**3GPP TSG-RAN WG4 Meeting # 102-e R4-22xxxxx**

**Electronic Meeting, February 21 – March 3, 2022**

**Agenda item:** 9.25

**Source:** Moderator (CATT)

**Title:** Email discussion summary for [102-e][112] NR\_LTE\_V2X\_PC5\_combos

**Document for:** Information

# Introduction

In this email discussion summary, several new band combinations for V2X con-current operation are discussed.

The candidate targets of this email discussion for 1st round and 2nd round:

* 1st round
	+ Companies to provide comments on open issues involved.
	+ Companies to provide comments on TPs and CRs involved.
* 2nd round
	+ Further check the revised TPs and CRs if any.
	+ Recommend the final status of TPs and CRs.

# Topic #1: MSD for V2X\_1A-n47A and V2X\_n1A-47A

## Companies’ contributions summary

|  |  |  |
| --- | --- | --- |
| **T-doc number** | **Company** | **Proposals / Observations** |
| R4-2203915 | CATT | Draft CR for TS 38.101-1, Introduce new band combinations of V2X\_n1A-n47A |
| R4-2203916 | CATT | Draft CR for TS 38.101-3, Introduce new band combination of V2X\_n1A\_47A and V2X\_1A\_n47A |
| R4-2203917 | CATT | TR37.875, Band combinations of V2X con-current operation**For post-meeting email approval** |
| R4-2204172 | CATT | Big CR for 38.101-1, Introduce new band combination for V2X con-current operation**For post-meeting email approval** |
| R4-2204173 | CATT | Big CR for 38.101-3, Introduce new band combination for V2X con-current operation**For post-meeting email approval** |
| R4-2203913 | CATT | TP on coexistence study of V2X\_n1A-n47A, V2X\_1A\_n47A and V2X\_n1A\_47A |
| R4-2203914 | CATT | TP on coexistence study of V2X\_n8A-n47A, V2X\_8A\_n47A and V2X\_n8A\_47A**Correct the fx\_high of Band n8.** |
| R4-2204014 | Qualcomm Incorporated | Calculation of MSD for V2X\_n1A-47A and accompanying TP**Proposal 1: Adopt the MSD’s given in Table2 for band 47 for the following V2X combination: V2X\_n1A-47A** **Table 2: Band 47 MSD for V2X\_n1A-47A**

|  |  |  |
| --- | --- | --- |
| BW(MHz) | 10 | 20 |
| MSD (dB) | 16.6 | 13.8 |

 |
| R4-2204171 | CATT | TP for 37.875, Correction on coexistence study of V2X\_3A\_n47A**Correct the fx\_high of Band 3.** |

## Open issues summary

Based on above contributions, the following sub-topics and issues are summarized.

### Sub-topic 1-1: MSD

**Issue 1-1-1: Band 47 MSD for V2X\_n1A\_47A**

* Proposals
	+ Option 1: Adopt the MSD’s given in below table for band 47 for V2X\_n1A-47A

|  |  |  |
| --- | --- | --- |
| BW(MHz) | 10 | 20 |
| MSD (dB) | 16.6 | 13.8 |

* + Option 2: Other option is not precluded.
* Recommended WF
	+ TBA

## Companies views’ collection for 1st round

### Open issues

**Issue 1-1-1: Band 47 MSD for V2X\_n1A\_47A**

|  |  |
| --- | --- |
| **Company** | **Comments** |
| Qualcomm | Option 1To Huawei: The MSD values approved in TP R4-2202155 were for V2X\_1A\_n47A and V2X\_n1A\_n47A. The sensitivity values for B47 are ~2 dB larger than for n47 and this is what leads to the different MSD values for V2X\_n1A\_47A. |
| Huawei | Based on the approved TP R4-2202155, MSD for V2X\_1A\_n47 and V2X\_n1A-n47 are different from the proposed MSD value for V2X\_n1A\_47. I’d like to know why they are different. We still prefer the values which we have agreed in last meeting. |
|  |  |

### 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** |
| R4-2203915(Draft CR for TS 38.101-1, Introduce new band combinations of V2X\_n1A-n47A) | Qualcomm: Typo in table 5.3E.2-1. Should be n1 not n39. |
| CATT: The CR will be updated. |
|  |
| R4-2203916(Draft CR for TS 38.101-3, Introduce new band combination of V2X\_n1A\_47A and V2X\_1A\_n47A) | Qualcomm: In table 6.5E.3.2.2-1 V2X\_1A\_n47A is missing protected band n77 |
| CATT: The CR will be updated. |
|  |
| R4-2203913(TP on coexistence study of V2X\_n1A-n47A, V2X\_1A\_n47A and V2X\_n1A\_47A) | CATT: Two typos in this TP. Will be updated.

| **Operating Band** | **Band n1** | **Band n47** |
| --- | --- | --- |
| **UE UL carriers** | **fx\_low** | **fx\_high** | **fy\_low** | **fy\_high** |
| UL frequency (MHz) | 1920 | 1980 | 5855 | 5925 |
| 2nd harmonics frequency limits | 2\*fx\_low | 2\*fx\_high | 2\* fy\_low | 2\* fy\_high |
| 2nd harmonics frequency limits (MHz)  | 3840 | 3960 | 11710 | 11850 |
| 3rd harmonics frequency limits | 3\*fx\_low | 3\*fx\_high | 3\* fy\_low | 3\* fy\_high |
| 3rd harmonics frequency limits (MHz) | 5760 | 5940 | 17565 | 17775 |
| Two tone 2nd order IMD products | |fy\_low – fx\_high| | |fy\_high – fx\_low| | |fy\_low + fx\_low| | |fy\_high + fx\_high| |
| IMD frequency limits (MHz) | 3875 | 4005 | 7775 | 7905 |
| Two-tone 3rd order IMD products | |2\*fx\_low – fy\_high| | |2\*fx\_high – fy\_low| | |2\*fy\_low – fx\_high| | |2\*fy\_high – fx\_low| |
| IMD frequency limits (MHz) | 2085 | 1895 | 9730 | 9930 |
| Two-tone 3rd order IMD products | |2\*fx\_low + fy\_low| | |2\*fx\_high + fy\_high| | |2\*fy\_low + fx\_low| | |2\*fy\_high + fx\_high| |
| IMD frequency limits (MHz) | 9695 | 9885 | 13630 | 13830 |
| Two-tone 4th order IMD products | |3\*fx\_low – fy\_high| | |3\*fx\_high – fy\_low| | |3\*fy\_low – fx\_high| | |3\*fy\_high – fx\_low| |
| IMD frequency limits (MHz) | 165 | 85 | 15585 | 15855 |
| Two-tone 4th order IMD products | |3\*fx\_low + fy\_low| | |3\*fx\_high + fy\_high| | |3\*fy\_low + fx\_low| | |3\*fy\_high + fx\_high| |
| IMD frequency limits (MHz) | 11615 | 11865 | 19485 | 19755 |
| Two-tone 4th order IMD products | |2\*fx\_low – 2\*fy\_high| | |2\*fx\_high – 2\*fy\_low| | |2\*fx\_low + 2\*fy\_low| | |2\*fx\_high + 2\*fy\_high| |
| IMD frequency limits (MHz) | 8010 | 7750 | 15550 | 15810 |
| Two-tone 5th order IMD products | |fx\_low – 4\*fy\_high|  | |fx\_high – 4\*fy\_low| | |fy\_low – 4\*fx\_high| | |fy\_high – 4\*fx\_low| |
| IMD frequency limits (MHz) | 21780 | 21440 | 2065 | 1755 |
| Two-tone 5th order IMD products | |fx\_low + 4\*fy\_low| | |fx\_high + 4\*fy\_high| | |fy\_low + 4\*fx\_low| | |fy\_high + 4\*fx\_high| |
| IMD frequency limits (MHz) | 25340 | 25680 | 13535 | 13845 |
| Two-tone 5th order IMD products | |2\*fx\_low – 3\*fy\_high| | |2\*fx\_high – 3\*fy\_low| | |2\*fy\_low – 3\*fx\_high| | |2\*fy\_high – 3\*fx\_low| |
| IMD frequency limits (MHz) | 13935 | 13815 | 5700 | 6090 |
| Two-tone 5th order IMD products | |2\*fx\_low + 3\*fy\_low| | |2\*fx\_high + 3\*fy\_high| | |2\*fy\_low + 3\*fx\_low| | |2\*fy\_high + 3\*fx\_high| |
| IMD frequency limits (MHz) | 21405 | 21735 | 17470 | 17790 |

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| R4-2203914(TP on coexistence study of V2X\_n8A-n47A, V2X\_8A\_n47A and V2X\_n8A\_47A) |  |
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|  |
| R4-2204014(Calculation of MSD for V2X\_n1A-47A and accompanying TP) | Qualcomm: support this TPTo CATT: Thank you for checking these values. In our opinion I believe both R4-2204014 and R4-2203913 contain mostly the same information once the typos are corrected. So, we think that the best way to proceed is to correct either document for round 2 and get agreement on the corrected version in this meeting. |
| CATT: Seven typos in this TP.To Qualcomm: Yes, these two TP should be revised for 2nd round discussion. To avoid duplicated work, it would be preferred to capture coexistence study in revised R4-2203913 and to capture MSD in revised R4-2204014.

| **Operating Band** | **Band n1** | **Band n47** |
| --- | --- | --- |
| **UE UL carriers** | **fx\_low** | **fx\_high** | **fy\_low** | **fy\_high** |
| UL frequency (MHz) | 1920 | 1980 | 5855 | 5925 |
| 2nd harmonics frequency limits | 2\*fx\_low | 2\*fx\_high | 2\* fy\_low | 2\* fy\_high |
| 2nd harmonics frequency limits (MHz)  | 3840 | 3860 | 11710 | 11850 |
| 3rd harmonics frequency limits | 3\*fx\_low | 3\*fx\_high | 3\* fy\_low | 3\* fy\_high |
| 3rd harmonics frequency limits (MHz) | 5760 | 5940 | 17565 | 17775 |
| Two tone 2nd order IMD products | |fy\_low – fx\_high| | |fy\_high – fx\_low| | |fy\_low + fx\_low| | |fy\_high + fx\_high| |
| IMD frequency limits (MHz) | 3875 | 4005 | 7775 | 7905 |
| Two-tone 3rd order IMD products | |2\*fx\_low – fy\_high| | |2\*fx\_high – fy\_low| | |2\*fy\_low – fx\_high| | |2\*fy\_high – fx\_low| |
| IMD frequency limits (MHz) | 2085 | 1895 | 9730 | 9930 |
| Two-tone 3rd order IMD products | |2\*fx\_low + fy\_low| | |2\*fx\_high + fy\_high| | |2\*fy\_low + fx\_low| | |2\*fy\_high + fx\_high| |
| IMD frequency limits (MHz) | 9695 | 9885 | 13630 | 13830 |
| Two-tone 4th order IMD products | |3\*fx\_low – fy\_high| | |3\*fx\_high – fy\_low| | |3\*fy\_low – fx\_high| | |3\*fy\_high – fx\_low| |
| IMD frequency limits (MHz) | 165 | 85 | 15585 | 15855 |
| Two-tone 4th order IMD products | |3\*fx\_low + fy\_low| | |3\*fx\_high + fy\_high| | |3\*fy\_low + fx\_low| | |3\*fy\_high + fx\_high| |
| IMD frequency limits (MHz) | 11615 | 11865 | 19485 | 19755 |
| Two-tone 4th order IMD products | |2\*fx\_low – 2\*fy\_high| | |2\*fx\_high – 2\*fy\_low| | |2\*fx\_low + 2\*fy\_low| | |2\*fx\_high + 2\*fy\_high| |
| IMD frequency limits (MHz) | 8010 | 7750 | 7750 | 8010 |
| Two-tone 5th order IMD products | |fx\_low – 4\*fy\_high|  | |fx\_high – 4\*fy\_low| | |fy\_low – 4\*fx\_high| | |fy\_high – 4\*fx\_low| |
| IMD frequency limits (MHz) | 21780 | 21440 | 2065 | 1755 |
| Two-tone 5th order IMD products | |fx\_low + 4\*fy\_low| | |fx\_high + 4\*fy\_high| | |fy\_low + 4\*fx\_low| | |fy\_high + 4\*fx\_high| |
| IMD frequency limits (MHz) | 25340 | 25680 | 13535 | 13845 |
| Two-tone 5th order IMD products | |2\*fx\_low – 3\*fy\_high| | |2\*fx\_high – 3\*fy\_low| | |2\*fy\_low – 3\*fx\_high| | |2\*fy\_high – 3\*fx\_low| |
| IMD frequency limits (MHz) | 13935 | 13605 | 5770 | 6090 |
| Two-tone 5th order IMD products | |2\*fx\_low + 3\*fy\_low| | |2\*fx\_high + 3\*fy\_high| | |2\*fy\_low + 3\*fx\_low| | |2\*fy\_high + 3\*fx\_high| |
| IMD frequency limits (MHz) | 21615 | 21525 | 17650 | 17610 |

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| R4-2204171(TP for 37.875, Correction on coexistence study of V2X\_3A\_n47A) |  |
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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#1** | *Tentative agreements:**Candidate options:**Recommendations for 2nd round:* |
| **Issue 1-1-1: Band 47 MSD for V2X\_n1A\_47A** | *Tentative agreements: NONE.**Candidate options:** + Option 1: Adopt the MSD’s given in below table for band 47 for V2X\_n1A-47A

|  |  |  |
| --- | --- | --- |
| BW(MHz) | 10 | 20 |
| MSD (dB) | 16.6 | 13.8 |

* + Option 2: Reuse the MSD value in the approved TP R4-2202155

*Recommendations for 2nd round:**Check if option 1 can be agreeable.* |
|  |  |

### 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”* |
| R4-2203915 | To be revised. |
| R4-2203916 | To be revised.  |
| R4-2203913 | To be revised. Capture the coexistence study expect for MSD. |
| R4-2203914 | To be approved. |
| R4-2204014 | To be revised. Remove the coexistence study and capture the MSD. |
| R4-2204171 | To be approved. |

## Discussion on 2nd round (if applicable)

## Companies views’ collection for 2st round

### Open issues

|  |  |
| --- | --- |
| **Company** | **Comments** |
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### CRs/TPs comments collection

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| --- | --- |
| **CR/TP number** | **Comments collection** |
|  |  |
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## Summary on 2nd round (if applicable)

*Moderator tries to summarize discussion status for 2nd round and provided recommendation on CRs/TPs/WFs/LSs Status update suggestion*

|  |  |
| --- | --- |
| **CR/TP/LS/WF number** | **T-doc Status update recommendation**  |
| XXX | *Based on 2nd round of comments collection, moderator can recommend the next steps such as “agreeable”, “to be revised”* |
|  |  |
|  |  |
|  |  |

# Recommendations for Tdocs

## 1st round

**New tdocs**

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

**Existing tdocs**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Tdoc number** | **Title** | **Source** | **Recommendation**  | **Comments** |
| R4-210xxxx | CR on … | XXX | Agreeable, Revised, Merged, Postponed, Not Pursued |  |
| R4-2203915 | Draft CR for TS 38.101-1, Introduce new band combinations of V2X\_n1A-n47A | CATT | To be revised. |  |
| R4-2203916 | Draft CR for TS 38.101-3, Introduce new band combination of V2X\_n1A\_47A and V2X\_1A\_n47A | CATT | To be revised.  |  |
| R4-2203913 | TP on coexistence study of V2X\_n1A-n47A, V2X\_1A\_n47A and V2X\_n1A\_47A | CATT | To be revised.  | Capture the coexistence study expect for MSD. |
| R4-2203914 | TP on coexistence study of V2X\_n8A-n47A, V2X\_8A\_n47A and V2X\_n8A\_47A | CATT | To be approved. |  |
| R4-2204014 | Calculation of MSD for V2X\_n1A-47A and accompanying TP | Qualcomm Incorporated | To be revised.  | Remove the coexistence study and capture the MSD. |
| R4-2204171 | TP for 37.875, Correction on coexistence study of V2X\_3A\_n47A | CATT | To be approved. |  |
| R4-2203917 | TR37.875, Band combinations of V2X con-current operation | CATT | For email approval |  |

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** | **Title** | **Source** | **Recommendation**  | **Comments** |
| R4-210xxxx | CR on … | XXX | Agreeable, Revised, Merged, Postponed, Not Pursued |  |
|  |  |  |  |  |
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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

# Annex

Contact information

|  |  |  |
| --- | --- | --- |
| **Company** | **Name** | **Email address** |
|  |  |  |

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)