Noted |  |
|  |  |  |  |  |  |

Notes:

1. Please include the summary of recommendations for all tdocs across all sub-topics.
2. For the Recommendation column please include one of the following:
	1. CRs/TPs: Agreeable, Revised, Merged, Postponed, Not Pursued
	2. Other documents: Agreeable, Revised, Noted
3. Do not include hyper-links in the documents