**3GPP TSG-RAN WG4 Meeting # 101-e R4-211XXXX**

**Electronic Meeting, 1st – 12th November, 2021**

**Agenda item:** 9.6 Issues arising from basket WIs but not subject to block approval

**Source:** Dominique Brunel (Skyworks Solutions Inc.)

**Title:** Draft initial Email discussion summary for [101b-e][109] NR\_Baskets\_Part\_1

**Document for:** Information

# Introduction

Email discussion for contributions submitted under agenda item 5.7 “Issues arising from basket WIs but not subject to block approval” for UE RF and NR-U intra-band contiguous ULCA, and additional documents submitted to NR band related band combination baskets that require discussion.

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

* 1st round: Discussion and potential approval of CRs. Proposals for way forward.
* 2nd round: Finalization of CRs and way forwards.

Topics:

1. LB-LB cases
2. 3rd band MSD
3. CA\_n46-48-n96 and related fall backs
4. Other BC: fall-backs
5. Triple beat and NC ULCA IMD issues
6. NR-U contiguous UL CA
7. Low MSD for CA and DC
8. Documents moved from block approval (if applicable)

# Topic #1: LB-LB cases

## Companies’ contributions summary

|  |  |  |
| --- | --- | --- |
| **T-doc number** | **Company** | **Proposals / Observations** |
| [**R4-2204213**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_102-e/Docs/R4-2204213.zip)CA\_n18-n28 and DC\_18\_n28 LB\_LB\_MSD | Qualcomm Incorporated | CA\_n18-n28 MSD

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| UL band | DL band | 5MHz (dB) | 10MHz (dB) | 15MHz (dB) |
| n18 | n28 | [31.1] | [28.4] |  |

UL config

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| UL band | DL band | SCS of UL band (kHz) | 5 MHz | 10 MHz | 15 MHz |
| n18 | n28 | 15 | 25 | 25 |  |

DC\_18\_n28 MSD

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| UL band | DL band | 5MHz (dB) | 10MHz (dB) | 15MHz (dB) | 20MHz (dB) | 25MHz (dB) | 30 MHz (dB) |
| n18 | n28 | [31.1] | [28.4] | [26.6] | [23.9] |  | [12.0] |

UL config

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| UL band | DL band | SCS of UL band (kHz) | 5 MHz | 10 MHz | 15 MHz | 20 MHz | 25 MHz | 30 MHz |
| n18 | n28 | 15 | 25 | 25 | 25 | 25 |  | 25 |

 |
| [**R4-2206140**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_102-e/Docs/R4-2206140.zip)Corrections for CA\_n18-n28, DC\_18\_n18 MSD | Skyworks Solutions Inc. | **Proposal 1: For DC\_18\_n28, remove the n28 frequency range restriction to 703-733 MHz for the UL and 758-788 MHz in Table 5.5B.4.1-1.****Proposal 2: For CA\_n18-n28, adopt MSD specifications captured in Table 7.3A.6-1 and Table 7.3A.6-2.**Table 7.3A.6-1: Reference sensitivity exceptions (MSD)

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| UL band | DL band | 5MHz (dB) | 10MHz (dB) | 15MHz (dB) |
| n18 | n28 | 31.4 | 28.9 |  |

Table 7.3A.6.2: Uplink configuration

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| UL band | DL band | SCS of UL band (kHz) | 5 MHz | 10 MHz | 15 MHz |
| n18 | n28 | 15 | 25 | 25 |  |

**Proposal 3: For DC\_18\_n28, adopt MSD specifications captured in Table 7.3B.2.3.4-1 and Table 7.3B.2.3.4-2:**Table 7.3B.2.3.4-1: Reference sensitivity exceptions (MSD)

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| UL band | DL band | 5MHz (dB) | 10MHz (dB) | 15MHz (dB) | 20MHz (dB) | 25MHz (dB) | 30 MHz (dB) |
| 18 | n28 | 31.4 | 28.9 | 27.2 | 24.6 |  | 12.7 |

Table 7.3B.2.3.4-2: Uplink configuration for reference sensitivity exceptions due to cross band isolation for EN-DC in NR FR1

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| UL band | DL band | SCS of UL band (kHz) | 5 MHz**(LCRB)**  | 10 MHz**(LCRB)**  | 15 MHz**(LCRB)**  | 20 MHz**(LCRB)**  | 25 MHz**(LCRB)** | 30 MHz**(LCRB)**  |
| 18 | n28 | 15 | 25 | 25 | 25 | 25 |  | 25 |

 |
| [**R4-2204680**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_102-e/Docs/R4-2204680.zip)Draft Correction CR to R17 TS38.101-1 on MSD for CA\_n18-n28 | Samsung, KDDI, Skyworks Solutions Inc., Qualcomm | Moderator: CR to capture outcome of discussion of above two papers, comments on CR can be done directly in CR comment section, I suggest to merge input from MediaTek and add as co-author |
| [**R4-2204681**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_102-e/Docs/R4-2204681.zip)Draft Correction CR to R17 TS38.101-3 on MSD for DC\_18\_n28 | Samsung, KDDI, Skyworks Solutions Inc., Qualcomm | Moderator: CR to capture outcome of discussion of above two papers, comments on CR can be done directly in CR comment section |
| [**R4-2204480**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_102-e/Docs/R4-2204480.zip)Discussion on CA\_n18\_n28 | MediaTek Inc. | **proposes to add note 2 to restrict applicable spectrum for n28:**NOTE 2: The frequency range in band n28 is restricted for this band combination to 703-733 MHz for the UL and 758-788 MHz for the DL. The restriction also apply for any band combinations when CA\_n20-n28 is a subset of a higher order band combination. |
| [**R4-2204482**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_102-e/Docs/R4-2204482.zip)draft CR to 38101-1-h40 improve note for CA\_n18-n28 | MediaTek Inc. | Moderator: CR to capture proposed Note in R4-2204480, comments on CR can be done directly in CR comment section |
| [**R4-2206141**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_102-e/Docs/R4-2206141.zip)Corrections for CA\_n5-n28 MSD | Skyworks Solutions Inc. | **Proposal 1: For CA\_n5-n28, remove the n28 frequency range restriction to 703-733 MHz for the UL and 758-788 MHz for the DL in Table 5.2A.2.1-1.****Proposal 2: For CA\_n5-n28, adopt MSD specifications captured in Table 7.3A.6-1 and Table 7.3A.6-2.**Table 7.3A.6-1: Reference sensitivity exceptions (MSD) due to cross band isolation for NR CA FR1

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| UL band | DL band | 5MHz (dB) | 10MHz (dB) | 15MHz (dB) | 20MHz (dB) | 25MHz (dB) | 30 MHz (dB) |
| n5 | n28 | 17.5 | 15.8 | 14.0 | 11.7 |  | 2.9 |

Table 7.3A.6.2: Uplink configuration for reference sensitivity exceptions due to cross band isolation for NR CA FR1

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| UL band | DL band | SCS of UL band (kHz) | 5 MHz | 10 MHz | 15 MHz | 20 MHz | 25 MHz | 30 MHz |
| n5 | n28 | 15 | 20 | 20 | 20 | 20 |  | 20 |

 |
| [**R4-2206134**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_102-e/Docs/R4-2206134.zip)CR to R17 TS38.101-1 on MSD for CA\_n5-n28 | Skyworks Solutions Inc. | Moderator: CR to capture outcome of discussion of above two papers, comments on CR can be done directly in CR comment section |

## Open issues summary

### Sub-topic 1-1: CA and DC of band n18/18 and band n28

**Issue 1-1a: spectrum restriction for n28**

Proposals

* Skyworks: For DC\_18\_n28, remove the n28 frequency range restriction to 703-733 MHz for the UL and 758-788 MHz in Table 5.5B.4.1-1.
* MediaTek: The frequency range in band n28 is restricted for this band combination to 703-733 MHz for the UL and 758-788 MHz for the DL.

Recommended WF

* Needs to be discussed but based on available spectrum in Japan, not based on operator’s holding

**Issue 1-1b: CA\_n18-n28 MSD**

Proposals

* Both contributions are close for Qualcomm and Skyworks

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | UL band | DL band | 5MHz (dB) | 10MHz (dB) | 15MHz (dB) |
| Qualcomm | n18 | n28 | [31.1] | [28.4] |  |
| Skyworks | n18 | n28 | 31.4 | 28.9 |  |
| Average |  |  | 31.3 | 28.7 |  |

Recommended WF

* Use averaged value between Qualcomm and Skyworks

**Issue 1-1c: DC\_18\_n28 MSD**

Proposals

* Both contributions are close for Qualcomm and Skyworks

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | UL band | DL band | 5MHz (dB) | 10MHz (dB) | 15MHz (dB) | 20MHz (dB) | 25MHz (dB) | 30 MHz (dB) |
| Qualcomm | 18 | n28 | [31.1] | [28.4] | [26.6] | [23.9] |  | [12.0] |
| Skyworks | 18 | n28 | 31.4 | 28.9 | 27.2 | 24.6 |  | 12.7 |
| Average |  |  | 31.3 | 28.7 | 26.9 | 24.3 |  | 12.4 |

Recommended WF

* Use averaged value between Qualcomm and Skyworks

### Sub-topic 1-2: CA\_n5-n28

**Issue 1-2a: spectrum restriction for n28**

Proposals

* For CA\_n5-n28, remove the n28 frequency range restriction to 703-733 MHz for the UL and 758-788 MHz for the DL in Table 5.2A.2.1-1.

Recommended WF

* Since there is no difference in MSD for n28 full range this seems agreeable.

**Issue 1-2b: CA\_n5-n28 MSD**

Proposals

* Skyworks input

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| UL band | DL band | 5MHz (dB) | 10MHz (dB) | 15MHz (dB) | 20MHz (dB) | 25MHz (dB) | 30 MHz (dB) |
| n5 | n28 | 17.5 | 15.8 | 14.0 | 11.7 |  | 2.9 |

Recommended WF

* Unless there is disagreement by experts, MSD values are adopted

## Companies views’ collection for 1st round

### Open issues

Sub topic 1-1

|  |  |
| --- | --- |
| **Company** | **Comments** |
| KDDI | Issue 1-1a spectrum restriction for n28The operating frequency of n28 in Japan is the same as TS38.101-1, UL: 703-748MHz DL: 758-803MHz.Issue 1-1b CA\_n18-n28 MSDWe agree with recommended WF.Issue 1-1c DC\_18\_n28 MSDWe agree with recommended WF. |
| MediaTek | Issue 1-1a spectrum restriction for n28Our understanding is The Japan operators own n28 spectrum higher than 788MHz does not have n18 spectrum. We think the n28A only restriction is still valid.Issue 1-1b CA\_n18-n28 MSDNot sure if n28B filter rejection to n18 uplink can reach minimum 30~35dB. Need more time to check. We would like to hear more voice on filter rejection performance from UE/filter companies.Issue 1-1c DC\_18\_n28 MSD Same with issue 1-1b |
| Qualcomm | Issue 1-1a spectrum restriction for n28We had the same view as MediaTek but considering the RAN plenary agreement about available spectrum Vs operator holding, the worst-case MSD may need to be analyzed assuming operation in the upper block.  |

 Sub topic 1-2

|  |  |
| --- | --- |
| **Company** | **Comments** |
| XXX | Issue 1-2a spectrum restriction for n28Issue 1-2b CA\_n5-n28 MSD |
| XXX | Issue 1-2a spectrum restriction for n28Issue 1-2b CA\_n5-n28 MSD  |

### 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** |
| [**R4-2204680**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_102-e/Docs/R4-2204680.zip)Draft Correction CR to R17 TS38.101-1 on MSD for CA\_n18-n28 | Company A |
| Company B |
|  |
| [**R4-2204681**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_102-e/Docs/R4-2204681.zip)Draft Correction CR to R17 TS38.101-3 on MSD for DC\_18\_n28 | Company A |
| Company B |
|  |
| [**R4-2206134**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_102-e/Docs/R4-2206134.zip)CR to R17 TS38.101-1 on MSD for CA\_n5-n28 | Company A |
| Company B |
|  |
| [**R4-2204482**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_102-e/Docs/R4-2204482.zip)draft CR to 38101-1-h40 improve note for CA\_n18-n28 | Company A |
| Company B |
|  |

## Summary for 1st round

### Open issues

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

|  |  |
| --- | --- |
|  | **Status summary**  |
| **Sub-topic #1.1** | *Tentative agreements:**Candidate options:**Recommendations for 2nd round:* |
| **Sub-topic #1.2** | *Tentative agreements:**Candidate options:**Recommendations for 2nd round:* |

### CRs/TPs

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

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

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

## Discussion on 2nd round (if applicable)

## 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”* |

# Topic #2: 3rd band MSD

## Companies’ contributions summary

|  |  |  |
| --- | --- | --- |
| **T-doc number** | **Company** | **Proposals / Observations** |
| [**R4-2203623**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_102-e/Docs/R4-2203623.zip)Discussion on UE RF requirements for DC\_8-28\_n3 | VODAFONE Group Plc | This contribution is a draft text proposal for TR 37.717-21-11 to include DC\_8-28\_n3. Since this is a combination with two low bands and has an IMD2 issue, discussion is required to determine the appropriate UE RF requirements. |
| [**R4-2203624**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_102-e/Docs/R4-2203624.zip)Discussion on UE RF requirements for DC\_8-28\_n78 | VODAFONE Group Plc | This contribution is a draft text proposal for TR 37.717-21-11 to include DC\_8-28\_n78. Since this is a combination with two low bands and has both IMD4 and IMD5 issues, discussion is required to determine the appropriate UE RF requirements. |
| [**R4-2203625**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_102-e/Docs/R4-2203625.zip)Discussion on UE RF requirements for DC\_8-32\_n78 | VODAFONE Group Plc | This contribution is a draft text proposal for TR 37.717-21-11 to include DC\_8-32\_n78. Since this combination has an IMD3 hit in B32 as highlighted in section 5.x.4, input is needed on a suitable MSD test point. |
| [**R4-2203626**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_102-e/Docs/R4-2203626.zip)Discussion on UE RF requirements for DC\_20-28\_n78 | VODAFONE Group Plc | This contribution is a draft text proposal for TR 37.717-21-11 to include DC\_20-28\_n78. Since this is a combination with two low bands and has both IMD4 and IMD5 issues, discussion is required to determine the appropriate UE RF requirements. |
| [**R4-2203627**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_102-e/Docs/R4-2203627.zip)Discussion on UE RF requirements for DC\_20-38\_n8 | VODAFONE Group Plc | This contribution is a draft text proposal for TR 37.717-21-11 to include DC\_20-38\_n8. Since this is a combination with two low bands and has IMD3 issues, discussion is required to determine the appropriate UE RF requirements. |

## Open issues summary

### Sub-topic 2-1: DC\_8-28\_n3

**Issue 2-1: test point and MSD**

Proposals

* Test point required for IMD2 hit in band 28 for DC\_8\_n3 UL.

Recommended WF

* Experts to provide MSD test point and if possible MSD level

### Sub-topic 2-1: DC\_8-28\_n78

**Issue 2-1: test point and MSD**

Proposals

* Test points required for IMD5 with DC\_28\_n78 UL and IMD4 with DC\_8\_n78 UL.

Recommended WF

* Experts to provide MSD test point and if possible MSD level

### Sub-topic 2-1: DC\_8-32\_n78

**Issue 2-1: test point and MSD**

Proposals

* Test point required for band 32 IMD3 hit from DC\_8\_n78 UL.

Recommended WF

* Experts to provide MSD test point and if possible MSD level

### Sub-topic 2-1: DC\_20-28\_n78

**Issue 2-1: test point and MSD**

Proposals

* Test points required for band 28 IMD4 with DC\_20\_n78 UL and band 20 IMD5 with DC\_28\_n78 UL.

Recommended WF

* Experts to provide MSD test point and if possible MSD level

### Sub-topic 2-1: DC\_20-38\_n8

**Issue 2-1: test point and MSD**

Proposals

* MSD test points required for band 38 IMD3 hit due to DC\_20\_n8 UL and band 20 IMD3 hit due to DC\_38\_n8 UL.

Recommended WF

* Experts to provide MSD test point and if possible MSD level

## Companies views’ collection for 1st round

### Open issues

Sub topic 2-1 DC\_8-28\_n3

|  |  |
| --- | --- |
| **Company** | **Comments** |
| Qualcomm | Can use same MSD test point as DC\_8A\_n3A-n28A

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
|  | 8 | 912.5 | 5 | 25 | 957.5 | N/A | N/A |
|  | 3 | 1712.5 | 5 | 25 | 1807.5 | N/A | N/A |
|  | n28 | 745 | 5 | 25 | 800 | 30.4 | IMD2 |

 |
| XXX |  |

Sub topic 2-2 DC\_8-28\_n78

|  |  |
| --- | --- |
| **Company** | **Comments** |
| Qualcomm | Can use same IMD4 test point as DC\_8A\_n28A-n78A

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
|  | 8 | 910 | 5 | 25 | 955 | N/A | N/A |
|  | 28 | 710 | 5 | 25 | 765 | 11.6 | IMD4 |
|  | n78 | 3495 | 10 | 50 | 3495 | N/A | N/A |

Can use same IMD5 test point as DC\_28A\_n8A-n78A

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
|  | 28 | 713 | 5 | 25 | 768 | N/A | N/A |
|  | 8 | 890 | 5 | 25 | 935 | 4.3 | IMD5 |
|  | n78 | 3787 | 10 | 50 | 3787 | N/A | N/A |

 |
| XXX |  |

Sub topic 2-3 DC\_8-32\_n78

|  |  |
| --- | --- |
| **Company** | **Comments** |
| Qualcomm | Can use same IMD3 test point as DC\_8A-11A\_n78A

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
|  | 8 | 910 | 5 | 25 | 955 | N/A | N/A |
|  | n78 | 3311 | 10 | 50 | 3311 | N/A | N/A |
|  | 32 | N/A | 5 | 25 | 1491 | 18.8 | IMD3 |

 |
| XXX |  |

Sub topic 2-4 DC\_20-28\_n78

|  |  |
| --- | --- |
| **Company** | **Comments** |
| Qualcomm | Can use same IMD4 test point as DC\_20A\_n28A-n78A

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
|  | 20 | 837 | 5 | 25 | 796 | N/A | N/A |
|  | n78 | 3310 | 10 | 50 | 3310 | N/A | N/A |
|  | 28 | 744 | 5 | 25 | 799 | 9.4 | IMD4 |

Can use similar MSD IMD5 as DC\_28A\_n8A-n78A

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
|  | 28 | 713 | 5 | 25 | 768 | N/A | N/A |
|  | 20 | 847 | 5 | 25 | 806 | 4.3 | IMD5 |
|  | n78 | 3658 | 10 | 50 | 3658 | N/A | N/A |

 |
| XXX |  |

Sub topic 2-5 DC\_20-38\_n8

|  |  |
| --- | --- |
| **Company** | **Comments** |
| Qualcomm | Can use similar MSD IMD3 test points as DC\_7A-20A\_n8A

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
|  | 38 | 2575 | 5 | 25 | 2575 | N/A | N/A |
|  | n8 | 885 | 5 | 25 | 930 | N/A | N/A |
|  | 20 | 846 | 5 | 25 | 805 | 17.4 | IMD3 |
|  | 38 | 2580 | 5 | 25 | 2580 | 21.1 | IMD3 |
|  | n8 | 900 | 5 | 25 | 945 | N/A | N/A |
|  | 20 | 840 | 5 | 25 | 799 | N/A | N/A |
|  | 38 | 2624 | 5 | 25 | 2624 | 18.8 | IMD3 |
|  | n8 | 910 | 5 | 25 | 955 | N/A | N/A |
|  | 20 | 857 | 5 | 25 | 816 | N/A | N/A |

 |
| XXX |  |

### 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** |
| [**R4-2203623**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_102-e/Docs/R4-2203623.zip)Discussion on UE RF requirements for DC\_8-28\_n3 | Company A |
| Company B |
|  |
| [**R4-2203624**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_102-e/Docs/R4-2203624.zip)Discussion on UE RF requirements for DC\_8-28\_n78 | Company A |
| Company B |
|  |
| [**R4-2203625**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_102-e/Docs/R4-2203625.zip)Discussion on UE RF requirements for DC\_8-32\_n78 | Company A |
| Company B |
|  |
| [**R4-2203626**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_102-e/Docs/R4-2203626.zip)Discussion on UE RF requirements for DC\_20-28\_n78 | Company A |
| Company B |
|  |
| [**R4-2203627**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_102-e/Docs/R4-2203627.zip)Discussion on UE RF requirements for DC\_20-38\_n8 | Company A |
| Company B |
|  |

## Summary for 1st round

### Open issues

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

|  |  |
| --- | --- |
|  | **Status summary**  |
| **Sub-topic #2.1** | *Tentative agreements:**Candidate options:**Recommendations for 2nd round:* |
| **Sub-topic #2.2** | *Tentative agreements:**Candidate options:**Recommendations for 2nd round:* |

### CRs/TPs

*Moderator tries to summarize discussion status for 1st round and 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)

## 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”* |

# Topic #3: CA\_n46-48-n96 and related fall backs

## Companies’ contributions summary

|  |  |  |
| --- | --- | --- |
| **T-doc number** | **Company** | **Proposals / Observations** |
| [**R4-2204214**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_102-e/Docs/R4-2204214.zip)CA\_n46-n48-n96\_Async\_MSD | Qualcomm Incorporated | Proposal 1: Define exclusion region for n48 2nd harmonic as shown in Tables 2.1-2 using the existing specification framework**Table 2.1-2: NR-U reference sensitivity measurement exclusion region in MHz.**

|  |
| --- |
| **NR Band / Harmonic order / Channel BW in UL** |
| **Band** | **Harmonic order** | **5MHz** | **10MHz** | **15MHz** | **20 MHz** | **40MHz** |
| n48 | 2 | +/- 10 | +/- 20 | +/- 30 | +/- 40 | +/- 80 |

**Proposal 2**: Use harmonic mixing MSD for CA\_n48-n96 fallback combination of CA\_n46-n48-n96 as shown in Tables 2.2-1 and 2.2-2. **Table 2.2-1: Reference sensitivity exceptions due to harmonic mixing for CA in NR FR1**

|  |
| --- |
| **NR Band / Channel bandwidth of the affected DL band (MHz) / MSD (dB)** |
| **UL band** | **DL band** | **5**  | **10** | **15** | **20** | **25** | **30** | **40** | **50** | **60** | **70** | **80** | **90** | **100** |
| n96 | n482 | 5.8 | 3.7 | 2.7 | 2.2 |  | 1.6 | 1.2 | 1.0 | 0.8 | 0.7 | 0.6 | 0.6 | 0.5 |

**Table 2.2-2: Reference sensitivity exceptions due to harmonic mixing for CA in NR FR1**

| **Operating band / SCS / Channel bandwidth / Duplex-mode** |
| --- |
| **Operating Band** | **SCS**  | **5** | **10** | **15** | **20** |  | **30** | **40** | **50** | **60** | **70** | **80** | **90** | **100** | **Duplex**  |
| n96 | 15 | 25 | 50 | 75 | 100 |  | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | TDD |

**Proposal 3**: Use cross band MSD for fallback combinations of CA\_n46-n48-n96 as shown in Tables 2.3-1 and 2.3-2 and revisit the existing crossband noise between the fallback combination of CA\_n46-n48.**Table 2.3-1: MSD due to cross band isolation**

|  |
| --- |
| **Operating Band / Channel bandwidth of the affected DL band** |
| **CA Configuration** | **UL band** | **DL band** | **5** | **10** | **15** | **20** | **25** | **30** | **40** | **50** | **60** | **80** | **90** | **100** |
| CA\_n46A-n48A | n46 | n48 | 13.3 | 13.3 | 11.8 | 10.7 | - | 9.4 | 8.5 | 7.9 | 7.3 | 7.0 | 6.4 | 6.2 |
|  | n48 | n46 | - | - | - | 15.7 | - | - | 15.7 | - | 15.7 | 15.7 | - | - |
| CA\_n48A-n96A | n96 | n48 | 4.3 | 4.1 | 4.0 | 3.9 |  | 3.9 | 3.9 | 3.9 | 3.8 | 3.8 | 3.8 | 3.8 |
|  | n48 | n96 |  |  |  | 5.8 |  |  | 5.6 |  | 5.5 | 5.5 |  |  |

**Table 2.3-2: Uplink configuration for reference sensitivity exceptions due to cross band isolation**

|  |
| --- |
| **Operating Band / SCS / Channel bandwidth of the affected DL band** |
| **UL**  | **DL** | **SCS** | **5** | **10** | **15** | **20** | **25** | **30** | **40** | **50** | **60** | **80** | **90** | **100** |
| n46 | n48 | 30 | 216 | 216 | 216 | 216 |  |  | 216 | 216 | 216 | 216 | 216 | 216 |
| n48 | n46 | 15 |  |  |  | 216 |  |  | 216 |  | 216 | 216 |  |  |
| n96 | n48 | 30 | 216 | 216 | 216 | 216 |  | 216 | 216 | 216 | 216 | 216 | 216 | 216 |
| n48 | n96 | 15 |  |  |  | 216 |  |  | 216 |  | 216 | 216 |  |  |

 |
| [**R4-2204090**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_102-e/Docs/R4-2204090.zip)On simultaneous Tx/Rx for constituents of CA\_n46-n48-n96 | Skyworks Solutions Inc. | **Proposal for CA\_n46-n96: co-banding of n46 and n96 should be the baseline assumption and results of only supporting non-simultaneous Tx/Rx. As such, the TP introducing CA\_n46-n96 should not include any MSD and should have the first table with following notes:*** **NOTE 9: Only applicable for UE supporting inter-band carrier aggregation without simultaneous Rx/Tx. (from 38.101-1 table 5.2A.2.1-1)**
* **NOTE XX: The minimum requirements for inter-band CA apply when the maximum power spectral density imbalance between downlink carriers is within 6 dB. The power spectral density imbalance condition also applies for these carriers when applicable CA configuration is a subset of a higher order CA configuration. (derived from 38.101-3 Table 5.5B.4.1-1 Note 11 for co-banding)**
* **NOTE YY: The combination is not used alone as fall back mode of other band combinations in which UL in Band n48 is not used. (derived from 38.101-3 Table 5.5B.4.1-1 Note 9 for UL configuration).**

**Proposal for CA\_n46-n48:** * **Simultaneous Tx/Rx is supported**
* **Cross band MSD for n48 UL in n46 and cross band MSD of n46 UL in n48 are specified.**

**Proposal for CA\_n48-n96:** * **Simultaneous Tx/Rx is supported**
* **Harmonic MSD of 2xn48 UL in n96 is specified**
* **Harmonic mixing of 2xn48DL = n96 UL is specified**
* **Cross band MSD for n48 UL in n96 and cross band MSD of n96 UL in n48 are specified if necessary.**
 |
| [**R4-2203538**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_102-e/Docs/R4-2203538.zip)TP to TR 38.717.02-01 for CA\_n46-n96 | Charter Communications, Inc | Moderator: TR to capture outcome of discussion of above two papers, comments on CR can be done directly in CR/TP comment section |
| [**R4-2205669**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_102-e/Docs/R4-2205669.zip)TP to TR 38.717.02-01 for CA\_n48-n96 and DC\_n48-n96 | Charter Communications, Inc | Moderator: TR to capture outcome of discussion of above two papers, comments on CR can be done directly in CR/TP comment section |
| [**R4-2203539**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_102-e/Docs/R4-2203539.zip)TP to TR TR38.717-03-01 for CA\_n46-n48-n96 | Charter Communications, Inc | Moderator: TR to capture outcome of discussion of above two papers, comments on CR can be done directly in CR/TP comment section |
| [**R4-2203540**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_102-e/Docs/R4-2203540.zip)TP to TR 38.717.03-02 for CA\_n46-n48--n96 | Charter Communications, Inc | Moderator: TR to capture outcome of discussion of above two papers, comments on CR can be done directly in CR/TP comment section |

## Open issues summary

### Sub-topic 3-1: CA\_n46-n96

**Issue 3-1: Non-simultaneous Tx/RX, Co-banding**

Proposals

* BC does not exist as stand-alone fallback
* Non simultaneous Tx/Rx is assumed, no MSD
* Co-banding assumptions.

Recommended WF

* Agree non simultaneous Tx/Rx and co-banding assumptions and discuss Notes and TP directly

### Sub-topic 3-2: CA\_n46-n48

**Issue 3-2: Simultaneous Tx/Rx, cross band MSD**

Proposals

* Simultaneous Tx/Rx is supported
* Cross band MSD for n48 UL in n46 and cross band MSD of n46 UL in n48 are specified.
* Cross band MSD

|  |
| --- |
| **Operating Band / Channel bandwidth of the affected DL band** |
| **CA Configuration** | **UL band** | **DL band** | **5** | **10** | **15** | **20** | **25** | **30** | **40** | **50** | **60** | **80** | **90** | **100** |
| CA\_n46A-n48A | n46 | n48 | 13.3 | 13.3 | 11.8 | 10.7 | - | 9.4 | 8.5 | 7.9 | 7.3 | 7.0 | 6.4 | 6.2 |
|  | n48 | n46 | - | - | - | 15.7 | - | - | 15.7 | - | 15.7 | 15.7 | - | - |

Recommended WF

* Agree Simultaneous Tx/Rx assumptions and cross band MSD

### Sub-topic 3-3: CA\_n48-n96

**Issue 3-3: Simultaneous Tx/Rx, Harmonic and Harmonic mixing, cross band MSD**

Proposals

* Simultaneous Tx/Rx is supported
* Harmonic MSD of 2xn48 UL in n96 is specified

|  |
| --- |
| **NR Band / Harmonic order / Channel BW in UL** |
| **Band** | **Harmonic order** | **5MHz** | **10MHz** | **15MHz** | **20 MHz** | **40MHz** |
| n48 | 2 | +/- 10 | +/- 20 | +/- 30 | +/- 40 | +/- 80 |

* Harmonic mixing of 2xn48DL = n96 UL is specified

|  |
| --- |
| **NR Band / Channel bandwidth of the affected DL band (MHz) / MSD (dB)** |
| **UL band** | **DL band** | **5**  | **10** | **15** | **20** | **25** | **30** | **40** | **50** | **60** | **70** | **80** | **90** | **100** |
| n96 | n482 | 5.8 | 3.7 | 2.7 | 2.2 |  | 1.6 | 1.2 | 1.0 | 0.8 | 0.7 | 0.6 | 0.6 | 0.5 |

* Cross band MSD for n48 UL in n96 and cross band MSD of n96 UL in n48 are specified if necessary.

|  |
| --- |
| **Operating Band / Channel bandwidth of the affected DL band** |
| **CA Configuration** | **UL band** | **DL band** | **5** | **10** | **15** | **20** | **25** | **30** | **40** | **50** | **60** | **80** | **90** | **100** |
| CA\_n48A-n96A | n96 | n48 | 4.3 | 4.1 | 4.0 | 3.9 |  | 3.9 | 3.9 | 3.9 | 3.8 | 3.8 | 3.8 | 3.8 |
|  | n48 | n96 |  |  |  | 5.8 |  |  | 5.6 |  | 5.5 | 5.5 |  |  |

Recommended WF

* Agree Simultaneous Tx/Rx assumptions H2 exception and harmonic + cross band MSD

## Companies views’ collection for 1st round

### Open issues

Sub topic 3-1 CA\_n46-n96

|  |  |
| --- | --- |
| **Company** | **Comments** |
| Charter Communications Inc. | Agree with the recommended WF; non simultaneous Tx/Rx and co-banding assumptions and discuss Notes and TP directly |
| MediaTek | Agree with recommended WF |
| ZTE | Agree with recommended WF, Co-banding assumptions is ok due to no gap between the two bands. |

 Sub topic 3-2 CA\_n46-n48

|  |  |
| --- | --- |
| **Company** | **Comments** |
| Charter Communications Inc. | Agree with recommended WF; Simultaneous Tx/Rx assumptions and cross band MSD |
| MediaTek | Agree with recommended WF |

Sub topic 3-3 CA\_n48-n96

|  |  |
| --- | --- |
| **Company** | **Comments** |
| Charter Communications Inc. | Agree with recommended WF; Simultaneous Tx/Rx assumptions H2 exception and harmonic + cross band MSD |
| MediaTek | Considering share path design on n46 and n96, we propose same values for MSD due to cross band isolation as CA\_n46-n48:

|  |
| --- |
| **Operating Band / Channel bandwidth of the affected DL band** |
| **CA Configuration** | **UL band** | **DL band** | **5** | **10** | **15** | **20** | **25** | **30** | **40** | **50** | **60** | **80** | **90** | **100** |
| CA\_n48A-n96A | n96 | n48 | 13.3 | 13.3 | 11.8 | 10.7 | - | 9.4 | 8.5 | 7.9 | 7.3 | 7.0 | 6.4 | 6.2 |
|  | n48 | n96 | - | - | - | 15.7 | - | - | 15.7 | - | 15.7 | 15.7 | - | - |

We are fine with other MSD mechanism proposals |

### 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** |
| [**R4-2203538**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_102-e/Docs/R4-2203538.zip)TP to TR 38.717.02-01 for CA\_n46-n96 | Charter Communications Inc. A revision of R4-2203538 has been uploaded for review supporting the agreement in 3-1 |
|  Skyworks: based on draft revision review: sections 7XXX should not be part of this TP but in revision of 5669 |
| ZTE: For NOTE X, would it better to modify a bit:NOTE X:   Simultaneous Rx/Tx capability does not apply for UEs supporting CA\_n46-n96. Same restrictions are applied when applicable NR CA configuration is part of a ~~to related~~ higher order configurationsIn addition, similar with Skyworks, no need to include section 7.3G.5.X in this TP |
| Charter Communications Inc. A second revision has been uploaded with the changes identified by Skyworks and ZTE |
| [**R4-2205669**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_102-e/Docs/R4-2205669.zip)TP to TR 38.717.02-01 for CA\_n48-n96 and DC\_n48-n96 | Charter Communications Inc. A revision of R4-2205669 has been uploaded for review supporting the agreement in 3-2 and 3.3 |
| Skyworks: based on draft revision review: harmonic 2 exception of n48 in n96 missing. Harmonic mixing n48 H2 = n96 missing . there is still text saying non-simultaneous Tx/Rx for CA\_n48-n96. There are CA\_n46-n48 related cross band in CA\_n48-n96 section. There is need for a specific CA\_n46-n48 section to update cross band based on simultaneous Tx/Rx |
| MediaTek: Considering share path design on n46 and n96, we propose same values for MSD due to cross band isolation as CA\_n46-n48:

|  |
| --- |
| **Operating Band / Channel bandwidth of the affected DL band** |
| **CA Configuration** | **UL band** | **DL band** | **5** | **10** | **15** | **20** | **25** | **30** | **40** | **50** | **60** | **80** | **90** | **100** |
| CA\_n48A-n96A | n96 | n48 | 13.3 | 13.3 | 11.8 | 10.7 | - | 9.4 | 8.5 | 7.9 | 7.3 | 7.0 | 6.4 | 6.2 |
|  | n48 | n96 | - | - | - | 15.7 | - | - | 15.7 | - | 15.7 | 15.7 | - | - |

 |
| ZTE: This sentence is not correct:There are no harmonic or IMD overlaps as a result of non-simultaneous Tx/Rx.In terms of the issue 3-3, Simultaneous Tx/Rx is supported. A note should be added in table 6.X.1.1-1, like you did in 2203538.For the cross band isolation MSD tables in section 7.3G.5.X, it should be remove to section 6.X.1.5. |
| Charter Communications Inc. A second revision has been uploaded with the changes identified by Skyworks and ZTE |
| [**R4-2203539**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_102-e/Docs/R4-2203539.zip)TP to TR TR38.717-03-01 for CA\_n46-n48-n96 | Charter Communications Inc. A revision of R4-2203539 has been uploaded for review supporting Qualcomm’s proposal 3 of R4-2204214 |
| Skyworks: based on draft revision review: there is no need for harmonic coex in 3band case. same for cross band: they should be in the 2 band fallback |
| ZTE: Similar with skyworks, no need to include cross band isolation for 1UL/3DL, it was already included in the 2DL fallback. |
| Charter Communications Inc. A second revision has been uploaded with the changes identified by Skyworks and ZTE |
| [**R4-2203540**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_102-e/Docs/R4-2203540.zip)TP to TR 38.717.03-02 for CA\_n46-n48--n96 | Charter Communications Inc. A revision of R4-2203540 has been uploaded for review supporting Qualcomm’s proposal 3 of R4-2204214 |
| Skyworks: based on draft revision review: there is an added “-“ in the band combination in titles. Contiguous ULCA is not finalized for NR-U so UL configurations with n96B shall be removed. Text says “Based on above table, there is no harmonic interference.” In an IMD analysis section. No need for cross band: they should be in the 2 band fallback |
| ZTE: Please remove section 7.3G.5.X. In 2UL/3DL TR, only IMD MSD should be checked.  |
| Charter Communications Inc. A second revision has been uploaded with the changes identified by Skyworks and ZTE |

## Summary for 1st round

### Open issues

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

|  |  |
| --- | --- |
|  | ***Status summary***  |
| **Sub-topic #3.1** | *Tentative agreements:**Candidate options:**Recommendations for 2nd round:* |
| **Sub-topic #3.2** | *Tentative agreements:**Candidate options:**Recommendations for 2nd round:* |

### 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)

## 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”* |

# Topic #4: Other BC: fall-backs

## Companies’ contributions summary

|  |  |  |
| --- | --- | --- |
| **T-doc number** | **Company** | **Proposals / Observations** |
| [**R4-2203709**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_102-e/Docs/R4-2203709.zip)Issue of many missing fallbacks in 38.101 specifications | Apple | **Proposal 1**: RAN4 should add the missing fallbacks that don’t need extra specification work with a CR.**Proposal 2**: RAN4 should generate a list of missing fallbacks that cannot be added with a CR. These fallbacks need to be added to the band combination request sheet for the usual processing with the **Proposal 3**: After completing the steps in the proposals above, the higher order parent combinations of these still missing fallbacks will be removed from the 38.101-x specifications.Moderator: have a look to the attached tables of missing fallbacks |
| [**R4-2204216**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_102-e/Docs/R4-2204216.zip)DC\_2\_n25\_Fallback\_MSD | Qualcomm Incorporated | **Proposal 1**: If treating DC\_2\_n25 with UL only in n25 like intra-band DC\_25\_n25 with n25 UL only, then use **ΔRIBNC** as shown in Table 2.1-2. Use test points same as LTE CA\_25A-25A and not include 3rd order effect.

| **DC configuration** | **Aggregated bandwidth** | **Wgap / (MHz)** | **UL NR allocation****(LCRB)** | **ΔRIBNC (dB)** | **Duplex mode** |
| --- | --- | --- | --- | --- | --- |
|  | **NR** | **E-UTRA** |  |  |  |  |
| DC\_25A\_n25A | 5MHz | 5MHz | 30.0 < Wgap ≤ 55.0 | 101 | 5.0 | FDD |
|  |  |  | 0.0 < Wgap ≤ 30.0 | 251 | 0 |  |
|  | 5MHz | 10MHz | 25.0 < Wgap ≤ 50.0 | 101 | 4.5 |  |
|  |  |  | 0.0 < Wgap ≤ 25.0 | 251 | 0 |  |
|  | 5MHz | 15MHz | 20.0 < Wgap ≤ 45.0 | 101 | 4.3 |  |
|  |  |  | 0.0 < Wgap ≤ 20.0 | 251 | 0 |  |
|  | 5MHz | 20MHz | 15.0 < Wgap ≤ 40.0 | 101 | 4.1 |  |
|  |  |  | 0.0 < Wgap ≤ 15.0 | 251 | 0 |  |
|  | 10MHz | 5MHz | 15.0 < Wgap ≤ 50.0 | 10 (RBstart = 33) | 5.5 |  |
|  |  |  | 0.0 < Wgap ≤ 15.0 | 321 | 0 |  |
|  | 10MHz | 10MHz | 10.0 < Wgap ≤ 45.0 | 10 (RBstart = 33) | 5.0 |  |
|  |  |  | 0.0 < Wgap ≤ 10.0 | 321 | 0 |  |
|  | 10MHz | 15MHz | 5.0 < Wgap ≤ 40.0 | 10 (RBstart = 33) | 4.5 |  |
|  |  |  | 0.0 < Wgap ≤ 5.0 | 321 | 0 |  |
|  | 10MHz | 20MHz | 0.0 < Wgap ≤ 35.0 | 10 (RBstart = 33) | 4.2 |  |
|  | 15MHz | 5MHz | 10.0 < Wgap ≤ 45.0 | 10 (RBstart = 44) | 7.6 |  |
|  |  |  | 0.0 < Wgap ≤ 10.0 | 321 | 0 |  |
|  | 15MHz | 10MHz | 5.0 < Wgap ≤ 40.0 | 10 (RBstart = 44) | 6.7 |  |
|  |  |  | 0.0 < Wgap ≤ 5.0 | 321 | 0 |  |
|  | 15MHz | 15MHz | 0.0 < Wgap ≤ 35.0 | 10 (RBstart = 44) | 5.6 |  |
|  | 15MHz | 20MHz | 0.0 < Wgap ≤ 30.0 | 10 (RBstart = 44) | 4.8 |  |
|  | 20MHz | 5MHz | 0.0 < Wgap ≤ 40.0 | 12 (RBstart = 62) | 8.0 |  |
|  | 20MHz | 10MHz | 0.0 < Wgap ≤ 35.0 | 12 (RBstart = 62) | 6.7 |  |
|  | 20MHz | 15MHz | 0.0 < Wgap ≤ 30.0 | 12 (RBstart = 62) | 6.1 |  |
|  | 20MHz | 20MHz | 0.0 < Wgap ≤ 25.0 | 12 (RBstart = 62) | 5.7 |  |

**Proposal 2**: If treating DC\_2\_n25 like inter-band ENDC combination with only n25 as uplink, then use MSD as shown in Table 2.2-1 and Tab le 2.2-2 to include 3rd order effect. Requirements are only required to be met with DL frames aligned within 3usec and PSD difference between carriers is 6dB.**Table 2.2-1: Reference sensitivity exceptions (MSD) due to cross band isolation for PC3 EN-DC in NR FR1**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **UL band** | **DL band** | **5 MHz****(dB)** | **10 MHz****(dB)** | **15 MHz****(dB)** | **20 MHz****(dB)** |
| n25 | 2 | 33 | 33 | 33 | 33 |

**Table 2.2-1: UL configuration for reference sensitivity exceptions due to cross band isolation for EN-DC in NR FR1**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **UL band** | **DL band** | **SCS of UL band (kHz)** | **5 MHz****(LCRB)** | **10 MHz****(LCRB)** | **15 MHz****(LCRB)** | **20 MHz****(LCRB)** |
| n25 | 2 | 15 | 40 | 40 | 40 | 40 |

 |
| [**R4-2205701**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_102-e/Docs/R4-2205701.zip)TP for TR 37.717-11-11 to include DC\_2\_n25 | Ericsson, Bell Mobility | Moderator: TP to capture outcome of discussion on DC\_2\_n25 MSD, comments on CR can be done directly in CR comment section |
| [**R4-2205702**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_102-e/Docs/R4-2205702.zip)TP for TR 37.717-21-11 to include DC\_2-7\_n25 | Ericsson, Bell Mobility | Moderator: only pending DC\_2\_n25, review TP directly |
| [**R4-2205703**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_102-e/Docs/R4-2205703.zip)TP for TR 37.717-31-11 to include DC\_2-7-66\_n25 | Ericsson, Bell Mobility | Moderator: only pending DC\_2\_n25, review TP directly |
| [**R4-2205704**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_102-e/Docs/R4-2205704.zip)TP for TR 37.717-31-11 to include DC\_2-7-13\_n25 | Ericsson, Bell Mobility | Moderator: only pending DC\_2\_n25, review TP directly |

## Open issues summary

### Sub-topic 4-1: Mising fallbacks

**Issue 4-1:**

Proposals

* RAN4 should add the missing fallbacks that don’t need extra specification work with a CR.
* RAN4 should generate a list of missing fallbacks that cannot be added with a CR. These fallbacks need to be added to the band combination request sheet for the usual processing with the
* After completing the steps in the proposals above, the higher order parent combinations of these still missing fallbacks will be removed from the 38.101-x specifications..

Recommended WF

* Discuss proposals and check the lists, ideally fallbacks without additional spec should be added with CR in this meeting
* Moderator: may be proponent can propose the two lists corresponding to the first two bullets

### Sub-topic 4-2: DC\_2\_n25

**Issue 4-2:**

Proposals

* Proposal 1: If treating DC\_2\_n25 with UL only in n25 like intra-band DC\_25\_n25 with n25 UL only, then use ΔRIBNC as shown in Table 2.1-2. Use test points same as LTE CA\_25A-25A and not include 3rd order effect.Cross band MSD for n48 UL in n46 and cross band MSD of n46 UL in n48 are specified.
* Proposal 2: If treating DC\_2\_n25 like inter-band ENDC combination with only n25 as uplink, then use MSD as shown in Table 2.2-1 and Tab le 2.2-2 to include 3rd order effect. Requirements are only required to be met with DL frames aligned within 3usec and PSD difference between carriers is 6dB.

Recommended WF

* Discuss approaches and MSD

## Companies views’ collection for 1st round

### Open issues

Sub topic 4-1 Missing fallbacks

|  |  |
| --- | --- |
| **Company** | **Comments** |
| Nokia | Agree with proposals. hopefully proposal 3 is not needed and no combinations needs to be removed. CR for combinations that can be added without technical work would be good to get approved in this meeting, |
| SoftBank | Thanks Apple for the big efforts. We have the same view of Nokia.  |

 Sub topic 4-2 DC\_2\_n25

|  |  |
| --- | --- |
| **Company** | **Comments** |
| XXX |  |
| XXX |  |

### 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** |
| [**R4-2205701**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_102-e/Docs/R4-2205701.zip)TP for TR 37.717-11-11 to include DC\_2\_n25 | Company A |
| Company B |
|  |
| [**R4-2205702**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_102-e/Docs/R4-2205702.zip)TP for TR 37.717-21-11 to include DC\_2-7\_n25 | Company A |
| Company B |
|  |
| [**R4-2205703**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_102-e/Docs/R4-2205703.zip)TP for TR 37.717-31-11 to include DC\_2-7-66\_n25 | Company A |
| Company B |
|  |
| [**R4-2205704**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_102-e/Docs/R4-2205704.zip)TP for TR 37.717-31-11 to include DC\_2-7-13\_n25 | Company A |
| Company B |
|  |

## Summary for 1st round

### Open issues

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

|  |  |
| --- | --- |
|  | ***Status summary***  |
| **Sub-topic #4.1** | *Tentative agreements:**Candidate options:**Recommendations for 2nd round:* |
| **Sub-topic #4.2** | *Tentative agreements:**Candidate options:**Recommendations for 2nd round:* |

### CRs/TPs

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

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

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

## Discussion on 2nd round (if applicable)

## 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”* |

# Topic #5: Triple beat and NC ULCA IMD issues

## Companies’ contributions summary

|  |  |  |
| --- | --- | --- |
| **T-doc number** | **Company** | **Proposals / Observations** |
| [**R4-2204217**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_102-e/Docs/R4-2204217.zip)Triple\_Beat\_MSD\_update | Qualcomm Incorporated | **Proposal 1:** Based on observation 1, ignore 2nd order triple beat for 3\_n41C, 25\_n41C, and 8\_n79C.**Proposal 2:** Use the worst-case power back off to calculate the triple beat MSD which implies a high-quality filter. The power back-off level per ULCC carrier will be 10\*log10(3) = 4.78dB backoff per carrier without violating power class.**Proposal 3:** Use updated triple beat MSD per Table 2.5-1:**Table 2.5-1**: Triple beat MSD

|  |
| --- |
| **NR or E-UTRA Band / Channel bandwidth / NRB / MSD** |
| **EN-DC****Configuration** | **EUTRA or NR band** | **UL Fc (MHz)** | **UL/DL** **BW (MHz)** | **UL LCRB** | **DL Fc** **(MHz)** | **MSD (dB)** | **Duplex mode** | **Triple beat order** |
| DC\_3A-n41C | 3 | 1782.5 | 5 | 25 | 1877.5 | [13.4] | FDD | 1 |
| n41C | 25552635 | [80][80] | [1 (RBstart=88)][1 (RBstart=128)] | 25552635 | N/A | TDD | N/A |
| DC\_25A-n41C | 25 | 1912.5 | 5 | 25 | 1992.5 | [18.0] | FDD | 1 |
| n41C | 25452595 | 90100 | 1 (RBstart=150)1 (RBstart=122) | 25452595 | N/A | TDD | N/A |
| DC\_8A-n79C | 8 | 912.5 | 5 | 25 | 957.5 | [0] | FDD | 1 |
| n79C | 45454645 | 100100 | 1 (RBstart=212)1 (RBstart=60) | 45454645 | N/A | TDD | N/A |

 |
| [R4-2204483](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_102-e/Docs/R4-2204483.zip)draft CR to 38101-1-h40 missing MSD for CA\_n5-n77(2A) | MediaTek Inc. | Table 7.3A.5-1: 2DL/2UL interband Reference sensitivity QPSK PREFSENS and uplink/downlink configurations for PC3 CA

|  |  |
| --- | --- |
| Band / Channel bandwidth / NRB / Duplex mode | Source of IMD |
| NR CA band combination | NR band | UL Fc (MHz) | UL/DL BW (MHz) | UL CLRB | DL Fc (MHz) | MSD (dB) | Duplex mode |  |
| CA\_n5-n77 | 5 | N/A | 5 | 25 | 880 | 27 | FDD | IMD2 |
| n77 | 33104190 | 10 | 50 | 33104190 | N/A | TDD | N/A |

 |

## Open issues summary

### Sub-topic 5-1: Triple beat order

**Issue 5-1:**

Proposals

* Proposal 1: Based on observation 1, ignore 2nd order triple beat for 3\_n41C, 25\_n41C, and 8\_n79C.

Recommended WF

* Discuss proposal
* Moderator: should we only look into 1st order triple beat only? (and remove order from table?)

### Sub-topic 5-2: back off for Triple beat

**Issue 5-2:**

Proposals

* Proposal 2: Use the worst-case power back off to calculate the triple beat MSD which implies a high-quality filter. The power back-off level per ULCC carrier will be 10\*log10(3) = 4.78dB backoff per carrier without violating power class.

Recommended WF

* Discuss backoff: equal power per CC or equal power per band?

### Sub-topic 5-3: Triple beat MSD

**Issue 5-3:**

Proposals

* **Proposal 3:** Use updated triple beat MSD per Table 2.5-1:

**Table 2.5-1**: Triple beat MSD

|  |
| --- |
| **NR or E-UTRA Band / Channel bandwidth / NRB / MSD** |
| **EN-DC****Configuration** | **EUTRA or NR band** | **UL Fc (MHz)** | **UL/DL** **BW (MHz)** | **UL LCRB** | **DL Fc** **(MHz)** | **MSD (dB)** | **Duplex mode** | **Triple beat order** |
| DC\_3A-n41C | 3 | 1782.5 | 5 | 25 | 1877.5 | [13.4] | FDD | 1 |
| n41C | 25552635 | [80][80] | [1 (RBstart=88)][1 (RBstart=128)] | 25552635 | N/A | TDD | N/A |
| DC\_25A-n41C | 25 | 1912.5 | 5 | 25 | 1992.5 | [18.0] | FDD | 1 |
| n41C | 25452595 | 90100 | 1 (RBstart=150)1 (RBstart=122) | 25452595 | N/A | TDD | N/A |
| DC\_8A-n79C | 8 | 912.5 | 5 | 25 | 957.5 | [0] | FDD | 1 |
| n79C | 45454645 | 100100 | 1 (RBstart=212)1 (RBstart=60) | 45454645 | N/A | TDD | N/A |

Recommended WF

* Discuss MSD and which cases are still valid to go in specification

### Sub-topic 5-4: IMD2 in LB from n77(2A)

**Issue 5-4:**

Moderator: new case for IMD or n77(2A) falling in LB

Proposals

* New MSD proposed

|  |  |
| --- | --- |
| Band / Channel bandwidth / NRB / Duplex mode | Source of IMD |
| NR CA band combination | NR band | UL Fc (MHz) | UL/DL BW (MHz) | UL CLRB | DL Fc (MHz) | MSD (dB) | Duplex mode |  |
| CA\_n5-n77 | 5 | N/A | 5 | 25 | 880 | 27 | FDD | IMD2 |
| n77 | 33104190 | 10 | 50 | 33104190 | N/A | TDD | N/A |

Recommended WF

* Discuss this new MSD type for IMD related to intra-band ULCA and see if it needs to be added to the specification framework

## Companies views’ collection for 1st round

### Open issues

Sub topic 5-1 Triple beat order

|  |  |
| --- | --- |
| **Company** | **Comments** |
| XXX |  |
| XXX |  |

 Sub topic 5-2 back off for Triple beat

|  |  |
| --- | --- |
| **Company** | **Comments** |
| XXX |  |
| XXX |  |

Sub topic 5-3 Triple beat MSD

|  |  |
| --- | --- |
| **Company** | **Comments** |
| XXX |  |
| XXX |  |

Sub topic 5-4 IMD2 in LB from n77(2A)

|  |  |
| --- | --- |
| **Company** | **Comments** |
| Skyworks | We want to thank MediaTek for bringing up this new issue of NC UL CA IMD2 falling on LB. We think it is useful to discuss this issue within the specification framework and guidelines for MSD due to IMD of intra-band UL CA:* With the current band definition, only n77, n46 and n96 have sufficient BW to generate an IMD2 in LB but n46 and n96 do not support NC ULCA yet.
* Still there may be a question on which n77 BW may be applicable given the fact that currently NC UL CA maximum BW separation class is 600MHz (to cover Japan largest need).

Given this, at least in release 17 we do not think such issue exists. |
| MediaTek | Thanks for valuable comments and further discussion. Agree that in Rel-17 such MSD issue does not exist. To make specs clear, the MSD due to IMD2 is listed with all values in N/A and update note 7. A revision of R4-2204483 is uploaded in the draft box.  |

### 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** |
| [R4-2204483](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_102-e/Docs/R4-2204483.zip)draft CR to 38101-1-h40 missing MSD for CA\_n5-n77(2A) | MediaTek: A revision of R4-2204483 is uploaded in the draft box. MSD due to IMD2 is listed with all values in N/A and update note 7 |
| Company B |
|  |

## Summary for 1st round

### Open issues

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

|  |  |
| --- | --- |
|  | ***Status summary***  |
| **Sub-topic #5.1** | *Tentative agreements:**Candidate options:**Recommendations for 2nd round:* |
| **Sub-topic #5.2** | *Tentative agreements:**Candidate options:**Recommendations for 2nd round:* |

### CRs/TPs

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

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

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

## Discussion on 2nd round (if applicable)

## 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”* |

# Topic #6: NR-U contiguous ULCA

## Companies’ contributions summary

|  |  |  |
| --- | --- | --- |
| **T-doc number** | **Company** | **Proposals / Observations** |
| [**R4-2206076**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_102-e/Docs/R4-2206076.zip) Proposals for NR-U Intraband Contiguous UL-CA requirements | Qualcomm Incorporated | **Proposal 1: For full allocation, support tentatively extending NR-U single CC wideband MPR requirements to NR-U contiguous UL CA for the same aggregated total bandwidth (up to 80MHz aggregated BW), when the same waveform type and modulation order is used across the CCs.** **Proposal 2: If there are concerns over DFT-s-OFDM, consider extending NR-U single CC wideband requirements to contiguous UL-CA only for CP-OFDM at this stage.****Proposal 3: If there are further concerns, discuss the introduction of a relaxation (e.g. 0.5 or 1 dB) for NR-U contiguous UL-CA MPR on top of existing NR-U single CC WB MPR requirements for full allocation.****Proposal 4: For interlaced allocation, support tentatively extending NR-U single CC wideband MPR requirements to NR-U contiguous UL CA for the same aggregated total bandwidth (so up to 80MHz aggregated BW), when the same waveform type and modulation order is used across the CCs and the RB interlaces are aligned across different CCs with the minimum distance with respect to Single CC RB allocation;****Proposal 5: If there are further concerns, discuss the introduction of a relaxation (e.g. 0.5 or 1 dB) for NR-U contiguous UL-CA MPR on top of existing NR-U single CC WB MPR requirements for interlaced allocation.** |
| [**R4-2206138**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_102-e/Docs/R4-2206138.zip) MPR proposal for NR-U UL-CA | Skyworks Solutions Inc. | **Proposal: Based on these observations, we propose to adopt:*** **3.0dB MPR for all QPSK DFT-s-OFDM waveforms except for WB configuration [1111]+[1000] with full RB allocation for which [4.0]dB MPR is proposed; and**
* **4.0 MPR for all QPSK CP-OFDM waveforms except for WB configuration [1111]+[1000] with full RB allocation for which [5.5]dB MPR is proposed.**
 |

## Open issues summary

### Sub-topic 6-1: MPR for NR-U ULCA

**Issue 6-1:**

Proposals

* Qualcomm proposes an approach were MPR is extended from single CC cases with potentially some 0.5/1dB relaxation
* Skyworks proposes MPR values based on measurements
	+ 3.0dB MPR for all QPSK DFT-s-OFDM waveforms except for WB configuration [1111]+[1000] with full RB allocation for which [4.0]dB MPR is proposed; and
	+ 4.0 MPR for all QPSK CP-OFDM waveforms except for WB configuration [1111]+[1000] with full RB allocation for which [5.5]dB MPR is proposed.

Recommended WF

* Compare proposals in terms of values w/wo relaxation to reach consensus on MPR table structure and possibly tentative values

## Companies views’ collection for 1st round

### Open issues

Sub topic 6-1 MPR for NR-U ULCA

|  |  |
| --- | --- |
| **Company** | **Comments** |
| XXX |  |
| XXX |  |

## 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 #4.1** | *Tentative agreements:**Candidate options:**Recommendations for 2nd round:* |
| **Sub-topic #4.2** | *Tentative agreements:**Candidate options:**Recommendations for 2nd round:* |

### CRs/TPs

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

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

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

## Discussion on 2nd round (if applicable)

## 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”* |

# Topic #7: Low MSD for CA and DC

## Companies’ contributions summary

|  |  |  |
| --- | --- | --- |
| **T-doc number** | **Company** | **Proposals / Observations** |
| [**R4-2204088**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_102-e/Docs/R4-2204088.zip)On low MSD for CA and DC | Huawei, HiSilicon | **Proposal 1: No need to have further discussion in Rel-17 for the low MSD for CA and DC** |

## Open issues summary

### Sub-topic 7-1: Low MSD for CA and DC in R17

**Issue 7-1:**

Proposals

* No need to have further discussion in Rel-17 for the low MSD for CA and DC

Recommended WF

* Discuss proposal
* Moderator: our understanding is this was moving to R18 anyhow

## Companies views’ collection for 1st round

### Open issues

Sub topic 7-1 Low MSD for CA and DC in R17

|  |  |
| --- | --- |
| **Company** | **Comments** |
| Skyworks | In our view, low MSD is discussed again for Release 18 and given the status can’t see any further progress feasible in Release 17. Agree not to discuss further in R17 |
| MediaTek | Agree with the proposal. Since Rel-18 will discuss the topic, there’s no need to discuss it in R17 |

## 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 #4.1** | *Tentative agreements:**Candidate options:**Recommendations for 2nd round:* |
| **Sub-topic #4.2** | *Tentative agreements:**Candidate options:**Recommendations for 2nd round:* |

### CRs/TPs

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

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

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

## Discussion on 2nd round (if applicable)

## 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”* |

# Topic #8: Documents moved from block approval

Moderator Note: band combinations moved from #111/112 will be treated here or if they fall in one of the above topic it will be added to the topic.

## Companies’ contributions summary

|  |  |  |
| --- | --- | --- |
| **T-doc number** | **Company** | **Proposals / Observations** |
| [**R4-2204736**](https://urldefense.proofpoint.com/v2/url?u=https-3A__www.3gpp.org_ftp_TSG-5FRAN_WG4-5FRadio_TSGR4-5F102-2De_Docs_R4-2D2204736.zip&d=DwMFAg&c=VYRDWu-sKuQrybEAJ2u-dYX_FK6X1lTrDf-PKXUa2P4&r=pRthG0xxDB77vg4aSNBQn5JOtJLs0OZjgw-oylT0McK0oow-yPNwujyHTOyyY1lN&m=uE9t9EWjm3Hp_Yu5s-oMj-nXaj_nNRTHfJzmaXf15d4gn376zd-r55EIHVpdO2fA&s=aI3O6RoNmm_RK8I1x-o8PFGg5l_d4sNKJx2fjthPw-s&e=)TP for TR 37.717-11-11: Update MSD analysis of DC\_(n)3AA | Huawei Technologies France | Only single switched UL mode is supported and UL-DL separation is not large (20 MHz), however no MSD is needed for the requested channel bandwidths.Flagged by Qualcomm and Skyworks |
| [**R4-2204806**](https://urldefense.proofpoint.com/v2/url?u=https-3A__www.3gpp.org_ftp_TSG-5FRAN_WG4-5FRadio_TSGR4-5F102-2De_Docs_R4-2D2204806.zip&d=DwMGaQ&c=VYRDWu-sKuQrybEAJ2u-dYX_FK6X1lTrDf-PKXUa2P4&r=pRthG0xxDB77vg4aSNBQn5JOtJLs0OZjgw-oylT0McK0oow-yPNwujyHTOyyY1lN&m=3rqdM2cc8eo63pKn64kld_twtkZQib_hWe_3De8j6IKQziPp25b2c1Z79eyB8veb&s=45TSvyHMRc6PGaVzmXBtYCJU_Eu-ygBbKVD-b3-DesU&e=)TP for TR 37.717-21-11: Update DC\_1A\_(n)3AA | Huawei Technologies France | Moderator: Dependent on lower fallback in [R4-2204736](https://urldefense.proofpoint.com/v2/url?u=https-3A__www.3gpp.org_ftp_TSG-5FRAN_WG4-5FRadio_TSGR4-5F102-2De_Docs_R4-2D2204736.zip&d=DwMFAg&c=VYRDWu-sKuQrybEAJ2u-dYX_FK6X1lTrDf-PKXUa2P4&r=pRthG0xxDB77vg4aSNBQn5JOtJLs0OZjgw-oylT0McK0oow-yPNwujyHTOyyY1lN&m=uE9t9EWjm3Hp_Yu5s-oMj-nXaj_nNRTHfJzmaXf15d4gn376zd-r55EIHVpdO2fA&s=aI3O6RoNmm_RK8I1x-o8PFGg5l_d4sNKJx2fjthPw-s&e=) |
| [**R4-2204754**](https://urldefense.proofpoint.com/v2/url?u=https-3A__www.3gpp.org_ftp_TSG-5FRAN_WG4-5FRadio_TSGR4-5F102-2De_Docs_R4-2D2204754.zip&d=DwMGaQ&c=VYRDWu-sKuQrybEAJ2u-dYX_FK6X1lTrDf-PKXUa2P4&r=pRthG0xxDB77vg4aSNBQn5JOtJLs0OZjgw-oylT0McK0oow-yPNwujyHTOyyY1lN&m=yWcxCqjstDCXf-Ci1ee8QOzOlr1F25-cI2HL5s3hLXQxqMQHKig_htGCuohwbhee&s=iIhJULpXjD-mdCimQhXynKYsmAqB8XkkCxd_UhJi1E4&e=) TP for TR38.717-03-02: CA\_n28A-n40A-n41A | ZTE Corporation | Moderator: flagged by Qualcomm on low IMD4 MSD |

## Open issues summary

### Sub-topic 8-1

**Issue 8-1a: DC\_(n)3AA**

Proposals

* Only single switched UL mode is supported and UL-DL separation is not large (20 MHz), however no MSD is needed for the requested channel bandwidths

Recommended WF

* Proponent need to discuss with flagging companies to agree on MSD value

**Issue 8-1b: CA\_n28A-n40A-n41A**

Proposals

|  |  |
| --- | --- |
| Band / Channel bandwidth / NRB / Duplex mode | Source of IMD |
| NR CAConfiguration | NR band | UL Fc (MHz) | UL/DL BW (MHz) | UL CLRB | DL Fc (MHz) | MSD (dB) | Duplex mode |  |
| CA\_n28-n40-n41 | n28 | 710 | 5 | 25 | 765 | 1.3 | FDD | IMD4 |
|  | n40 | 2302.5 | 5 | 25 | 2302.5 | N/A | TDD | N/A |
|  | n41 | 2685 | 10 | 50 | 2685 | N/A | TDD | N/A |

Recommended WF

* Proponent need to discuss with flagging companies to agree on MSD value

## Companies views’ collection for 1st round

### Open issues

Sub topic 8-1

|  |  |
| --- | --- |
| **Company** | **Comments** |
| MediaTek | Issue 8-1a: If only single switched UL mode is supported, the “Uplink ENDC configurations” in table 1 shall be updated accordingly. In table 3, REFSENS is incorrect, REFSENS of LTE is -91dBm. MSD due to IMD5 when UL=n3,30MHz was not analyzed. |
| XXX | @MediaTek: Thanks for the comment. Table one is an extract of Bandwidth combination requested in RP-212096. The Single switched uplink mode was decided based on Annex I 38.101-3.The REFSENS is updated to -91dBm, however still no MSD is required.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|   |   |   |   | Main | Div |
| LTE Rx BW |  |  |  | 20.000 | 20.000 |
| Receiver NF |  |  |  | 9.000 | 9.000 |
| TX Noise at RX band at the antenna |  |  | -89.000 | -99.000 |
| RX Thermal noise at the antenna |  |  | -92.447 | -92.447 |
| RX Total noise at the antenna |  |  | -87.380 | -91.580 |
| SNR |  |  |  | -3.620 | 0.580 |
| REFSENS |  |  |  | -91.000 | -91.000 |
|   |  |  |  |  |   |
| MRC RX total noise |  |  |  | -92.979 |   |
| MSD |  |  |  | 2.479 |   |
| SNR |  |  |  | 1.979 |   |
| MSD at SNR=-1 |   |   |   | 0.000 |   |

On the other hand, for the table 3 configuration Tx is indeed an NR TX with 30MHZ CBW and its noise is received at an LTE receiver with CBW=20MHz, as we mentioned “*Table 3 contains the MSD analysis with a NR active Tx with a CBW of 30MHz and an inactive LTE Tx with a CBW of 20MHz.*”. Also,Figure 1, corresponds to the case in Table 3. I will add a phrase mentioning that the table corresponds to the configuration in Figure 1 in the revised version.   |
| MediaTek2 | In response to HW: Since the IMD5 of n3 uplink does not fall in the LTE DL receiving range, we can accept no MSD on LTE RX. As for single switched uplink, it needs to be indicated in Table 5.5B.2-1 of 38l101-3, not annex I, like below:Table 5.5B.2-1: Intra-band contiguous EN-DC configurations

|  |  |  |
| --- | --- | --- |
| EN-DCconfiguration | Uplink EN-DCconfiguration(NOTE 1) | Single UL allowed |
| **DC\_(n)3AA** | **DC\_(n)3AA6** | **Yes6** |
| DC\_(n)5AA | DC\_(n)5AA6 | Yes6 |

 |
| Qualcomm | MSD can be more significant with the 5th order distortion and RXBN at a lower duplex offset. We did RXBN measurements as well as CIM5 added to the intermodulation of CIM3 with the TX signal. All combinations were analyzed that can have potential MSD with a single NR uplink or a single EUTRA uplink.Other company views should be considered. We estimate 5.3dB MSD for the worst-case combination. MSD for all other possible combinations is listed in the table below. |

Sub topic 8-1b

|  |  |
| --- | --- |
| **Company** | **Comments** |
| Qualcomm | Issue 8-1b: Forward IMD4 products dominate in this band combination. Assume 60dB PA->LNA and PA->PA isolation and making sure IMD4 is measured at the PA output pin since PA is combined with front end filter as part of a module. The filter to reject IMD4 from the HB PA outputs is 35dB + 15dB from any N plexer =50dB. Our estimated MSD is 7.6dBApplication, table, Excel  Description automatically generatedTable  Description automatically generated |

### 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** |
| [**R4-2204736**](https://urldefense.proofpoint.com/v2/url?u=https-3A__www.3gpp.org_ftp_TSG-5FRAN_WG4-5FRadio_TSGR4-5F102-2De_Docs_R4-2D2204736.zip&d=DwMFAg&c=VYRDWu-sKuQrybEAJ2u-dYX_FK6X1lTrDf-PKXUa2P4&r=pRthG0xxDB77vg4aSNBQn5JOtJLs0OZjgw-oylT0McK0oow-yPNwujyHTOyyY1lN&m=uE9t9EWjm3Hp_Yu5s-oMj-nXaj_nNRTHfJzmaXf15d4gn376zd-r55EIHVpdO2fA&s=aI3O6RoNmm_RK8I1x-o8PFGg5l_d4sNKJx2fjthPw-s&e=)TP for TR 37.717-11-11: Update MSD analysis of DC\_(n)3AA | Company A |
| Company B |
|  |
| [**R4-2204806**](https://urldefense.proofpoint.com/v2/url?u=https-3A__www.3gpp.org_ftp_TSG-5FRAN_WG4-5FRadio_TSGR4-5F102-2De_Docs_R4-2D2204806.zip&d=DwMGaQ&c=VYRDWu-sKuQrybEAJ2u-dYX_FK6X1lTrDf-PKXUa2P4&r=pRthG0xxDB77vg4aSNBQn5JOtJLs0OZjgw-oylT0McK0oow-yPNwujyHTOyyY1lN&m=3rqdM2cc8eo63pKn64kld_twtkZQib_hWe_3De8j6IKQziPp25b2c1Z79eyB8veb&s=45TSvyHMRc6PGaVzmXBtYCJU_Eu-ygBbKVD-b3-DesU&e=)TP for TR 37.717-21-11: Update DC\_1A\_(n)3AA | Company A |
| Company B |
|  |

## Summary for 1st round

### Open issues

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

|  |  |
| --- | --- |
|  | **Status summary**  |
| **Sub-topic #6.1** | *Tentative agreements:**Candidate options:**Recommendations for 2nd round:* |
| **Sub-topic #6.2** | *Tentative agreements:**Candidate options:**Recommendations for 2nd round:* |

### CRs/TPs

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

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

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

## Discussion on 2nd round (if applicable)

## 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** |
| [**R4-2204213**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_102-e/Docs/R4-2204213.zip) | CA\_n18-n28 and DC\_18\_n28 LB\_LB\_MSD | Qualcomm Incorporated | Agreeable, Revised, Merged, Postponed, Not Pursued |  |
| [**R4-2206140**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_102-e/Docs/R4-2206140.zip) | Corrections for CA\_n18-n28, DC\_18\_n18 MSD | Skyworks Solutions Inc. |  |  |
| [**R4-2204680**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_102-e/Docs/R4-2204680.zip) | Draft Correction CR to R17 TS38.101-1 on MSD for CA\_n18-n28 | Samsung, KDDI, Skyworks Solutions Inc., Qualcomm |  |  |
| [**R4-2204681**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_102-e/Docs/R4-2204681.zip) | Draft Correction CR to R17 TS38.101-3 on MSD for DC\_18\_n28 | Samsung, KDDI, Skyworks Solutions Inc., Qualcomm |  |  |
| [**R4-2204480**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_102-e/Docs/R4-2204480.zip) | Discussion on CA\_n18\_n28 | MediaTek Inc. |  |  |
| [**R4-2204482**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_102-e/Docs/R4-2204482.zip) | draft CR to 38101-1-h40 improve note for CA\_n18-n28 | MediaTek Inc. |  |  |
| [**R4-2206141**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_102-e/Docs/R4-2206141.zip) | Corrections for CA\_n5-n28 MSD | Skyworks Solutions Inc. |  |  |
| [**R4-2206134**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_102-e/Docs/R4-2206134.zip) | CR to R17 TS38.101-1 on MSD for CA\_n5-n28 | Skyworks Solutions Inc. |  |  |
| [**R4-2203623**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_102-e/Docs/R4-2203623.zip) | Discussion on UE RF requirements for DC\_8-28\_n3 | VODAFONE Group Plc |  |  |
| [**R4-2203624**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_102-e/Docs/R4-2203624.zip) | Discussion on UE RF requirements for DC\_8-28\_n78 | VODAFONE Group Plc |  |  |
| [**R4-2203625**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_102-e/Docs/R4-2203625.zip) | Discussion on UE RF requirements for DC\_8-32\_n78 | VODAFONE Group Plc |  |  |
| [**R4-2203626**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_102-e/Docs/R4-2203626.zip) | Discussion on UE RF requirements for DC\_20-28\_n78 | VODAFONE Group Plc |  |  |
| [**R4-2203627**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_102-e/Docs/R4-2203627.zip) | Discussion on UE RF requirements for DC\_20-38\_n8 | VODAFONE Group Plc |  |  |
| [**R4-2204214**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_102-e/Docs/R4-2204214.zip) | CA\_n46-n48-n96\_Async\_MSD | Qualcomm Incorporated |  |  |
| [**R4-2203538**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_102-e/Docs/R4-2203538.zip) | TP to TR 38.717.02-01 for CA\_n46-n96 | Charter Communications, Inc |  |  |
| [**R4-2205669**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_102-e/Docs/R4-2205669.zip) | TP to TR 38.717.02-01 for CA\_n48-n96 and DC\_n48-n96 | Charter Communications, Inc |  |  |
| [**R4-2203539**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_102-e/Docs/R4-2203539.zip) | TP to TR TR38.717-03-01 for CA\_n46-n48-n96 | Charter Communications, Inc |  |  |
| [**R4-2203540**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_102-e/Docs/R4-2203540.zip) | TP to TR 38.717.03-02 for CA\_n46-n48--n96  | Charter Communications, Inc |  |  |
| [**R4-2204090**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_102-e/Docs/R4-2204090.zip) | On simultaneous Tx/Rx for constituents of CA\_n46-n48-n96 | Skyworks Solutions Inc. |  |  |
| [**R4-2203709**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_102-e/Docs/R4-2203709.zip) | Issue of many missing fallbacks in 38.101 specifications | Apple |  |  |
| [**R4-2204216**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_102-e/Docs/R4-2204216.zip) | DC\_2\_n25\_Fallback\_MSD | Qualcomm Incorporated |  |  |
| [**R4-2205701**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_102-e/Docs/R4-2205701.zip) | TP for TR 37.717-11-11 to include DC\_2\_n25 | Ericsson, Bell Mobility |  |  |
| [**R4-2205702**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_102-e/Docs/R4-2205702.zip) | TP for TR 37.717-21-11 to include DC\_2-7\_n25 | Ericsson, Bell Mobility |  |  |
| [**R4-2205703**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_102-e/Docs/R4-2205703.zip) | TP for TR 37.717-31-11 to include DC\_2-7-66\_n25 | Ericsson, Bell Mobility |  |  |
| [**R4-2205704**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_102-e/Docs/R4-2205704.zip) | TP for TR 37.717-31-11 to include DC\_2-7-13\_n25 | Ericsson, Bell Mobility |  |  |
| [**R4-2204217**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_102-e/Docs/R4-2204217.zip) | Triple\_Beat\_MSD\_update | Qualcomm Incorporated |  |  |
| [**R4-2204483**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_102-e/Docs/R4-2204483.zip) | draft CR to 38101-1-h40 missing MSD for CA\_n5-n77(2A) | MediaTek Inc. |  |  |
| [**R4-2206076**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_102-e/Docs/R4-2206076.zip) | Proposals for NR-U Intraband Contiguous UL-CA requirements | Qualcomm Incorporated |  |  |
| [**R4-2206138**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_102-e/Docs/R4-2206138.zip) | MPR proposal for NR-U UL-CA | Skyworks Solutions Inc. |  |  |
| [**R4-2204088**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_102-e/Docs/R4-2204088.zip) | On low MSD for CA and DC | Huawei, HiSilicon |  |  |
| [**R4-2204736**](https://urldefense.proofpoint.com/v2/url?u=https-3A__www.3gpp.org_ftp_TSG-5FRAN_WG4-5FRadio_TSGR4-5F102-2De_Docs_R4-2D2204736.zip&d=DwMFAg&c=VYRDWu-sKuQrybEAJ2u-dYX_FK6X1lTrDf-PKXUa2P4&r=pRthG0xxDB77vg4aSNBQn5JOtJLs0OZjgw-oylT0McK0oow-yPNwujyHTOyyY1lN&m=uE9t9EWjm3Hp_Yu5s-oMj-nXaj_nNRTHfJzmaXf15d4gn376zd-r55EIHVpdO2fA&s=aI3O6RoNmm_RK8I1x-o8PFGg5l_d4sNKJx2fjthPw-s&e=) | TP for TR 37.717-11-11: Update MSD analysis of DC\_(n)3AA | Huawei Technologies France |  |  |
| [**R4-2204806**](https://urldefense.proofpoint.com/v2/url?u=https-3A__www.3gpp.org_ftp_TSG-5FRAN_WG4-5FRadio_TSGR4-5F102-2De_Docs_R4-2D2204806.zip&d=DwMGaQ&c=VYRDWu-sKuQrybEAJ2u-dYX_FK6X1lTrDf-PKXUa2P4&r=pRthG0xxDB77vg4aSNBQn5JOtJLs0OZjgw-oylT0McK0oow-yPNwujyHTOyyY1lN&m=3rqdM2cc8eo63pKn64kld_twtkZQib_hWe_3De8j6IKQziPp25b2c1Z79eyB8veb&s=45TSvyHMRc6PGaVzmXBtYCJU_Eu-ygBbKVD-b3-DesU&e=) | TP for TR 37.717-21-11: Update DC\_1A\_(n)3AA | Huawei Technologies France |  |  |
| **[R4-2204754](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_102-e/Docs/R4-2204754.zip)** | TP for TR38.717-03-02: CA\_n28A-n40A-n41A | ZTE Corporation |  |  |

Notes:

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

## 2nd round

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

# Annex

Contact information

|  |  |  |
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| Skyworks Solutions Inc. (moderator) | Dominique Brunel | dominique.brunel@skyworksinc.com |
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|  |  |  |
|  |  |  |
|  |  |  |
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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)