**3GPP TSG-RAN WG4 Meeting # 104-e R4-22xxxxx**

**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 |
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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 |
| Vivo | 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?We suggest to change ‘ 8 Simplification to PC5 configurations’ to ‘8 Simplification to PC5 configurations with Uu configuration’.Issue 1-3A.Yes. We think PC5 on CA is in the objective in Rel-18 SL evolution, which needs further confirmation in RAN#97. Also, we never studied LTE CA/DC, EN-DC, NR DC+PC5 band combination in Rel-16/17/18 SL related WI. Therefore, we think the scope on Uu and PC5 combos should be restricted. |
| ZTE | Issue 1-1A: Yes.Issue 1-2A: Reply to Vivo: We are ok to change the title of section 8 as you suggest.Issue 1-3A: The working scope of PC5 on CA should not exceed the objective of Rel-18 SL evolution. A revised SID on FS\_SimBC is suggested. |
| Huawei | Issue 1-1A: Yes.Issue 1-2A: Since we have the second target as below, in order to match the objectives, we suggest to change the titles as below :6 ~~Guidelines of specifying band combinations~~ Test burden reduction for band combinations.* 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 **( clause 6 )**
		- 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 **( clause 7 )**
		- 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
 |

### 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.*

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| --- | --- |
|  | **Status summary**  |
| **Sub-topic #1-1** | **Issue 1-1A: Is the work plan in R4-2213594 acceptable?**Yes.*Tentative agreements: The work plan in R4-2213594 is suggested to be approved.**Candidate options:**Recommendations for 2nd round: No further discussion is needed in the 2nd round.* |
| **Sub-topic #1-2** | **Issue 1-2A: Is the skeleton for TR 38.846 in R4-2213595 acceptable?**1. vivo suggests to change ‘ 8 Simplification to PC5 configurations’ to ‘8 Simplification to PC5 configurations with Uu configuration’.
2. Huawei suggests to we suggest to change the titles as below :

6 ~~Guidelines of specifying band combinations~~ Test burden reduction for band combinations.*Tentative agreements:**Revise R4-2213595 to include the companies’ concerns raised in the 1st round discussion and recommend into the 2nd round discussion.**(Note: The title for “Test burden reduction for band combinations” should be revised in section 7)**Candidate options:**Recommendations for 2nd round: Further discuss on the skeleton for TR 38.846 in the 2nd round.* |
| **Sub-topic #1-3** | **Issue 1-3A: Should we restrict the scope of Uu and PC5 related BC as follows?**Yes. vivo thinks PC5 on CA is in the objective in Rel-18 SL evolution, which needs further confirmation in RAN#97. Also, we never studied LTE CA/DC, EN-DC, NR DC+PC5 band combination in Rel-16/17/18 SL related WI. Therefore, we think the scope on Uu and PC5 combos should be restricted.ZTE thinks that the working scope of PC5 on CA should not exceed the objective of Rel-18 SL evolution. A revised SID on FS\_SimBC is suggested.*Tentative agreements:**It is suggested to restrict the scope of Uu and PC5 related BC not exceeding the objective of Rel-18 SL evolution. The SID for FS\_SimBC should be revised accordingly.**Candidate options:**Recommendations for 2nd round: Further discussion on the revised SID for FS\_SimBC to consider the restriction of PC5 on CA is recommended in the 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)

*The 2nd round discussion mainly focuses on sub-topic #1-2 and sub-topic #1-3. For sub-topic #1-2, the skeleton of TR 38.846 will be further discussed to include companies’ concerns. For sub-topic #1-3, the revision of the SID FS\_SimBC to reflect the restriction to the scope of Uu and PC5 related BC will be discussed.*

* ***Sub-topic #1-2 (2nd round)***  ***Skeleton for TR 38.846***

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| --- | --- |
| **Company** | **Comments** |
| *Sub-topic #1-2 (2nd round)*: *(Revised R4-2213595)* |
| ZTE | The revision has been uploaded under the folder ‘[Skeleton for TR 38.846](https://www.3gpp.org/ftp/tsg_ran/WG4_Radio/TSGR4_104-e/Inbox/Drafts/%5B104-e%5D%5B131%5D%20FS_SimBC/Skeleton%20for%20TR%2038.846)’.https://www.3gpp.org/ftp/tsg\_ran/WG4\_Radio/TSGR4\_104-e/Inbox/Drafts/%5B104-e%5D%5B131%5D%20FS\_SimBC/Skeleton%20for%20TR%2038.846/R4-2213595r1%20--%20TR%2038.846%20v0.0.1\_Study%20on%20simplification%20of%20band%20combination%20specification%20for%20NR%20and%20LTE.docx |
|  |  |

* ***Sub-topic #1-3 (2nd round)***  ***Work scope on Uu and PC5 combos***

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| --- | --- |
| **Company** | **Comments** |
| *Sub-topic #1-3 (2nd round)*: *(new Revised SID for FS\_SimBC)* |
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# Topic #2: Simplification of working procedure

## Companies’ contributions summary

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| --- | --- | --- |
| **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

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| --- | --- |
| **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. |
| vivo | **Issue 2-1A: Is the template for R18 PC3 ENDC, NR CA, SUL and V2X band combination in R4-2212736 acceptable?**There are some minor corrections for V2X band combination template. Please see if the highlight part can be accepted.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **~~SUL~~ V2X configuration** | **Uplink/Sidelinkconfiguration** | **E-UTRA or NR Band/V2X band** | **Interface** | **Channel bandwidth (MHz)** | **Bandwidth combination set** |
| V2X\_n79A-n47A | V2X\_n79A-n47A | n79 | Uu | 40, 50, 60, 80, 100 | 0 |
| n47 | PC5 | 10, 20, 30, 40 |

 |
| Nokia | Issue 2-1A: We are fine with the template. We encourage that every time a change/update is made to the template we officially approve a version, WITH A VERSION NUMBER, at a RAN4 meeting. This would make it easier to manage. Issue 2-2A: Currently we have an agreed rule stating it shall be 7 days before the RAN4 Tdoc deadline. In practice, it has often been the same as the RAN4 Tdoc deadline. We are fine either way (Option 1 or 2) but would favor 7 days before (Option 1) the RAN4 Tdoc deadline since we then can submit revised WIDs to the RAN4 meeting for checking and do not need to spend time on this after the RAN4 meeting under email approval round. Issue 2-2B: In our opinion it is the proponent (Option 1) who need to check the fallbacks and ensure there are completed at least together with the combination. Then all interested companies should also perform checks but for the request it must be the proponent. Issue 2-2C: In our opinion a band combination after it is included to an approved WID can be completed in parallel with its fallbacks (Option 2). However, it would be recommended that the proponent then clarify the fallback status in the TPs/draftCRs. A simple list of fallbacks with status and if not already completed tdoc refs. together with the intended (high-order) band combination. This can be copied to all related tdocs for the specific band combinations and is anyway information the proponent has or have checked. This practice will also make sense if we adopt option 1. |
| ZTE | **Issue 2-1A:** OK**Issue 2-2A:** Option 1 or Option 2 are fine with us. In addition, maybe it is not appropriate to request the combinations for a bis meeting due to basket WID works are not expected in a bis meeting, as announced by Chairman in recent years. **Issue 2-2B:** Option 1 (Also all the other interested companies can help to check.)**Issue 2-2C:** either option 1 or option 2.It seems companies have already use the approaches as option 2 for many years. So option 2 is fine to us. But we can also live with Option 1.**Issue 2-2D:** Option 1 |
| Ericsson | Issue 2-1A: Template is acceptableIssue 2-2A: No strong opinion since WID’s are normally not written and distributed until after the meeting, so no real hurry or point with an early deadline.Issue 2-2B: If all is responsible, then in practice no one is responsible. So we suggest proponents to be responsible. But all others are encouraged to check fallbacks also.Issue 2-2C: If BC can only be finalized when all fallbacks are already in the specification it would take 1 year (4 meeting cycles) to complete a 5 band inter-band combination. Therefore, BC and fallbacks need to be possible to request and complete in parallel. In submitted tdoc’s it need to be clearly mentioned the fallback tdoc’s it depends on.Issue 2-2D: Option 1 |
| Apple | **Issue 2-1A:** Option 1**Issue 2-2A:** Option 1**Issue 2-2B:** Option 1. Main responsible person is the proponent, who shall list all the fallbacks in the request sheet together with their status. The proponent is also responsible to ensure the fallbacks are completed in the CR or spec before the higher order combinations is added to the CR. Additionally the rapporteur should refuse to add any combinations to the big CR before the proponent has done the work to prove that all fallbacks have been added. As a third line of definse of your everyone checking the big CR is encouraged to check if the fallbacks are already there.**Issue 2-2C:** Option 3: We should not allow a higher order combination to be completed (i.e. added to a big CR) before ALL the lower order combinations are either in the spec or in their big CR. The CRs for the higher order and the lower order combinations may also be done in the same meeting. We have seen that higher and lower order combinations were requested in the same meeting, and while the higher order combination was immediately added to the Big CR, there were TPs and technical work still ongoing for the lower order combinations. In this case it shall not be allowed to add the higher order combination to the big CR, since otherwise we will have the higher order combination in. the spec while the lower order combination is added one to two spec revisions later, this is not good, since the fallbacks are missing in some spec revision. We have to ensure the higher order combinations don’t appear in the spec earlier than the lower order combinations, even if they are requested together in the same meeting.. |
| Huawei | Issue 2-1A: Is the template for R18 PC3 ENDC, NR CA, SUL and V2X band combination in R4-2212736 acceptable?YesIssue 2-2A: When is the appropriate submission deadline for a new band combination request?Either way is OK.Issue 2-2B: Who is the responsible person for checking the fallback BCs for a new BC request?Share the same view with Nokia.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. For request, BC and it’s fallbacks can be in parallel.Issue 2-2D: Can the working procedure agreed in normal CA/DC basket WIs also be applied to V2X basket WI?It’s up to rapporteur CATT to decide. |
| Qualcomm | **Issue 2-2A: Option 1 or 2 is fine.****Issue 2-2B: Option 1&2&3 and supporting companies all shall check the fallback. We should make sure the fallback is correct when requesting the BC.****Issue 2-2C: option 1 or 2 is fine.****Issue 2-2D: 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** |
| R4-2212736 | Please see our comments on V2X band combination template in Issue 2-1A. |
| Nokia – Is this not discussed under Issue 2-1A**?** |
|  |
|  |

## 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** | **Issue 2-1A: Is the template for R18 PC3 ENDC, NR CA, SUL and V2X band combination in R4-2212736 acceptable?**Yes.vivo: There are some minor corrections for V2X band combination template.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **~~SUL~~ V2X configuration** | **Uplink/Sidelinkconfiguration** | **E-UTRA or NR Band/V2X band** | **Interface** | **Channel bandwidth (MHz)** | **Bandwidth combination set** |
| V2X\_n79A-n47A | V2X\_n79A-n47A | n79 | Uu | 40, 50, 60, 80, 100 | 0 |
| n47 | PC5 | 10, 20, 30, 40 |

Nokia: We encourage that every time a change/update is made to the template we officially approve a version, WITH A VERSION NUMBER, at a RAN4 meeting. This would make it easier to manage.*Tentative agreements:**The template in R4-2212736 is suggested to be corrected for the typo mentioned above in the 2nd round. No more discussion is needed in the 2nd round. It is suggested to make the template a version number and ask for MCC to upload to the 3GPP server after the meeting. The website is as follows.**<https://www.3gpp.org/ftp/tsg_ran/WG4_Radio/Templates/>**Candidate options:**Recommendations for 2nd round: Check the revision of R4-2212736. No more discussion is need in the 2nd round.* |
| **Sub-topic#2-2** | **Issue 2-2A: When is the appropriate submission deadline for a new band combination request?**Option 1: One week prior to the RAN4 submission deadline* Samsung, Xiaomi, Softbank, Nokia, ZTE, Apple, Huawei, QC

Option 2: Same deadline as RAN4 Tdoc submission.* CHTTL, Xiaomi, Softbank, Nokia, ZTE, Apple, Huawei, QC

Most of the companies are ok for either Option 1 or Option 2. No companies prefer option 3 (Before the end of RAN4 meeting): Final decision on Option 1 or Option 2 will be made during the 2nd round discussion.**Issue 2-2B: Who is the responsible person for checking the fallback BCs for a new BC request?**Option 1: The Proponent of new BC request* Samsung, CHTTL, Xiaomi, Softbank, Nokia, ZTE, Ericsson, Apple, Huawei, QC

Option 2: The rapporteur of the basket WI* QC

Option 3: All interesting companies.* Softbank, QC

Most of the companies prefer Option 1, i.e. the proponent of new BC request is the responsible person for checking the fallbacks and encourage all companies to check the fallbacks.**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 1: Strictly sequential introduction of BC (All fallbacks complete first)* ZTE, QC

Option 2: BC and its fallbacks request in parallel* Samsung, CHTTL, Xiaomi, Softbank, Nokia, ZTE, Ericsson, Huawei, QC

Option 3: Others* Apple (Mechanism should be established to ensure the higher order combinations not earlier than the lower order combinations in the spec)

Most of the companies support Option 2 which allows the higher order combination and its fallbacks request in parallel. However there is also concern raised how to ensure the higher order combinations not earlier than the lower order combinations in the spec.**Issue 2-2D: Can the working procedure agreed in normal CA/DC basket WIs also be applied to V2X basket WI?**Option 1: Yes* Samsung, CHTTL, Xiaomi, ZTE, Ericsson, QC

Option 2: No* *H*uawei (It is up to the rapporteur of V2X basket WI)

Most of the companies support that the working procedure agreed in the normal CA/DC basket WIs also applied to V2X basket WI. However, there is also company suggest that it is up to V2X basket WI.*Tentative agreements:*1. **For the appropriate submission deadline for a new band combination request, Option 3 (Before the end of RAN4 meeting) is excluded. Whether Option 1 (One week prior to the RAN4 submission deadline) or Option 2 (Same deadline as RAN4 Tdoc submission) is suggested to be** decided **in the 2nd round.**
2. **Regarding to the responsible person for checking the fallback BCs for a new BC request, it is suggested** that the proponent of new BC request be the first responsible person and all companies are encouraged to check the fallbacks.
3. With regard to **the order of the request BC and its fallbacks**, it is suggested that the higher order combination and its fallbacks request could be in parallel. However, how to ensure the higher order combination not earlier than the lower order combinations in the spec is suggested to be discussed in 2nd round. Furthermore, we should also give a guidance to the basket WI rapporteur, if the rapporteur could refuse to add any combinations to the big CR before the proponent has done the work to prove that all fallbacks have been added?
4. For the issue if **the working procedure agreed in normal CA/DC basket WIs** could **also be applied to V2X basket WI**, it is suggested to be decided by the rapporteur of V2X basket WI. No further discussion is needed in the 2nd round.

*Candidate options:***Issue 2-2A: When is the appropriate submission deadline for a new band combination request?*** + Option 1: One week prior to the RAN4 submission deadline.
	+ Option 2: Same deadline as RAN4 Tdoc submission.
	+ Option 3: 3 weeks prior to the RAN4 submission deadline (From Thread#115)

**Issue 2-2E: How to ensure the higher order combination not earlier than the lower order combinations in the spec?*** + Option 1: The proponent should clarify the fallback status in the TPs / draftCRs and if lower order combinations are not finished in the same meeting, the higher order combinations should be put on hold.
	+ Option 2: Others.

**Issue 2-2F: Can the rapporteur of basket WI refuse to add any combinations to the big CR before the proponent has done the work to prove that all fallbacks have been added?*** + Option 1: Yes.
	+ Option 2: No.

*Recommendations for 2nd round:**It is suggested to discuss the following questions in the 2nd round.***Issue 2-2A: When is the appropriate submission deadline for a new band combination request?****Issue 2-2E: How to ensure the higher order combination not earlier than the lower order combinations in the spec?****Issue 2-2F: Can the rapporteur of basket WI refuse to add any combinations to the big CR before the proponent has done the work to prove that all fallbacks have been added?** |

### 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”.*

*The 2nd round discussion mainly focuses on sub-topic #2-2. There are 3 issues in sub-topice #2-2 to be discussed in the 2nd round. For sub-topic #2-1, only check the revision of the excel template is needed.*

* ***Sub-topic #2-1 (2nd round)***  ***Excel template for R18 BC request***

|  |  |
| --- | --- |
| **Company** | **Comments** |
| *Sub-topic #2-1 (2nd round)*: *(Revised R4-2212736)**[Moderator Note] Check the revision for typo correction. No more discussion is needed.* |
| ZTE | The revision have already been uploaded under ‘[Excel template for R18 BC request](https://www.3gpp.org/ftp/tsg_ran/WG4_Radio/TSGR4_104-e/Inbox/Drafts/%5B104-e%5D%5B131%5D%20FS_SimBC/Excel%20template%20for%20R18%20BC%20request)’ folder.https://www.3gpp.org/ftp/tsg\_ran/WG4\_Radio/TSGR4\_104-e/Inbox/Drafts/%5B104-e%5D%5B131%5D%20FS\_SimBC/Excel%20template%20for%20R18%20BC%20request/Revision%20of%20R4-2212736%20Template%20for%20R18%20PC3%20ENDC%20NRCA%20SUL%20V2X%20band%20combinations\_v1.xlsx |
| Nokia | We are fine with the template but would like that a version number is added on the “cover sheet” tab in the basket list tables. In this way we can track potential updates to the template and also the baskets listed.  |
| ZTE | After some offline discussion with Nokia, the revision can be found:https://www.3gpp.org/ftp/tsg\_ran/WG4\_Radio/TSGR4\_104-e/Inbox/Drafts/%5B104-e%5D%5B131%5D%20FS\_SimBC/Excel%20template%20for%20R18%20BC%20request/Revision%20of%20R4-2212736%20Template%20for%20R18%20PC3%20ENDC%20NRCA%20SUL%20V2X%20band%20combinations\_v2.xlsx |

* ***Sub-topic #2-2 (2nd round)***  ***Working procedure for BC basket WI***

|  |  |
| --- | --- |
| **Company** | **Comments** |
| *Sub-topic #2-2 (2nd round)*: *Issue 2-2A: When is the appropriate submission deadline for a new band combination request?** + Option 1: One week prior to the RAN4 submission deadline.
	+ Option 2: Same deadline as RAN4 Tdoc submission.
	+ Option 3: 3 weeks prior to the RAN4 submission deadline (From Thread#115)

*Issue 2-2E: How to ensure the higher order combination not earlier than the lower order combinations in the spec?** + Option 1: The proponent should clarify the fallback status in the TPs / draftCRs and if lower order combinations are not finished in the same meeting, the higher order combinations should be put on hold.
	+ Option 2: Others.

*Issue 2-2F: Can the rapporteur of basket WI refuse to add any combinations to the big CR before the proponent has done the work to prove that all fallbacks have been added?** + Option 1: Yes.
	+ Option 2: No.
 |
| T-Mobile USA | Comment: First of all, we need to document somehow exactly what mandatory fallbacks are. Some requests are made that do not have all of the fallbacks listed. An example from RAN4#104:

|  |  |  |
| --- | --- | --- |
| CA\_n5A-n77C | CA\_n77C | (Complete) DL\_n77C\_UL\_77C(Missing) DL\_n5A-n77C\_BCS0 |

Issue 2-2A: Deadline should continue to be one week before RAN4 tdocs are due.Issue 2-2E: Proponent needs to checkIssue 2-2F: This would be tricky, because the proponent needs to check the big CR for the lower order combinations before they can prove that all fallbacks have been added. Fallbacks status should be checked when combinations are proposed and added to the WID. |
| Samsung | We think there is overlapping discussion in thread [115] regarding Issue 2-2A/E/F, and A WF is generated and under discussion there, companies could check if interested.Issue 2-2A: Slightly prefer 7 days before Tdoc submission deadline unless there is other announcement from Mr Chair, in order to allow more time for rapporteurs to check the request. We are also fine with 0 day if it is the majority view.Issue 2-2E/F: Proponents should always be the first person responsible to check the fallbacks.Below rule was approved in RAN4#102-e which has also been captured in the TR 38.862-h10. The intention is to urge proponents to pay attention to the fallback rules, as well as facilitate rapporteurs work when checking the fallback status. We think rapporteurs/interested companies could flag the TP/draft CR if below rule is not followed, and the rapporteur shall not introduce these band combination into big CR unless the flag has been addressed.*# 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*. |
| ZTE | Issue 2-2A: We are ok for both option 1 and 2, but slightly prefer option 1, i.e. one week prior to the RAN4 submission deadline. If the time interval between the two consecutive meetings is too close, exceptions may be required.Issue 2-2E: Option 1. The proponent should clarify the fallback status in the TPs / draftCRs to ensure the higher order BC not to enter into spec before the lower fallback BCs.Issue 2-2F: Option 1. The rapporteur has the right to refuse to add any combinations to the big CR before the proponent proves that all fallbacks have been added. |
| CHTTL | Issue 2-2A: We strongly suggest to set the new band combination request deadline to be the same deadline as RAN4 Tdoc submission, Option 2. Given the reasons below:1. We have set the request deadline to be same deadline as RAN4 Tdoc submission for several years, without major issues encountered. Considering the 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.2. Basically we respect the proponent’s urgent request, so even the deadline is passed, we still allow those late requests, so setting the deadline earlier will only increase the chance of receiving a late request. 3. Set the new band combination request deadline to be the same deadline as RAN4 Tdoc submission can already allow sufficient time for interested companies to review. Before the Tdoc submission deadline probably people are busy focus on preparing the contributions, so setting the deadline earlier is not that meaningful.4. There is no need to be hurry to provide the revised WID before the meeting, there might need additional work on the revisions if there is comment, and also during the post meeting, we also update the latest status of each combination in the revised WID, which will be the correct information for the next plenary.Issue 2-2E: We still need someone to check whether there are unfinished fallbacks in the same meeting, otherwise probably the TP/draft CR will still go through the basket approval.Issue 2-2F: Even if we agree this proposal, rapporteurs might be busy implementing the big CRs so that it will be difficult to do the cross check at that time. |
| Nokia | Issue 2-2A: We are fine either way (Option 1 or 2) but would favor 7 days before (Option 1) the RAN4 Tdoc deadline since we then can submit revised WIDs to the RAN4 meeting for checking and do not need to spend time on this after the RAN4 meeting under email approval round.Issue 2-2E: We are okay with option 1. In our understanding this is how it is supposed to work now.Issue 2-2F: Similar comment as CHTTL, even the rapporteur can choose not to implement a combination since fallbacks are missing then this still would not solve the issue completely. The complex work of crosschecking all combinations for a big CR should at least be a shared burden between the interested parties.  |
| Apple | Issue 2-2A: Option 1: The deadline should be one week before the Tdoc deadline, since then it is possible to check the band combination requests before the Tdoc deadline, since after the Tdoc deadline there is usually already the flagging process for the contributions resulting from the requests for the baskets. Checking the combinations requests simultaneously with the Tdocs already trying to bring them into the spec is difficult.Issue 2-2E: Option 1: The proponent has to prove that all fallbacks are there. There is also an easy way to ensure it: the number of fallbacks is always be the same as the number of carriers in the combination. If in a 3 carrier combination you remove the first carrier, you get the first fallback, removing the second carrier you get the second fallback andremoving the third carrier results in the third fallback. So if the proponent has a 3 carrier combination, there shall be three fallbacks. However, in the case of T-Mobile above there are two identical fallbacks, CA\_n5A-n77A for the first contiguous n77C carrier as well as for the second contiguous n77C carrier. And there is also a bug in the T-Mobile statement, as the missing fallback combination is CA\_n5A-n77A and not CA\_n5A-n77C, which is the original higher order combination. And the rapporteur can easily check, if the number of fallbacks equals the number of carriers.Issue 2-2F: Option 1: The rapporteur should not add combinations to the CR, for which fallbacks are missing in the request sheet (not the same number of fallbacks including duplicates as the number of carriers) and all fallbacks are either marked as being in the spec or being in a CR. |

# 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. |
| Nokia | *Sub-topic 3-1:* We understand the test burden, but what is the outcome of agreeing Issue 3-1x? What is specified in RAN4 specs to ensure the tests will be skipped?*Issue 3-2A*: Option 2 may be a way to go, as 2UL coex table had lots of errors in the past and was not very helpful as requirement specification. However, there is a potential issue on Option 2. Some 2UL combos are specific to operators or regions, so the simple intersection set requires unnecessary band protection. Thus, some exceptions may be needed, if mandating to protect all intersection set causes issues.*Issue 3-3A and Issue 3-3B*The tables in TR should be aligned simply with the latest agreed spec when draft CRs are edited so that big CRs can be edited easily.*Issue 3-4A*If the maintenance CR is submitted already, why would we need to discuss it in this Rel-18 SI? We’d leave it for Rel-17 thread to decide.*Issue 3-5A*: Regarding the statement “valid uplink CA configurations are such that uplink does not have more carriers than downlink,” the purpose of the UL configuration column for CA is to list the possible UL configurations used together with DL. So in some case, maximum possible number of UL carriers is smaller than DL. Also it is possible not to list up all the possible fallbacks.In case of DC, two connections are independent each other and support capability independently. So this was not needed. We may need to further discuss if this is ok. |
| Skyworks | ***Issue 3-1A*: About the similarity and dependency of Tx RF requirements.***Option 3:* we are also confused by what option 1 means with reference to proposal “does it still need to test BC per feature?”. We thought the goal was to discuss how can RAN4 simplify core requirements and possibly reduce the number of test points. Could examples of what option 1 means be provided?***Issue 3-1B*: About MSD due to harmonic/harmonic mixing or cross band isolation.**Option3. We have same view as CHTTL. The new template for capturing NRCA MSD test points for crossband isolation and harmonic interference should be adopted for ENDC, however, as CHHTL correctly points out, in NRCA the maximum specified CBW of a given constituent band is not always specified for a given NRCA BCS. The other difference is the LTE max CBW of 20MHz. So, adopting NRCA MSD template will help reduce the number of test points, the MSD levels may differ.***Issue 3-1C*: About MSD due to IMD for two bands. “*Can EN-DC combos (…) share the same mechanism with NR CA combos which have MSD requirements due to two bands IMD interference?*”**We are not sure what option 1 means by the term “(..) mechanism”. If the intention is to unify the MSD test points, then considering many CA 2UL MSD test points are identical to ENDC, there might be opportunities for simplification. However, there are exceptions: 1) when one of the constituents is configured as an intra-band UL CA since the max. agg BW may differ between NRCA given BCS and ENDC combination 2) for the case of intra-band CA MSD due to dual UL transmissions.***Issue 3-1D*:** same comment as 3-1C. If the intention to unify the MSD test points, this might be feasible, but what would be the approach in case different MSD levels or different test points have been agreed between EN-DC, EN-DC and NR-CA? Example of MSD level comparison between DC\_1-3\_n78, DC\_1\_n3-n78, DC\_3\_n1-n78 vs CA\_n1-n3-n78:B1/n1 IMD5 MSD: 2.8dB (B1 in DC\_1-3\_n78) vs 3.5dB (n1 in DC\_3\_n1-n78) vs not specified for CA\_n1-n3-n78,B3 IMD2 MSD: 31.2dB for DC vs n/a for CA,n3 IMD2 MSD: 27.9dB for DC vs 27.9dB for CA: good matchn78 IMD2 MSD: 28.4dB for DC vs 28.4dB for CA: good matchn78 IMD4 MSD: not specified for DC vs 11.4dB for CA.***Issue 3-2A*: How to handle the FR1 2UL inter-band CA coexistence requirements?** Option2 would be a simple way to go since one other challenge in these tables is the task of maintenance. Everytime a new band protection is changed/added/removed in NR or LTE bands, the whole set of UE coex requirements for CA needs to be updated, making this task a never-ending job. An alternative option 3 would be if 3GPP could develop a script-based tool that performs the intersection operation automatically. This would reduce RAN4 workload and maintain up to date tables. Does RAN4 has an obligation to publish UE coex tables for regulatory purposes?***Issue 3-5A*:** same view as Nokia, more discussions are needed. |
| SoftBank | ***Issue 3-2A*: How to handle the FR1 2UL inter-band CA coexistence requirements?** We would like to clarify the meaning of "intersection set". One example is CA\_n1-n18. In the co-ex table of band n1, E-UTRA Band 8 exists. In the co-ex table of band n18, Band 8 does not exist but the requirement for frequency range: 945-960MHz exist. In that case, does “intersection set" includes the co-ex requirement for 945-960MHz? This requirement has to be included in the intersection set because its frequency range is included in the co-ex table of both bands. We are afraid that the reader may misunderstand that case.  |
| ZTE | **Issue 3-1A: About the similarity and dependency of Tx RF requirements.**It seems bandwidth class is not considered here. In our understanding, RAN5 will do the test for all the configurations for a certain band combination. Although EN-DC and NR CA are somehow the same requirements for the same band combination (Not sure if it is the case for all of the EN-DC and NR CA band combination), different configurations are supported for EN-DC and NR CA. From this aspect, it may not proper to use one test to cover the other test. (For example, EN-DC DL\_nXC-nYA\_UL\_nXA-nYA may not be replaced with NR CA DL\_nXA-nYC\_UL\_nXA-nYC, where for the latter one, triple beat MSD may apply).**Issue 3-1B: About MSD due to harmonic/harmonic mixing or cross band isolation.**Similar view as CHTTL. MSD Table template can be the same. **Issue 3-1C: About MSD due to IMD for two bands.**We think bandwidth class should be considered. We take above examples, ENDC DL\_nXC-nYA\_UL\_nXA-nYA may not be replaced with NR CA DL\_nXA-nYC\_UL\_nXA-nYC, where for the latter one, triple beat MSD may apply. In this case how can we say they are “share the same mechanism”?**Issue 3-1D: About MSD due to IMD for three bands.**Maybe more clarification on ‘share the same mechanism’ is needed.**Issue 3-1E: About REFSENS without degradation for more than one DL band**Maybe more clarification on ‘share the same mechanism’ is needed. BTW, there are no MSD defined for CA\_nA-nB-nC-nD in current spec.**Issue 3-2A: How to handle the FR1 2UL inter-band CA coexistence requirements?** We may need careful to remove the table which have been used for many years. Actually, this table includes protected bands, specific frequency range and protected NR bands, for the latter two ones, intersection method is not applied.**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.**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?**Option 1. Reply to Nokia, we have no strong opinion whether it should be implemented in Rel-17 or in Rel-18.**Issue 3-5A: Is the following rule acceptable for CA configuration table and applicable to uplink CA band combination request?**Option 1. To Samsung and CHTTL, the valid Uplink configurations means uplink does not have more carriers than downlink in the same FBG. To this extent, CA\_nXA could be regarded as a valid UL configuration. To Nokia and Skyworks, with regard to the possibility of not listing up all the possible fallbacks, we believe for most of the configurations in current spec, this rule for simplification can work. In case some fallback configurations are not supported, we can put a note in the table to clarify. |
| Apple | **Issue 3-1A: About the similarity and dependency of Tx RF requirements.**Option 2It is reasonable to not repeat the same RF tests for the same band combinations in different features (such as NR CA versus NR DC, EN-DC, and NE-DC) where they have the same RF requirements.**Issue 3-1B: About MSD due to harmonic/harmonic mixing or cross band isolation.**Option 1The test is meant to verify the RF front-end components linearity and isolation performance which are expected to not vary within the BW range. Testing different BW combinations would not improve test coverage but to increase test loading. **Issue 3-1C: About MSD due to IMD for two bands.**Option 1This has been the common understanding in RAN4 on specifying the MSD requirements.**Issue 3-1D: About MSD due to IMD for three bands.**Option 1RF characteristics do not change between Band A and Band nA.**Issue 3-1E: About REFSENS without degradation for more than one DL band**Option 1Yes if the UL configuration is the same between EN-DC and CA.**Issue 3-2A: How to handle the FR1 2UL inter-band CA coexistence requirements?** Our preference is Option 1 based on our assessment in R4-2212357. Option 2 is also acceptable to us if companies have concern on removing the requirements entirely. **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**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?**Option 1Isn’t this already the current understanding?**Issue 3-5A: Is the following rule acceptable for CA configuration table and applicable to uplink CA band combination request?**Option 1 |
| Huawei | **Issue 3-1A: About the similarity and dependency of Tx RF requirements.**To Samsung/Nokia/Skyworks/CHTTL:Since this is a SI, firstly we can record what we can achieve. And then we can further clarify it in RAN4 spec in a following WI or we send it to RAN5 as a recommendation. For example, we should clarify that the 23dBm MOP requirements are same and equivalent among UL\_n1A-n3A / DC\_1A\_n3A / DC\_3A\_n1A / UL\_1A-3A (LTE) / UL\_1A\_n80A…. If UL\_n1A-n3A (NR RAT) can pass the test, other declared band combinations can pass as well. To ZTE:I think this issue is related to UL requirements. MSD belong to the Rx RF requirements. Besides, we can consider the worst case.**Issue 3-1B: About MSD due to harmonic/harmonic mixing or cross band isolation.**To CHTTL, since BCS was not specified for ENDC, we stated that “without considering different bandwidth combination”. We are OK with your suggestion.**Issue 3-1C: About MSD due to IMD for two bands.**To CHTTL: Thanks for your comments. And Thanks to Samsung’s explanation. I agree with it.Counterpart band combinations share the same RF architecture could be tested just once which is enough to verify the RF chain performance.To Skyworks/ZTE: firstly we can consider the simple cases (each carrier in one band). In the future, we can consider the complicated cases and corner case. In my understanding, the simple cases and general cases are widely implemented by UE vendors. And the industry can benefit from this work.**Issue 3-1D: About MSD due to IMD for three bands.**To Skyworks:If we find some misalignment, we should analyze where it is from and refine it. At least, the implementation of RF chain for these DC\_1-3\_n78, DC\_1\_n3-n78, DC\_3\_n1-n78 vs CA\_n1-n3-n78 BC are same in understanding. We can consider to reunify the RF requirements.**Issue 3-1E: About REFSENS without degradation for more than one DL band.**To ZTE, ‘share the same mechanism’ means that counterpart band combinations share the same RF architecture could be tested just once which is enough to verify the RF chain performance.**Issue 3-2A: How to handle the FR1 2UL inter-band CA coexistence requirements?**We still need to identify some exceptional cases before we go option 2.**Issue 3-3A/3-3B.**Option1**Issue 3-5A:**Option 2: Due to BCS, CA configuration can't be aligned with DC even if we adopt these proposals. And it will cause some confusions. |
| Qualcomm | **Issue 3-1A: Option 2. If all the configurations are the same among CA/DC/EN-DC, there is no need to repeat the test.****Issue 3-1B: Option 1. It should be same as NR-CA.****Issue 3-1C: Option 1. We don’t see the difference for EN-DC and NR CA with UL configurations.****Issue 3-1D: Option 1 if the all the configurations are the same.****Issue 3-1E: Option 1 if the all the configurations are the same.****Issue 3-2A: We prefer option 2 which will not have a big change for the spec.****Issue 3-5A: Could proponent can explain more why we need this rule? What’s the benefit?** |

### 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.*

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

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|  | **Status summary**  |
| **Sub-topic#3-1** | **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)?**Option 1: Yes.* Samsung, Xiaomi

Option 2: No.* Apple, QC

Option 3: Others.* CHTTL, Nokia, Skyworks, ZTE

**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?** Option 1: Yes.* Samsung, Xiaomi, Apple, QC

Option 2: No.* None

Option 3: Others.* CHTTL, Nokia, Skyworks, ZTE

**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?** Option 1: Yes.* Samsung, Xiaomi, Apple, QC

Option 2: No.* None

Option 3: Others.* CHTTL, Nokia, Skyworks, ZTE

*Tentative agreements:**How to reduce test burden for band combination need further clarification, especially how it affects RAN4 spec and the work procedure between RAN4 and RAN5. A way forward on test burden reduction for band combination is suggested to be discussed in the 2nd round.**Candidate options:**Recommendations for 2nd round:**A way forward on test burden reduction for band combination is suggested to be discussed in the 2nd round.* |
| **Sub-topic#3-2** | **Issue 3-2A: How to handle the FR1 2UL inter-band CA coexistence requirements?** Option 1: Remove the FR1 2UL inter-band CA coexistence requirements entirely.* Apple

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.* Samsung, Xiaomi, Nokia, Skyworks, Apple, QC, Huawei,

Option 3: Others* CHTTL, Softbank, ZTE

*Tentative agreements:**No consensus can be achieved on whether remove the 2UL inter-band CA coexistence table or not. It is suggested a way forward on the 2UL inter-band CA coexistence table, solutions such as how to apply ‘intersection’ on ‘frequency range’ should be discussed.**Candidate options:**Recommendations for 2nd round:**Further discussion on the feasibility of the solution and a way forward in the 2nd round is recommended.* |
| **Sub-topic#3-3** | **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?.**Yes.**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?**Yes.*Tentative agreements:**It is suggested to include the new ΔTIB,c and ΔRIB,c templates in the related TR for the Rel-18 basket WIDs. 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.**Candidate options:**Recommendations for 2nd round:**No further discussion is needed in the 2nd round.* |
| **Sub-topic#3-4** | **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.**

Yes.*Tentative agreements:**For intra-band contiguous CA / non-contiguous CA and intra-band contiguous / non-contiguous EN-DC, apply band edge relaxation to the uplink configurations if this band has band edge relaxation for MOP as single band usage.**Candidate options:**Recommendations for 2nd round:**No further discussion is needed in the 2nd round.* |
| **Sub-topic#3-5** | **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.**

Option 1: Yes.* Apple, ZTE

Option 2: No.* Samsung, CHTTL, Huawei

Option 3: Others.* Nokia, Skyworks, QC

*Tentative agreements:**No consensus can be achieved and need further discussion. It is suggested to postpone to next meeting.**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”.*

*The 2nd round discussion mainly focuses on sub-topic #3-1 and #3-2. For sub-topic #3-1, how to reduce test burden for band combination will be further discussed. A WF on test burden reduction will focus on the working scope and the procedure between RAN4 and RAN5. For sub-topic #3-2, further explanation on the solution, such as how to apply ‘intersection’ on ‘frequency range’ should be considered.*

* ***Sub-topic #3-1 (2nd round)***  ***Reduction of test burden***

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| --- | --- |
| **Company** | **Comments** |
| *Sub-topic #3-1 (2nd round)*: *(Way forward on test burden reduction for band combination)* |
| ZTE | To reduce the test burden is one of the objectives in the SID, we are ok to capture the related agreements as the outcome of this TR. Regarding to the following WI in RAN4, it will depend on the outcome of the study. For RAN5 WI, the decision should be made by RAN5. For the similarity and dependency of Tx/Rx, more discussion is needed. |
| Nokia | We are fine to further investigate test burden reduction and capture finding in the TR. RAN4 shall not decide on RAN5 WIs. This is an discussion between RAN5 and RAN.  |
| Skyworks | WF P2: See our comments in WF. As proponents of NR-CA new MSD template, we agree the new template can significantly reduce the number of these MSD test points. We would like to remind however that not all NR-CA test points can considered as “test burden savers” for their EN-DC counterparts, and vice-versa. For example, the n40 MSD in CA\_n1-n40 is specified for n1 20MHz UL CBW, while for DC\_40\_n1, it may be assumed that B40 MSD is specified for n1 50MHz UL CBW. One way to provide a higher level of commonality between NRCA and ENDC test points, and therefore to enable further test point savings would be to specify BCS4/5 for a greater number of NRCA combinations.WF P3: See our comment in WF. Another way to further reduce the number of test points would be to remove test points for higher order IMD products, i.e. keep only the highest MSD test point (lowest IMD order). For example, in CA\_n25-n77, two n25 MSDs are specified: 26dB due to IMD2 and 8dB due to IMD4. We could remove the MSD due to IMD4. Greater savings may be achieved for 3DL/2UL MSD tables. |
| Huawei | To Skyworks, Thanks for your comments and issues your raised. I think we can address them in next meeting and add these point into the WF. Please feel free to let me know whether it’s OK for you. |

* ***Sub-topic #3-2 (2nd round)***  ***FR1 2UL inter-band CA coexistence***

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| --- | --- |
| **Company** | **Comments** |
| *Sub-topic #3-2 (2nd round)*: *(Way forward on FR1 2UL inter-band CA coexistence requirements)**Further discussion on Issue 3-2A: How to handle the FR1 2UL inter-band CA coexistence requirements?*  |
| ZTE | To simplify the FR1 2UL inter-band CA coexistence requirements is a good attempt. We are open to the solution. However, further considerations on the exceptional cases should be analyzed. |
| CHTTL | See our comment in the WF. |
| Nokia | Comments will be added to the WF. |

# Recommendations for Tdocs

## 1st round

**New tdocs**

|  |  |  |  |
| --- | --- | --- | --- |
| **New Tdoc number** | **Title** | **Source** | **Comments** |
|  |  |  |  |
|  |  |  |  |
|  |  |  |  |
|  | *TR 38.846 v0.0.1\_Study on simplification of band combination specification for NR and LTE* | *ZTE* | *Revision of R4-2213595* |
|  | *EXCEL template for R18 PC3 ENDC NRCA SUL V2X band combinations* | *ZTE* | *Revision of* *R4-2212736* |
|  | *Revised SID for Study on simplification of band combination specification for NR and LTE* | *vivo, ZTE* |  |
|  | *Way forward on test burden reduction for band combination* | *Huawei* |  |
|  | *Way forward on FR1 2UL inter-band CA coexistence requirements* | *Apple* |  |

**Existing tdocs**

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

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