**3GPP T****SG-RAN WG4 Meeting#111 R4-240xxxx**

**Fukuoka, Japan, 20 – 24 May 2024**

**Agenda item:** 6.1 and 12.3

**Source:** Moderator (Skyworks Solution Inc.)

**Title:** AdHoc minutes [111][105] NR\_Baskets\_Part\_1

**Document for:** Information

# Introduction

AI 6.1 Issues arising from basket WIs but not subject to block approval

* AI 6.1 Topic 1: MSD proposal for band combination with intra-band ULCA
* AI 6.1 Topic 2: Discussion on MSD test point for band combination with intra-band ULCA
* AI 6.1 Topic 3: Band combination with close proximity issues
* AI 6.1 Topic 4: Harmonic mixing
* AI 6.1 Topic 5: CR requiring attention from experts
* AI 6.1 Topic 6: Place holder: contributions transferred from block approval.

AI 12.3 RAN4 basket WI work plan (according to WF R4-2403721)

* AI 12.3 Topic 1: Templates and guidelines
* AI 12.3 Topic 2: work plan and baskets

Recommendations for document handling

# AI 6.1 Topic #1: Band combination with intra-band ULCA

## Companies’ contributions summary

|  |  |  |  |
| --- | --- | --- | --- |
| **T-doc number** | **Title** | **Company** | **Proposals / Observations** |
| [**R4-2407072**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_111/Docs/R4-2407072.zip) | MSD Analysis for CA\_n40A-n41C | Apple | **Proposal:** Adopt CA\_n25A-n77A MSD Levels proposed in Table 3-1 shown below.

|  |  |
| --- | --- |
| **Band / Channel bandwidth / NRB / Duplex mode** | **Source of IMD** |
| NR CA band combination | NR band | UL Fc (MHz) | UL/DL BW (MHz) | UL LCRB | DL Fc (MHz) | MSD (dB) | Duplex mode |  |
| CA\_n40-n41 | n40 | N/A | 5 | N/A | 2358.5 | **55** | TDD | IMD3 |
|  | n41 | 2545 | 60 | 1 (RBSTART= 0) | 2545 | N/A | TDD | N/A |
|  |  | 2625 | 100 | 1 (RBSTART= 272) | 2625 |  |  |  |

**Table 3.1**: IMD3 MSD proposal for CA\_n40A\_41C |
| [**R4-2407073**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_111/Docs/R4-2407073.zip) | MSD Analysis for CA\_n41C-n79A | Apple | **Proposal:** Adopt CA\_n25A-n77A MSD Levels proposed in Table 3-1 shown below.

|  |  |
| --- | --- |
| **Band / Channel bandwidth / NRB / Duplex mode** | **Source of IMD** |
| NR CA band combination | NR band | UL Fc (MHz) | UL/DL BW (MHz) | UL LCRB | DL Fc (MHz) | MSD (dB) | Duplex mode |  |
| CA\_n41-n79 | n41 | 2545 | 60 | 1 (RBSTART= 0) | 2545 | N/A | TDD | N/A |
|  |  | 2625 | 100 | 1 (RBSTART= 272) | 2625 |  |  |  |
|  | n79 | N/A | 40 | N/A | 4872.5 | **8.415** | TDD | IMD4 |
| NOTE 15: This band is subject to IMD6 also which MSD is not specified |

**Table 3.1**: IIMD4 MSD proposal for CA\_n41C\_n79A |
| [**R4-2407154**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_111/Docs/R4-2407154.zip) | CA\_n41C-n79 MSD | Skyworks Solutions Inc. | **Proposal:** Consider adopting the PC3 CA\_n41C-n79A MSD/REFSENS test point captured in the table below.

|  |
| --- |
| **Band / Channel Bandwidth / NRB / Duplex mode** |
| **NR CA Band combination** | **NR Band** | **UL Fc (MHz)** | **UL/DL BW (MHz)** | **UL LCRB** | **DL Fc (MHz)** | **MSD (dB)** | **Duplex mode** | **Source of IMD** |
| CA\_n41-n79 | n41 | 2545 | 60 | 1 (RBSTART= 0) | 2545 | N/A | TDD | N/A |
|  |  | 2625 | 100 | 1 (RBSTART= 272) | 2625 |  |  |  |
|  | n79 | N/A | 40 | N/A | 4872.5 | 4.215 | TDD | IMD4 |
| NOTE 15: This band is subject to IMD6 also which MSD is not specified. |

 |
| [**R4-2407155**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_111/Docs/R4-2407155.zip) | CA\_n40A-n41C MSD | Skyworks Solutions Inc., ZTE Corporation | **Proposal:** Consider adopting the power class 3 CA\_n40A-n41C MSD/REFSENS test point captured in Table 3.**Table 3:** PC3 Band n40 MSD/REFSENS for CA\_n40A-n41C.

|  |
| --- |
| **Band / Channel Bandwidth / NRB / Duplex mode** |
| **NR CA Band combination** | **NR Band** | **UL Fc (MHz)** | **UL/DL BW (MHz)** | **UL LCRB** | **DL Fc (MHz)** | **MSD (dB)** | **Duplex mode** | **Source of IMD** |
| CA\_n40-n41 | n40 | N/A | 5 | N/A | **2358.5** | **42.5** | TDD | IMD3 |
|  | n41 | 2545 | 60 | 1 (RBSTART= 0) | 2545 | N/A | TDD | N/A |
|  |  | 2625 | 100 | 1 (RBSTART= 272) | 2625 |  |  |  |

 |
| [**R4-2407172**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_111/Docs/R4-2407172.zip) | Discussion on IMD4 MSD for CA\_n41A-n79C and CA\_n41C-n79A | MediaTek Inc. | **Proposal 1: IMD4 MSD due to UL\_CA\_n41C in n79 DL as the value below,**

|  |  |
| --- | --- |
| **Band / Channel bandwidth / NRB / Duplex mode** | **Source of IMD** |
| NR CA band combination | NR band | UL Fc (MHz) | UL/DL BW (MHz) | UL LCRB | DL Fc (MHz) | MSD (dB) | Duplex mode |  |
| **CA\_n41-n79** | **n41** | **2545** | **60** | **1 (RBSTART= 0)** | **2545** | **N/A** | **TDD** | **N/A** |
|  |  | **2625** | **100** | **1 (RBSTART= 272)** | **2625** |  |  |  |
|  | **n79** | **N/A** | **40** | **N/A** | **4872.5** | **12.615** | **TDD** | **IMD4** |
| **NOTE 15: This band is subject to IMD6 also which MSD is not specified** |

 |
| [**R4-2407578**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_111/Docs/R4-2407578.zip) | CA\_n71B BCS4/5 PC3, PC2 1TX, PC2 2TX | Murata Manufacturing Co Ltd. | **Proposal 1**: Use PC3, 1TX PC2, and 2TX PC2 REFSENS relaxation values as shown in Table 2-3 and 2-4.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **CA configuration** | **SCS****(PCC/SCC)****(kHz)** | **Aggregated channel bandwidth (PCC+SCC)** | **UL PCC allocation****(LCRB)** | **ΔRIBC (dB)** | **Duplex mode** |
| CA\_n71B | 15/15 | 30MHz + 5MHz | 20 (RBSTART = 0) | [4.9] | FDD |

**Tabe 2-3:** **ΔRIBC** for PC3

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **CA configuration** | **SCS****(kHz)** | **Aggregated channel bandwidth (PCC+SCC)** | **UL PCC allocation** | **ΔRIBNCX (dB)** | **ΔRIBNCY (dB)** | **Duplex mode** |
| CA\_n71B**Z** | 15/15 | 30 MHz + 5 MHz | 20 (RBstart = 0) | [7.0] | [8.4] | FDD |
| NOTE X: Applicable to UE supporting PC2 with single Tx. NOTE Y: Applicable to UE supporting PC2 with dual Tx.NOTE Z: Applicable only to BCS 4 and 5 and UEs supporting the optional symmetrical UL/DL bandwidths. |

**Tabe 2-4:** **ΔRIBC** for PC2 |
| **[R4-2408380](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_111/Docs/R4-2408380.zip)** | TP for TR38.718-02-01\_CA\_n40A-n41C | ZTE Corporation, Skyworks Solutions, Inc. | Moderator: TP according to MSD proposals in [**R4-2407155**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_111/Docs/R4-2407155.zip) |
| **[R4-2408381](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_111/Docs/R4-2408381.zip)** | TP for TR38.718-02-01\_CA\_n41A-n79C and CA\_n41C-n79A | ZTE Corporation, Mediatek,Sanechips | Moderator: TP according to MSD proposals in [**R4-2407172**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_111/Docs/R4-2407172.zip) |
| [**R4-2408858**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_111/Docs/R4-2408858.zip) | Missing MSD for PC3 CA\_n71B BCS4/5 | Qualcomm France | **Proposal 1**: Add the following MSD test point for PC3 n71B:

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **CA configuration** | **SCS****(PCC/SCC)****(kHz)** | **Aggregated channel bandwidth (PCC+SCC)** | **UL PCC allocation****(LCRB)** | **ΔRIBC (dB)** | **Duplex mode** |
| CA\_n71B | 15/15 | 30MHz + 5MHz | 20 (RBSTART = 0)  | 4.5 | FDD |

**Proposal 2**: Add the following text into 7.3A.2.1:For specific uplink and downlink test points which are specified in Table 7.3A.2.X-Y and the reference sensitivity power level increased by ΔRIBC. The requirements apply with all downlink carriers active. Unless given by Table 7.3.2-4, the reference sensitivity requirements shall be verified with the network signaling value NS\_01 (Table 6.2.3.1-1) configured. |
| [**R4-2409317**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_111/Docs/R4-2409317.zip) | Discussion on MSD for CA\_n41C-n79A with intra-band UL CA\_n41C | Huawei, HiSilicon | Proposal 1: The REFSENS degradation will not be higher than 1dB for CA\_n41C-n79A with UL intra-band CA\_n41C for 1RB+1RB allocations.Proposal 2: There is no need to specify MSD with fully allocated maximum aggregated BW for CA\_n41C-n79A with UL intra-band CA\_n41C. |

## Open issues summary

### Sub-topic 1-1 CA\_n40-n41C

**Issue 1-1:**

* Proposals:
* Proposal: the following table summarizes the inputs from all companies proposing MSD

|  |  |
| --- | --- |
| **Band / Channel bandwidth / NRB / Duplex mode** |  |
| NR CA band combination | NR band | UL Fc (MHz) | UL/DL BW (MHz) | UL LCRB | DL Fc (MHz) | MSD (dB) | Duplex mode | Source of IMD |
| CA\_n40-n41 | n40 | N/A | 5 | N/A | 2358.5 | **Apple: 55****Skyworks, ZTE: 42.5** | TDD | IMD3 |
|  | n41 | 2545 | 60 | 1 (RBSTART= 0) | 2545 | N/A | TDD | N/A |
|  |  | 2625 | 100 | 1 (RBSTART= 272) | 2625 |  |  |  |

* Note a different proposal in Topic 2 for allocation in : R4-2409316 Discussion on MSD for CA\_n40A-n41C with intra-band UL CA\_n41C Huawei, HiSilicon
	+ Proposal 1: As RAN4 has specified the MSD due to cross band isolation from ACLR2 for the fallback CA\_n40A-n41A, RAN4 can consider the similar method to specify the MSD due to cross band isolation from ACLR1 for CA\_n40A-n41C with UL intra-band CA\_n41C instead of 1RB+1RB allocations.
* Note that MSD differences vs Allocation is discussed in Topic 2 in Document: R4-2407372 On UL configuration for intra-band ULCA IMDs Skyworks Solutions Inc. and shows with measurements that once MPR is accounted for (which is the guideline) the MSDs are similar for different allocations and 1RB+1RB enables direct estimation of IMDs and ease the test point. Also 1RB+1RB conforms to current guidelines.
* Recommended WF
* Discuss if RB allocation should be revisited?
* MSD Values are discussed amongst experts.
* Agreements are captured in revision of with potential co-signees: TP for TR38.718-02-01\_CA\_n40A-n41C ZTE Corporation, Skyworks Solutions, Inc.
* If no agreement based on current guidelines, the band combination is postponed to R19.

Offline discussion comments

|  |  |
| --- | --- |
| **Company/Delegate** | **Comment** |
| Skyworks/ Laurent | As proponent, we support the MSD test point captured in R4-2408380 TP for TR38.718-02-01\_CA\_n40A-n41C |
| Qualcomm | We are ok tp capture the MSD test point in R4-2408380. Our analysis in previous meeting showed MSD>50dB, but it did not account any MPR. With MPR, the proposal in R4-2408380 is ok. |
| ZTE |  As far as i see, if no MPR is applied, then the MSD would be >55dB. However, if MPR is applied, then the MSD would be ~43dB. It seems the MSD in Apple’s paper didn’t account MPR. |
| Huawei / Peng Zhang | I know even if full RB allocation was used, the ACLR1 will fall into the DL band n40 for CA\_n40A-n41C. But, if we only use 1RB+1RB configuration, there are only a few DL RBs which be affected. I don’t think we need so large MSD. |

AdHoc minutes

ZTE: CA\_n40-n41C and CA\_n41C-n79 can be postponed.

CMCC: prefer to postpone CA\_n40-n41C and CA\_n41C-n79. Appreciate the work.

Apple: we followed guidelines for CA\_n40-n41C

### Sub-topic 1-2 CA\_n41C-n79

**Issue 1-2:**

* Proposals:
* Proposal: the following table summarizes the inputs from all companies proposing MSD

|  |
| --- |
| **Band / Channel Bandwidth / NRB / Duplex mode** |
| **NR CA Band combination** | **NR Band** | **UL Fc (MHz)** | **UL/DL BW (MHz)** | **UL LCRB** | **DL Fc (MHz)** | **MSD (dB)** | **Duplex mode** | **Source of IMD** |
| CA\_n41-n79 | n41 | 2545 | 60 | 1 (RBSTART= 0) | 2545 | N/A | TDD | N/A |
|  |  | 2625 | 100 | 1 (RBSTART= 272) | 2625 |  |  |  |
|  | n79 | N/A | 40 | N/A | 4872.5 | **Apple: 8.415****MediaTek: 12.615****Skyworks: 4.215** | TDD | IMD4 |
| NOTE 15: This band is subject to IMD6 also which MSD is not specified. |

* Proposal from Huawei:
	+ Proposal 1: The REFSENS degradation will not be higher than 1dB for CA\_n41C-n79A with UL intra-band CA\_n41C for 1RB+1RB allocations.
	+ Proposal 2: There is no need to specify MSD with fully allocated maximum aggregated BW for CA\_n41C-n79A with UL intra-band CA\_n41C.
* Note that IMD4 measurements vs allocations are in Topic 2 in Document: R4-2407372 On UL configuration for intra-band ULCA IMDs Skyworks Solutions Inc. and shows with measurements that once IMD4 of any allocation are not negligible.
* Recommended WF:
* Discuss if RB allocation should be revisited?
* MSD Values are discussed amongst experts.
* Agreements are captured in revision of with potential co-signees: R4-2408381 TP for TR38.718-02-01\_CA\_n41A-n79C and CA\_n41C-n79A ZTE Corporation, Mediatek, Sanechips
* If no agreement based on current guidelines, the band combination is postponed to R19.

Offline discussion comments

|  |  |
| --- | --- |
| **Company/Delegate** | **Comment** |
| Skyworks / Laurent | Question to Apple and Mediatek: Does the interference level used in your MSD analyzes account for MPR allowance? Reason for asking is that the CA\_n41C 2UL IMD3 at MPR0 fails the -13dBm/MHz requirements. Our MSD assumes the UE applies MPR which is why we believe our MSD is lower. This assumption is inline with TR 38.862 guidelines and the assumptions used for CA\_n40A\_n41C MSD analysis. |
| Qualcomm | Discrepancy in the MSD numbers is quite large, but given this is last meeting of R18 we are ok with averaging. Our analysis in previous meeting showed MSD 17.4dBm, but it did not account MPR so with that I’m ok with averaging with the three numbers proposed in this meeting |
| ZTE | As offline discussed with Mediatek, the proposed MSD didn’t account MPR. If the MPR is accouted, then the MSD would be ~7.4dB. |
| Huawei / Peng Zhang | If full RB allocation was used for CA\_n41C-n79A, I don’t think we need any MSD as the frequency separation is larger than 1GHz. |

AdHoc minutes

Need revision of TP to remove UL CA\_n41C-n79A.

### Sub-topic 1-3 CA\_n71B

**Issue 1-3:**

* Proposals: from Qualcomm on CA\_n71B
	+ Proposal 1: Add the following MSD test point for PC3 n71B:

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  **CA configuration** | **SCS****(PCC/SCC)****(kHz)** | **Aggregated channel bandwidth (PCC+SCC)** | **UL PCC allocation****(LCRB)** | **ΔRIBC (dB)** | **Duplex mode** |
| CA\_n71B | 15/15 | 30MHz + 5MHz | 20 (RBSTART = 0)  | 4.5 | FDD |

* + Proposal 2: Add the following text into 7.3A.2.1:

For specific uplink and downlink test points which are specified in Table 7.3A.2.X-Y and the reference sensitivity power level increased by ΔRIBC. The requirements apply with all downlink carriers active. Unless given by Table 7.3.2-4, the reference sensitivity requirements shall be verified with the network signaling value NS\_01 (Table 6.2.3.1-1) configured.

* Recommended WF: Discuss proposals amongst experts. If agreeable see if this should be captured in a CR
	+ Moderator: Murata PC3 R4-2407578 input and Skyworks PC3 R4-2407157 input should also be accounted for, PC3 n71(2A) inputs should also be collected (Skyworks R4-2407158, others?)

Offline discussion comments

|  |  |
| --- | --- |
| **Company/Delegate** | **Comment** |
| Moderator | PC3 inputs of other companies that are in different agendas should be considered. Maybe one of the companies can collect all inputs for the Ad hoc. In any case companies should let me know if there are other PC3 inputs on n71 intra-cases that should be discussed here |
| Skyworks / Laurent | We are Ok with averaging MSDs. We are sorry that we had prepared a CR R4-2408479 which captured the averaged MSD but our upload failed and the CR is only available in the [104] draft inbox. Here is a screenshot of the CA\_n71B proposals for PC3 and PC2. Here is a screenshot of proposals for CA\_n71(2A): |
| Qualcomm | We are ok with averaging PC3 MSD. |

AdHoc minutes

Moderator: A CR can be requested to capture PC3 n71B and n71(2A) based on (linear) averaging of proposed MSD.

# Topic #2: Discussion on MSD test point for band combination with intra-band ULCA

## Companies’ contributions summary

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| --- | --- | --- | --- |
| **T-doc number** | **Title** | **Company** | **Proposals / Observations** |
| **[R4-2407082](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_111/Docs/R4-2407082.zip)** | On MSD requirements with intra-band contiguous UL CA | Apple | **Proposal 1:** For NR FDD band intra-band contiguous UL CA, REFSENS requirement does not need to be specified.**Proposal 2:** Remove NR FDD band intra-band contiguous UL CA REFSENS requirements from the earliest release of the specifications (Rel-16).**Proposal 3:** There is no need to introduce cross-band MSD requirements resulting from intra-band contiguous UL CA configured with fully allocated maximum aggregated BW if the cross-band MSD requirement has been specified with single carrier UL aggressor at maximum channel BW.**Proposal 4:** Remove the MSD requirements for both inter-band CA/EN-DC with cross-band DL interference and triple-beat issue from the earliest release of specifications (Rel-17) to avoid the unnecessary RAN4 workload in future and reduce the already heavily loaded UE test burden. |
| [**R4-2407083**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_111/Docs/R4-2407083.zip) | CR to 38.101-1 on removing MSD requirements with intra-band contiguous UL CA | Apple | Moderator: CR according to [**R4-2407082**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_111/Docs/R4-2407082.zip) |
| [**R4-2407084**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_111/Docs/R4-2407084.zip) | CR to 38.101-1 on removing MSD requirements with intra-band contiguous UL CA | Apple | Moderator: CR according to [**R4-2407082**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_111/Docs/R4-2407082.zip) |
| [**R4-2407085**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_111/Docs/R4-2407085.zip) | CR to 38.101-1 on removing MSD requirements with intra-band contiguous UL CA | Apple | Moderator: CR according to [**R4-2407082**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_111/Docs/R4-2407082.zip) |
| [**R4-2407086**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_111/Docs/R4-2407086.zip) | CR to 38.101-3 on removing MSD requirements with intra-band contiguous UL CA in EN-DC | Apple | Moderator: CR according to [**R4-2407082**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_111/Docs/R4-2407082.zip) |
| [**R4-2407087**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_111/Docs/R4-2407087.zip) | CR to 38.101-3 on removing MSD requirements with intra-band contiguous UL CA in EN-DC | Apple | Moderator: CR according to [**R4-2407082**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_111/Docs/R4-2407082.zip) |
| **[R4-2407372](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_111/Docs/R4-2407372.zip)** | On UL configuration for intra-band ULCA IMDs | Skyworks Solutions Inc. | **Proposal 1:** If RB allocation (1RB+1RB) is re-considered for intra-band ULCA within an inter-band DL CA, it should be for intra-band TDD ULCA only.**Proposal for TDD:** MPR0 is not used for MSD evaluation of TDD intra-band contiguous and non-contiguous ULCA due to IMD or triple beat. IMD order with up to IMD7 is analyzed but IMD9 may require expert attention especially in the NS\_04 case.**Proposal for FDD:** According to current guidelines MPR0 is used for MSD evaluation of FDD intra-band ULCA due to IMD or triple beat. IMD order with up to IMD13 is analyzed, but IMD15/17 may require expert attention.**Proposal for band coexistence with intra-band ULCA:** MPR is allowed to meet general emission (SEM) and only IMD3 need evaluation whether -50dBm/MHz can be achieved. With this approach, band coexistence can be made independent of from the intra-band ULCA band and inter-band power class.**Proposal for TDD RB allocation for ULCA IMD MSD test point:** • The 1RB+1RB allocation is retained as per current guidelines and assuming MPR is applied, is consistent with the IMD orders that are requested for analysis.• This approach results in the MSD being independent from the TDD intra-band ULCA band and inter-band power class• This is valid for Release 18 and the start of Release 19. • If other approaches are to be evaluated for Release 19, this should be part of a specific WI as it will require extensive studies including measurements and simulations that is not compatible with block approval and will result in re-evaluating all currently specified intra-band ULCA related IMD and triple beat cases. |
| **[R4-2407622](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_111/Docs/R4-2407622.zip)** | Discussion on the MSD requirements of intra-band contiguous UL CA with non-contiguous RB allocation | Huawei, HiSilicon | *Observation 1: In TS 38.101-1, the triple beat is specified with the UL configuration of only one RB in each of the intra-band carriers.**Observation 2: As network vendor, we don't see the scheduling strategy that leads to triple beat, is typical.****Proposal 1:*** ***F****urther justify the necessity of specifying triple beat is required based on the commercial value.* |
| [**R4-2408731**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_111/Docs/R4-2408731.zip) | Discussion on MSD requirements with intra-band contiguous UL CA | CMCC | Observation 1: The test case that 1 RB is specified for each carrier of the intra-band CA will not appear in realistic network resource allocations, because one single carrier could achieve the throughput.Observation 2: The test case that 1 RB is specified for each carrier of the intra-band CA is an extreme scenario that doesn't occur in operators’ networks.**Proposal 1:** Do not consider only the MSD requirements resulting from intra-band contiguous UL CA configured with 1RB+1RB allocations, and cross-band MSD requirements resulting from intra-band contiguous UL CA configured with fully allocated maximum aggregated BW should be introduced.**Proposal 2:** Discuss the above test configuration first before the MSD value discussion. |
| [**R4-2409319**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_111/Docs/R4-2409319.zip) | Discussion on MSD test point trade-off for intra-band UL CA | Huawei, HiSilicon | **Proposal 1:** from RF and scheduling perspective, it’s encouraged for RAN4 to further discuss how to specify MSD test configuration due to IMD from intra-band UL CA. **Proposal 2:** If RAN4 need to specify some requirements to guarantee the IIP2/ IIP3/ IIP4 of PA performance, maybe RAN4 can further discuss the other methodology instead of leveraging REFSENS degradation. |
| [R4-2408357](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_111/Docs/R4-2408357.zip) | On MSD requirements with intra-band contiguous UL CA | ZTE Corporation, Sanechips | **Proposal 1:** No change from TR 38.862 guidelines unless there are updates for the existing guidelines in the WF. **Proposal 2:** MSD in the spec should be defined for practical scenarios, we slight prefer not to consider the MSD for intra-band contiguous UL CA configured with non-contiguous allocations.**Proposal 3:** Rel-19 seems to be more safe way to remove all the MSD for intra-band contiguous UL CA configured with non-contiguous allocations.**Proposal 4:** Technical speaking, there is a need to define the cross-band MSD requirements resulting from intra-band contiguous UL CA configured with fully allocated maximum aggregated BW.- Only to define new cross band isolation MSD for ACLR1/ACLR2 interference source- To reuse cross band isolation MSD of single carrier for >ACLR2 interference source |
| [**R4-2408853**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_111/Docs/R4-2408853.zip) | MSD requirements with intra-band contiguous CA | Qualcomm France | Proposal 1: Keep current practices in MSD test points for Intra-band contiguous UL CAProposal 3: Option 2 (moderator: no need to introduce cross-band MSD requirements resulting from intra-band contiguous UL CA configured with fully allocated maximum aggregated BW) |
| **[R4-2409316](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_111/Docs/R4-2409316.zip)** | Discussion on MSD for CA\_n40A-n41C with intra-band UL CA\_n41C | Huawei, HiSilicon | **Proposal 1:** As RAN4 has specified the MSD due to cross band isolation from ACLR2 for the fallback CA\_n40A-n41A, RAN4 can consider the similar method to specify the he MSD due to cross band isolation from ACLR1 for CA\_n40A-n41C with UL intra-band CA\_n41C instead of 1RB+1RB allocations. |

## Open issues summary

### Sub-topic 2-1 Need for specifying MSD for intra-band ULCA

**Issue 2-1:**

* Proposals: **Apple**:
	+ **Proposal 1:** For NR FDD band intra-band contiguous UL CA, REFSENS requirement does not need to be specified.
	+ **Proposal 2:** Remove NR FDD band intra-band contiguous UL CA REFSENS requirements from the earliest release of the specifications (Rel-16).
	+ Note from moderator: the related requirements have been discussed, and WF approved on how to specify these cases (RB allocation) in recent meetings. A few cases have already been specified.
* Recommended WF
* Discuss whether guidelines should be changed in R18
* Discuss proposal and depending on agreement, agree, revise, postpone, not pursue related part of the Apple CRs: R4-2407082, R4-2407083, R4-2407084, R4-2407085, R4-2407086, R4-2407087
	+ Check impact on on-going CRs, TPs
	+ If not agreeable the discussion may be continued in R19.

Offline discussion comments

|  |  |
| --- | --- |
| **Company/Delegate** | **Comment** |
| Skyworks/Dominique | As we show in our measurements in this meeting, Intra-band ULCA related IMDs are significant whatever the allocation chosen especially if MPR is not applied. Also the mechanism is different from 1CC UL MSD as in for intra-CA the MSD does not depend on the transceiver image and carrier leakage performance. So do not see what is wrong with what has been done for at least two releases and with contributions still in this meeting. We are open to remove any MSD due to intra-band UL CA (IMD and triple beat) in Release 19 but this should be given time to make clear that MSD will be there and worst than 1CC UL cases and instruct RAN5 properly that intra-band ULCA configuration should never be used for REFSENS measurements. Finally if we understand that removing the inter-band cases is probably fine, we do not think the FDD intra-band DL+UL CA should be discarded as the MSD issue can be so large that the usefulness of the combination is questionable. Finally, even if RAN$ decides that such MSDs should not be defined and tested, there are cases that will still be very bad if IMD3/5 range is involved. Also if removing this type of MSD is agreed does this mean they should be removed from all releases? |
| Qualcomm | We don’t want to remove these requirements. We are ok to discuss if something which was used as a basis at the time when existing principles were agreed has changed but we do think that is something to do during Rel-19  |

AdHoc minutes

Murata: we understand these are corner cases, but we need guidelines on the where there are issues with bad combination performance. Not OK to do changes in release 18.

Apple: our proposal is not to dismiss the work. In LTE we had intra-band DL/UL CA but did not have REFSENS exception.

Murata: in LTE the BW is limited thus higher IMD orders are involved.

Skyworks: for FDD intra-band allocation is same as 1CC REFSENS UL configuration.

Murata: If we remove All MSDs, the problem may exist in the network, the MSD is a way to provide guidelines

Nokia: appreciate the work, when deployment is done the Network and operator do not use RAN MSD to drive scheduler design. Understand this may be late in the release, could be captured in TR vs Spec.

Huawei: Issue for intra-band is obvious. For inter-band TDD allocation 1RB+1RB is not representative. What is important is to identify issues. Test burden is high. Try to find a compromise for balance in work and test burden.

Qualcomm: Important to keep continuity but also review from time to time. Without 3GPP requirement, Chipset and RFFE will still get requirement but without a reference. We agree test burden is real. Workload is also a concern

Skyworks: recognize the test burden issue but we have done already a lot of work to reduce the number of test points.

CMCC: focus is on the test case. Should find a more typical scenario.

ZTE: Difficult to converge. Prefer to have a more typical RB allocation. Before agreeing new approach the current guidelines should apply for Release 18.

CHTTL: need to manage the change also for reputation of the spec

Apple: purpose is to verify RF component performance. May be these are already verified with other measurements. OK to postpone deciding to remove the requirements.

How to proceed with related Band combinations in this meeting:

Skyworks: suggest to keep the guidelnes for Band combination.

### Sub-topic 2-2 Need for specifying MSD, applicable test points for inter-band BC with intra-band ULCA in one band.

**Issue 2-2:**

* Proposals 1: No need to specify MSD **Apple**:
	+ **Proposal 1:** There is no need to introduce cross-band MSD requirements resulting from intra-band contiguous UL CA configured with fully allocated maximum aggregated BW if the cross-band MSD requirement has been specified with single carrier UL aggressor at maximum channel BW.
	+ **Proposal 2:** Remove the MSD requirements for both inter-band CA/EN-DC with cross-band DL interference and triple-beat issue from the earliest release of specifications (Rel-17) to avoid the unnecessary RAN4 workload in future and reduce the already heavily loaded UE test burden.
* Proposals 2: Proposing fully allocated CCs **CMCC**
	+ **Proposal 1**: Do not consider only the MSD requirements resulting from intra-band contiguous UL CA configured with 1RB+1RB allocations, and cross-band MSD requirements resulting from intra-band contiguous UL CA configured with fully allocated maximum aggregated BW should be introduced.
	+ **Proposal 2**: Discuss the above test configuration first before the MSD value discussion.
* Proposals 3: Find ways to avoid REFSENS related requirement **Huawei**
	+ **Proposal 1:** from RF and scheduling perspective, it’s encouraged for RAN4 to further discuss how to specify MSD test configuration due to IMD from intra-band UL CA.
	+ **Proposal 2:** If RAN4 need to specify some requirements to guarantee the IIP2/ IIP3/ IIP4 of PA performance, maybe RAN4 can further discuss the other methodology instead of leveraging REFSENS degradation.
	+ **additional input on CA\_n40-n41C: Proposal 1:** As RAN4 has specified the MSD due to cross band isolation from ACLR2 for the fallback CA\_n40A-n41A, RAN4 can consider the similar method to specify the he MSD due to cross band isolation from ACLR1 for CA\_n40A-n41C with UL intra-band CA\_n41C instead of 1RB+1RB allocations.
* Proposals 4: NO change to TDD guidelines, Keep 1RB+1RB for case with TDD intra-band **Qualcomm, Skyworks. Skyworks:** additional input on FDD and others
	+ **QCOM Proposal 1:** Keep current practices in MSD test points for Intra-band contiguous UL CA
	+ **QCOM Proposal 3:** Option 2 (moderator: no need to introduce cross-band MSD requirementsresulting from intra-band contiguous UL CA configured with fully allocated maximum aggregated BW)
	+ **SKW Proposal 1:** If RB allocation (1RB+1RB) is re-considered for intra-band ULCA within an inter-band DL CA, it should be for intra-band TDD ULCA only.
	+ **SKW Proposal for TDD:** MPR0 is not used for MSD evaluation of TDD intra-band contiguous and non-contiguous ULCA due to IMD or triple beat. IMD order with up to IMD7 is analyzed but IMD9 may require expert attention especially in the NS\_04 case.
	+ **SKW Proposal for FDD:** According to current guidelines MPR0 is used for MSD evaluation of FDD intra-band ULCA due to IMD or triple beat. IMD order with up to IMD13 is analyzed, but IMD15/17 may require expert attention.
	+ **SKW Proposal for band coexistence with intra-band ULCA:** MPR is allowed to meet general emission and only IMD3 need evaluation whether -50dBm/MHz can be achieved. With this approach, band coexistence can be made independent of from the intra-band ULCA band and inter-band power class.
	+ **SKW Proposal for TDD RB allocation for ULCA IMD MSD test point:**

• The 1RB+1RB allocation is retained as per current guidelines and assuming MPR is applied, is consistent with the IMD orders that are requested for analysis.

• This approach results in the MSD being independent from the TDD intra-band ULCA band and inter-band power class

• This is valid for Release 18 and the start of Release 19.

• If other approaches are to be evaluated for Release 19, this should be part of a specific WI as it will require extensive studies including measurements and simulations that is not compatible with block approval and will result in re-evaluating all currently specified intra-band ULCA related IMD and triple beat cases.

* Proposals 5: **ZTE** proposing no change to guidelines, looking for better scenario on allocation (fully allocated) for R19
	+ **Proposal 1:** No change from TR 38.862 guidelines unless there are updates for the existing guidelines in the WF.
	+ **Proposal 2:** MSD in the spec should be defined for practical scenarios, we slight prefer not to consider the MSD for intra-band contiguous UL CA configured with non-contiguous allocations.
	+ **Proposal 3:** Rel-19 seems to be more safe way to remove all the MSD for intra-band contiguous UL CA configured with non-contiguous allocations.
	+ **Proposal 4:** Technical speaking, there is a need to define the cross-band MSD requirements resulting from intra-band contiguous UL CA configured with fully allocated maximum aggregated BW.
		- - Only to define new cross band isolation MSD for ACLR1/ACLR2 interference source
		- - To reuse cross band isolation MSD of single carrier for >ACLR2 interference source
* Note from moderator: Beyond the TDD intra-band ULCA case which has agreed guidelines since R17 using 1RB+1RB with MPR, there is RAN4 agreement to use no MPR and total allocation = REFSENS UL config at same BW for FDD cases. Also agreed templates in R4#110b are based on these guidelines.
* Recommended WF
* Discuss whether guidelines should be changed in R18
* Discuss new proposals for allocations for MSD or no MSD at all and associated timeline: R18 or R19
	+ Depending on agreement, agree, revise, postpone, not pursue related part of the Apple CRs: R4-2407082, R4-2407083, R4-2407084, R4-2407085, R4-2407086, R4-2407087
	+ Check impact on on-going CRs, TPs and related MSDs proposed in Topic 1:
	+ If not agreement the discussion may be continued in R19.

Offline discussion comments

|  |  |
| --- | --- |
| **Company/Delegate** | **Comment** |
| Skyworks/Dominique | As discussed in the previous issue, we do not see the benefit of changing the allocation to be used at the end of R18. Also we have shown that full allcocation would result into more work needed to derive MSD without reducing the MSD especially if 0dB MPR is applied and REFSENS/MSD test are not to be representative of network “typical” allocation but rather designed to reveal issues related to the UE linearity and selectivity behavior. As such we are open to discuss what to do in R19, including not specifying these MSDs (we would prefer that than changing the current guidelines that have worked for us for at least two releases). Changing the allocations will not change MSD significantly but only make it more effort in simulation/measurements |
| Qualcomm | To be discussed during Rel19. 1+1 RB may not be practical from NW perspective, but it is verifying RF linearity. Full UL allocation is not realistic either from NW side as UE is never so close to BS that it can use full RB’s and at the same time being at cell edge with victim band do full allocation is not any better in that sense. |
| ZTE |  Although we also think 1RB+1RB may not a pratical deployment, we would like to prefer to keep this test point in May meeting which is the principle captured in the TR. If there is agreement, it should be applied for the future release like R19.For the full aggregated CBW cross band isolation, technical speaking, there is a need to define. If majority company think there is no need, we are also fine. |
| Huawei / Peng Zhang | Maybe we have to know the motivation why we need to specify MSD. Our concerns are that more types MSD and more MSD test point will lead to the more RAN4 efforts and UE test burdens. If we go back to single carrier, RAN4 only consider one specific UL configuration for reference sensitivity. We have to identify the effective demands and typical scenario considering limited resources and efforts. If the scenario is not typical, it’s better to further trade-off the meaning of defining MSD. |

AdHoc minutes

# AI 6.1 Topic 3: Band combination with close proximity issues

## Companies’ contributions summary

|  |  |  |  |
| --- | --- | --- | --- |
| **T-doc number** | **Title** | **Company** | **Proposals / Observations** |
| [**R4-2408849**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_111/Docs/R4-2408849.zip) | Considerations on CA\_n3A-n39A | Qualcomm France | **Proposal 1**: Use the following analysis results as part of considering MSD for CA\_n3A-n39A

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **UL band** | **DL band** | **UL Fc** | **UL BW** | **SCS of UL band** | **UL RB Allocation** | **DL Fc** | **DL BW** | **MSD** | **Cross-band****Interference****source** |
| **(MHz)** | **(MHz)** | **(kHz)** | **LCRB** | **(MHz)** | **(MHz)** | **(dB)** |
| n3 | n39 | 1770 | 30 | 15 | 50 (RBstart=110) | 1877.5 | 5 | 2.7 | >ACLR2 |

**Proposal 2**: Assume Fdl\_low and Fdl\_high for UE supporting CA\_n3-n39 should be according to n3 Fdl\_low and n39 Fdl\_high |
| [**R4-2409311**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_111/Docs/R4-2409311.zip) | Discussion and TP for TR 38.718-02-01 to introduce CA\_n3A-n39A | Huawei, HiSilicon | Thus, the following MSD test configuration can be considered.

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| UL band | DL band | UL Fc | UL BW | SCS of UL band | UL RB Allocation | DL Fc | DL BW | MSD | Cross-bandInterferencesource |
| (MHz) | (MHz) | (kHz) | LCRB | (MHz) | (MHz) | (dB) |
| n3 | n39 | 1770 | 30 | 15 | 160 (RBstart=0) | 1882.5 | 5 | 1.5 dB | >ACLR2 |

 |

## Open issues summary

### Sub-topic 3-1 CA\_n3-n39 MSD

**Issue 3-1:**

* Proposals 1: **Qualcomm**
* Use the following analysis results as part of considering MSD for CA\_n3A-n39A

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **UL band** | **DL band** | **UL Fc** | **UL BW** | **SCS of UL band** | **UL RB Allocation** | **DL Fc** | **DL BW** | **MSD** | **Cross-band****Interference****source** |
| **(MHz)** | **(MHz)** | **(kHz)** | **LCRB** | **(MHz)** | **(MHz)** | **(dB)** |
| n3 | n39 | 1770 | 30 | 15 | 50 (RBstart=110) | 1877.5 | 5 | 2.7 | >ACLR2 |

* Assume Fdl\_low and Fdl\_high for UE supporting CA\_n3-n39 should be according to n3 Fdl\_low and n39 Fdl\_high
* Proposals 2: **Huawei**

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| UL band | DL band | UL Fc | UL BW | SCS of UL band | UL RB Allocation | DL Fc | DL BW | MSD | Cross-bandInterferencesource |
| (MHz) | (MHz) | (kHz) | LCRB | (MHz) | (MHz) | (dB) |
| n3 | n39 | 1770 | 30 | 15 | 160 (RBstart=0) | 1882.5 | 5 | 1.5 dB | >ACLR2 |

* Recommended WF: Discuss test point
* Discuss UL configuration (Note from moderator, usually this is UL REFSENS configuration at test point CBW)
* Discuss MSD value based on aligned UL configuration
* Check id proposal 2 from Qualcomm should be added as a note
* I agreement need to ask for a CR as this is the last meeting for R18 band combination otherwise postpone to R19.

Offline discussion comments

|  |  |
| --- | --- |
| **Company/Delegate** | **Comment** |
| Qualcomm | We are ok to average MSD between Huawei and QC proposals, if the n3 allocation is according to our proposal. |
| Huawei | For UL configuration in band n3, we are fine to follow QC’s proposal. For the DL center frequency, we have to allocate it in band n39. Averaging approach is OK to me. |

AdHoc minutes

Revise TP with the to be agreed test point and MSD

Moderator: Request a draftCR to capture agreed test point and MSD value

### Sub-topic 3-2 three band cases depending on CA\_n3-n39 approval

The following 3band TPs are depending on agreement on CA\_n3-n39 and should be reviewed

|  |  |  |  |
| --- | --- | --- | --- |
| [**R4-2409312**](https://urldefense.com/v3/__https%3A/www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_111/Docs/R4-2409312.zip__;!!MyQQGECaxY11k7S_!ZOqRL34GFPMG2ajbXt1SO8n1hXltpMGN-riBrg0KNzlGbWw6oEALNEJ4oLYF0Lje7twOZOdX5KrSvTKdspYLuE5fVnLwttVp$) | TP for TR 38.718-03-01 to introduce CA\_n3A-n8A-n39A | Huawei, HiSilicon | CA\_n3A-n39 not yet finalyzed. May be need to be moved to [105] to endorse if CA\_n3A-n39 can be finalyze |
| [**R4-2409313**](https://urldefense.com/v3/__https%3A/www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_111/Docs/R4-2409313.zip__;!!MyQQGECaxY11k7S_!ZOqRL34GFPMG2ajbXt1SO8n1hXltpMGN-riBrg0KNzlGbWw6oEALNEJ4oLYF0Lje7twOZOdX5KrSvTKdspYLuE5fVi0hR3_3$) | TP for TR 38.718-03-01 to introduce CA\_n3A-n39A-n41A | Huawei, HiSilicon | CA\_n3A-n39 not yet finalyzed. Need to discuss how band n41 is multiplexed on top of n3-n39 May be need to be moved to [105] to endorse if CA\_n3A-n39 can be finalyze.  |
| [**R4-2409314**](https://urldefense.com/v3/__https%3A/www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_111/Docs/R4-2409314.zip__;!!MyQQGECaxY11k7S_!ZOqRL34GFPMG2ajbXt1SO8n1hXltpMGN-riBrg0KNzlGbWw6oEALNEJ4oLYF0Lje7twOZOdX5KrSvTKdspYLuE5fVpU0v5Tq$) | TP for TR 38.718-03-01 to introduce CA\_n3A-n39A-n79A | Huawei, HiSilicon | CA\_n3A-n39 not yet finalyzed. May be need to be moved to [105] to endorse if CA\_n3A-n39 can be finalyze |

Recommended WF: Review TPs and comment in table below.

|  |  |
| --- | --- |
| **T-doc**  | **Company/Review comment** |
| [**R4-2409312**](https://urldefense.com/v3/__https%3A/www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_111/Docs/R4-2409312.zip__;!!MyQQGECaxY11k7S_!ZOqRL34GFPMG2ajbXt1SO8n1hXltpMGN-riBrg0KNzlGbWw6oEALNEJ4oLYF0Lje7twOZOdX5KrSvTKdspYLuE5fVnLwttVp$)TP for TR 38.718-03-01 to introduce CA\_n3A-n8A-n39A | Company A |
|  |
|  |
| [**R4-2409313**](https://urldefense.com/v3/__https%3A/www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_111/Docs/R4-2409313.zip__;!!MyQQGECaxY11k7S_!ZOqRL34GFPMG2ajbXt1SO8n1hXltpMGN-riBrg0KNzlGbWw6oEALNEJ4oLYF0Lje7twOZOdX5KrSvTKdspYLuE5fVi0hR3_3$)TP for TR 38.718-03-01 to introduce CA\_n3A-n39A-n41A | Skyworks/Laurent.: This is a difficult 3 band combination on top of a 2 band fallback that is already very complicated. Delta T/R should be discussed to reflect these challenges. |
| Huawei: the intension is not to combine the band n3 duplexer and band n41 filter in main path. But it’s possible to combine these three bands in the Rx diversity path. Further discussion on Delta T/R is OK. |
|  |
| [**R4-2409314**](https://urldefense.com/v3/__https%3A/www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_111/Docs/R4-2409314.zip__;!!MyQQGECaxY11k7S_!ZOqRL34GFPMG2ajbXt1SO8n1hXltpMGN-riBrg0KNzlGbWw6oEALNEJ4oLYF0Lje7twOZOdX5KrSvTKdspYLuE5fVpU0v5Tq$)TP for TR 38.718-03-01 to introduce CA\_n3A-n39A-n79A | Company A |
|  |
|  |

AdHoc minutes

Moderator: Request revisions for the TPS (if not done by basket) and address concerns on CA\_n3-n39-n41

# AI 6.1 Topic 4: Harmonic mixing

## Companies’ contributions summary

|  |  |  |  |
| --- | --- | --- | --- |
| **T-doc number** | **Title** | **Company** | **Proposals / Observations** |
| [**R4-2407577**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_111/Docs/R4-2407577.zip) | UL(n)/DL3 Harmonic Mixing Considerations | Murata Manufacturing Co Ltd. | **Observation 1**: Harmonic mixing MSD for higher orders > 5 should only be considered when there is sufficient margin to pass the OOB blocking exception level and as well as to pass the general spurious at the emission limit aggressor frequency.**Observation 2**: At least 55dB of RX selectivity is required to pass the OOB blocking exception level with sufficient margin.**Observation 3**:* CA\_n28-n40 UL1/DL3. The MSD is 37.8dB, but the RX selectivity is at least 10dB lower than other comparable low band combinations because the aggressor level is fixed at the fundamental TX power level. Increasing the RX selectivity brings the MSD value within the acceptable range of peers.
* CA\_n46-n48, CA\_n46-n77/n78 UL2/DL3. The MSD is ~22dB, but the RX selectivity is at a value with 0dB margin for OOB to pass the exception level AND there is also no margin to the spurious response limit.
* CA\_n39-n41 UL4/DL3. For the given 8.1dB MSD, the spurious emission is ~4dB below the limit which is unusual for UL4 (-19dBc harmonic level at the PA output). More spurious margin is available if less RX selectivity is assumed, but that would mean less margin to pass the OOB blocking exception level.

**Proposal 1:** Harmonic mixing MSD analysis for orders > 5 is justified if the victim band passes the minimum RX selectivity criteria and the general spurious emission limit for the UL harmonic aggressor is met with sufficient margin. |
| [**R4-2407579**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_111/Docs/R4-2407579.zip) | CA\_n25-n41 UL n25 harmonic mixing PC3 and PC2 | Murata Manufacturing Co Ltd. | **Proposal 1:** Use CA\_n25-n41 harmonic mixing MSD for PC3, 1TX PC2, and 2TX PC2 as shown in Table 2-2, 2-3, and 2-4.

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **UL band** | **DL band** | **UL BW** | **SCS of UL band** | **UL RB Allocation** | **DL BW** | **MSD** | **UL/DL fc condition** | **UL/DL harmonic order** |
| **(MHz)** | **(kHz)** | **LCRB** | **(MHz)** | **(dB)** |
| n25 | n41 | 5 | 15 | 25 (RBstart=0) | 5 | [2.5] | NOTE 11 | UL4/DL3 |

**Table 2-2**: CA\_n25-n41 power class 3 UL4/DL3 Rx harmonic mixing test points

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **UL band** | **DL band** | **UL BW** | **SCS of UL band** | **UL RB Allocation** | **DL BW** | **MSD** | **UL/DL fc condition** | **UL/DL harmonic order** |
| **(MHz)** | **(kHz)** | **LCRB** | **(MHz)** | **(dB)** |
| n25 | n41 | 5 | 15 | 25 (RBstart=0) | 5 | [3.7] | NOTE 11 | UL4/DL3 |

**Table 2-3**: CA\_n25-n41 1TX power class 2 UL4/DL3 Rx harmonic mixing test points

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **UL band** | **DL band** | **UL BW** | **SCS of UL band** | **UL RB Allocation** | **DL BW** | **MSD** | **UL/DL fc condition** | **UL/DL harmonic order** |
| **(MHz)** | **(kHz)** | **LCRB** | **(MHz)** | **(dB)** |
| n25 | n41 | 5 | 15 | 25 (RBstart=0) | 5 | [5.3] | NOTE 11 | UL4/DL3 |

**Table 2-4**: CA\_n25-n41 2TX power class 2 UL4/DL3 Rx harmonic mixing test points |

## Open issues summary

### Sub-topic 4-1 Additional criteria for harmonic mixing

**Issue 4-1:**

* Proposals 1: Harmonic mixing MSD analysis for orders > 5 is justified if the victim band passes the minimum RX selectivity criteria and the general spurious emission limit for the UL harmonic aggressor is met with sufficient margin.
* Recommended WF: Experts discuss whether this proposal should be part of guidelines or note on the harmonic mixing template for orders >5 (Moderator: > 5 means DL+UL order >5)

Murata: comment to address question of Huawei: Selectivity relates to the rejection of the blocker

### Sub-topic 4-2 CA\_n25-n41 UL n25 Harmonic mixing MSD for PC3 and PC2

**Issue 4-2a: PC3 MSD**

* Proposals 1:

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **UL band** | **DL band** | **UL BW** | **SCS of UL band** | **UL RB Allocation** | **DL BW** | **MSD** | **UL/DL fc condition** | **UL/DL harmonic order** |
| **(MHz)** | **(kHz)** | **LCRB** | **(MHz)** | **(dB)** |
| n25 | n41 | 5 | 15 | 25 (RBstart=0) | 5 | [2.5] | NOTE 11 | UL4/DL3 |

* Recommended WF: Experts discuss this MSD proposal together with previous inputs if any

**Issue 4-2b: PC2 1Tx MSD**

Moderator: this may have to be coordinated with thread [113]

* Proposals 1:

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **UL band** | **DL band** | **UL BW** | **SCS of UL band** | **UL RB Allocation** | **DL BW** | **MSD** | **UL/DL fc condition** | **UL/DL harmonic order** |
| **(MHz)** | **(kHz)** | **LCRB** | **(MHz)** | **(dB)** |
| n25 | n41 | 5 | 15 | 25 (RBstart=0) | 5 | [3.7] | NOTE 11 | UL4/DL3 |

* Recommended WF: Experts discuss this MSD proposal together with previous inputs if any

**Issue 4-2c: PC2 2Tx MSD**

Moderator: this may have to be coordinated with thread [113]

* Proposals 1:

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **UL band** | **DL band** | **UL BW** | **SCS of UL band** | **UL RB Allocation** | **DL BW** | **MSD** | **UL/DL fc condition** | **UL/DL harmonic order** |
| **(MHz)** | **(kHz)** | **LCRB** | **(MHz)** | **(dB)** |
| n25 | n41 | 5 | 15 | 25 (RBstart=0) | 5 | [5.3] | NOTE 11 | UL4/DL3 |

* Recommended WF: Experts discuss this MSD proposal together with previous inputs if any

Offline discussion comments

|  |  |
| --- | --- |
| **Company/Delegate** | **Comment** |
| Skyworks / Laurent | We have MSD proposals for PC3 and PC2 1Tx, PC2 2Tx in thread [113] R4-2407159. Qualcomm also posted MSD proposals in [113] in R4-2408854. We are Ok to average MSD amongst Murata, Qualcomm and our values. The open point is whether a PC3 test point should be introduced or not. Murata and Skyworks propose PC3 MSD. |
| Qualcomm | OK with averaging. Please note, our PC3 number is 1.5dB, PC2 1TX is 2.6dB, and PC2 2TX is 4.1dB (2TX is new) |
| Huawei | To issue 4-1, Many thanks for meaningful technical inputs.Question for clarification, what is the RX selectivity criteria? Do you mean DL CA ACS requirements with UL aggressor band? |

AdHoc minutes

Moderator: request PC3 draftCR to capture agreements, PC2 to be done by HPUE basket

Skyworks: Averaging of Murata, Qualcomm and Skyworks values: 2.5/1.5/0.8dB respectively

# AI 6.1 Topic 5: CR requiring attention from experts

## Companies’ contributions summary

|  |  |  |  |
| --- | --- | --- | --- |
| **T-doc number** | **Title** | **Company** | **Proposals / Observations** |
| [**R4-2408039**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_111/Docs/R4-2408039.zip) | CR for TS 38.307: Updates for new type of NE-DC configurations in Rel.18 | CHTTL | The following new intra-band NE-DC contiguous proposed in Rel.18 baskets will have impact on 38.307 specification if introduced to the 38.101-3 due to the increased number of E-UTRA CCs.- DC\_40(n)AC- DC\_40(n)ADNote that this approach is aligned with the guideline:When a new release independent feature is introduced, only the latest release of release independent specification shall be updated. The latest release of release independent specification refers to "release N", i.e. the release in which a feature is introduced into TS 38.101 or TS 38.133. Update Table 8.2.2-1 NE-DC contiguous intra-band configurations within FR1 to aligned with the new configurations mentioned above.Note that since the above two configurations are on-going before the meeting, the changes are proposed in a square bracket as this is the last meeting for this WI. And it is suggested that if the above two configurations are going to approved in this meeting, the CR can be revised by removing the square bracket can be removed.Moderator: CR is reviewed directly in the CR review section offline before the Adhoc. A special thread will be created. |
| [**R4-2408187**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_111/Docs/R4-2408187.zip) | CR for TS 38.846: Corrections on UL triple beat analysis table | CHTTL, Samsung | Some errors and misalignments are found in the uplink triple beat IMD products table.Currently the first row for the 1st order TB in Table 6.5.3-1:

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| 1st order TB | IfU3L -fU1L- fSCCL| | IfU2L -fU1L + fSCCL| | IfU2L -fU1L- fSCCH| | IfU3L -fU1L + fSCCH| |

However, if these equation are mapped to the TB1, TB2 in the WF R4-2220556.- TB1 = |f1+f2-f3|- TB2 = |f1-f2+f3| (f1 is the fSCC, and assume f2 > f3)Then table above will become:

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| 1st order TB | minimum TB2 | minimum TB1 | maximum TB2 | maximum TB1 |

It should be corrected to the following table:

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| 1st order TB | minimum TB2 | maximum TB2 | minimum TB1 | maximum TB1 |

So the middle two cells need to be swapped, so that the impacted range can displayed correctly.And some errors are found.Moderator: CR is reviewed directly in the CR review section offline before the Adhoc. A special thread will be created. |
| [**R4-2408503**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_111/Docs/R4-2408503.zip) | CR to TS 38.101-3 Rel18 Removal of Unnecessary NE-DC Requirements | Huawei, HiSilicon | Despite specification in 4.2 which indicates that NE-DC requirements are similar to EN-DC (unless specified otherwise) some unnecessary requirements have been specified. With this CR we plan to remove them and replace some of them with general statements. Some editorial corrections are performed, too.NOTE: This CR is not for block approvalModerator: CR is reviewed directly in the CR review section offline before the Adhoc. A special thread will be created. |
| [**R4-2408477**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_111/Docs/R4-2408477.zip) | (DC\_R17\_1BLTE\_1BNR\_2DL2UL-Core) CR to TS 38.101-3 Rel17 Removal of Unnecessary NE-DC Requirements | Huawei, HiSilicon | Despite specification in 4.2 which indicates that NE-DC requirements are similar to EN-DC (unless specified otherwise) some unnecessary requirements have been specified. With this CR we plan to remove them and replace some of them with general statements. Some editorial corrections are performed, too.NOTE: This CR is not for block approval Moderator: CR is reviewed directly in the CR review section offline before the Adhoc. A special thread will be created. |
| [**R4-2408490**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_111/Docs/R4-2408490.zip) |  DC\_R16\_1BLTE\_1BNR\_2DL2UL) CR to TS 38.101-3 Rel16 Removal of Unnecessary NE-DC Requirements | Huawei, HiSilicon | Harmonize the NE-DC requirements in section 4.2 Rel16, as it is the case for Rel17 and 18. Remove the unnecessary NE-DC requirements. Some editorial corrections are performed, too. NOTE: This CR is not for block approvalModerator: CR is reviewed directly in the CR review section offline before the Adhoc. A special thread will be created. |
| [**R4-2409467**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_111/Docs/R4-2409467.zip) | Draft CR for TS 38101-3 to clarify 1 UL configuration for NR Inter-band CA configurations between FR1 and FR2 | Huawei, Hisilicon | This formal CR is the same with the endorsed draft CR R4-2405300. Its purpose is to clearly specify the single UL configurations in the current specification TS38.101-3.Moderator: CR is reviewed directly in the CR review section offline before the Adhoc. A special thread will be created. Already endorsed in R4#110b |
| [**R4-2409468**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_111/Docs/R4-2409468.zip) | (NR\_CADC\_R18\_yBDL\_xBUL) CR for TS 38101-2 to clarify 1 UL configuration for CA | Huawei, Hisilicon | This formal CR is the same with the endorsed draft CR R4-2405301 in the RAN4#110bis meeting.Its purpose is to clearly specify the single UL configurations for NR CA in the current specification TS38.101-2.Moderator: CR is reviewed directly in the CR review section offline before the Adhoc. A special thread will be created. Already endorsed in R4#110b |
| [**R4-2409469**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_111/Docs/R4-2409469.zip) | (NR\_CADC\_R18\_yBDL\_xBUL) CR for TS 38101-1 to clarify 1 UL configuration for NR CA | Huawei, Hisilicon, Skyworks Solutions Inc. | This formal CR is the same with the endorsed draft CR R4-2403714. Its purpose is to clearly specify the single UL configurations for NR CA in the current specification TS38.101-1.Moderator: CR is reviewed directly in the CR review section offline before the Adhoc. A special thread will be created. Already endorsed in R4#110b |

## Open issues summary

Moderator: unless otherwise needed, the draft CRs will not be discussed in details in the Ad-hoc. Companies are

### Sub-topic 5-1 Draft CR review

Recommended WF: The CR should be reviewed offline to preserve ad-hoc time. A separate email thread will be used with below table to review offline and check during Ad-hoc.

|  |  |
| --- | --- |
| **T-doc**  | **Company/Review comment** |
| [**R4-2408039**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_111/Docs/R4-2408039.zip)CR for TS 38.307: Updates for new type of NE-DC configurations in Rel.18 | Company A |
| AdHoc minutes: Revise to remove brackets |
|  |
| [**R4-2408187**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_111/Docs/R4-2408187.zip)CR for TS 38.846: Corrections on UL triple beat analysis table | Skyworks: Thank you for aligning the convention with our previous WF R4-2220556 guidelines. If this CR gets agreed, it may be good to further cross-align the text of clause 6.5.3 brought in this CR with the text previously captured at the end of clause 7.4 regarding for the case of 3 band DL CA. Could we consider capturing the text highlighted in yellow below from clause 7.4 into this CR clause 6.5.3?“For type 3 UL configurations (e.g. CA\_n3A-n41C or DC\_3C\_n1A-n75A)For the case when the victim band may be affected by a 1st order triple-beat product Proponents should systematically check if the downlink band may be affected by dual uplink IMD3 interference. If the test point is missing, a dual UL IMD3 MSD test point should be specified.If TB frequency is composed of the frequency sum of the 2 discrete RBs in the contiguous UL CA, there is no need to specify the TB test configuration as the requirement can already be verified by the fallback 2UL IMD3. With reference to WF R4-2220556 [9], only the TB1 product |f1+f2-f3| and TB2 product |f1-f2+f3| should be considered – refer to TB landscape example of Figure 7.4-1. “This would bring further consistency between these two clauses. |
| Moderator: Revision needed to account for clarification given by Skyworks |
|  |
| [**R4-2408503**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_111/Docs/R4-2408503.zip)CR to TS 38.101-3 Rel18 Removal of Unnecessary NE-DC Requirements | Skyworks: Thanks for bringing this CR. We have some comments:* It may not be necessary to repeat the sentence “The requirements for EN-DC applies for NE-DC unless otherwise specified” in multiple places since Nokia pointed out in #110-bis that clause 4.2 already contains the sentence: “A terminal which supports NE-DC configurations shall meet the minimum requirements for corresponding EN-DC configuration, unless otherwise specified.”
* Clauses for which requirements are deleted should be voided, not deleted.

Not sure the grammatical corrections are need |
| Huawei/Mohammad: Based on offline discussions the revised Cr is uploaded of the draft folder. |
| Moderator: Revision needed |
| [**R4-2409467**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_111/Docs/R4-2409467.zip)Draft CR for TS 38101-3 to clarify 1 UL configuration for NR Inter-band CA configurations between FR1 and FR2 | ZTE: This CR is the resubmission of the endorsed draft CR from the last meeting, but the endorsed draft CR was already captured in the big CR (R4-2405980) in last meeting. So this CR is not needed. |
| Moderator: draft CR can be withdrawn |
|  |
| [**R4-2409468**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_111/Docs/R4-2409468.zip) (NR\_CADC\_R18\_yBDL\_xBUL) CR for TS 38101-2 to clarify 1 UL configuration for CA | ZTE: This CR is the resubmission of the endorsed draft CR from the last meeting, but the endorsed draft CR was already captured in the big CR (R4-2405979) in last meeting. So this CR is not needed. |
| Moderator: draft CR can be withdrawn |
|  |
| [**R4-2409469**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_111/Docs/R4-2409469.zip) (NR\_CADC\_R18\_yBDL\_xBUL) CR for TS 38101-2 to clarify 1 UL configuration for CA | Company A |
|  |
|  |
| [**R4-2408477**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_111/Docs/R4-2408477.zip) (DC\_R17\_1BLTE\_1BNR\_2DL2UL-Core) CR to TS 38.101-3 Rel17 Removal of Unnecessary NE-DC Requirements | Skyworks: Same comment as R4-2408503 |
| Moderator: Revision needed |
|  |
| [**R4-2408490**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_111/Docs/R4-2408490.zip)DC\_R16\_1BLTE\_1BNR\_2DL2UL) CR to TS 38.101-3 Rel16 Removal of Unnecessary NE-DC Requirements | Skyworks: Same comment as R4-2408503 |
| Moderator: Revision needed |
|  |

AdHoc minutes

# AI 6.1 Topic 6: Place holder: contributions transferred from block approval.

## Companies’ contributions summary

|  |  |  |  |
| --- | --- | --- | --- |
| **T-doc number** | **Title** | **Company** | **Proposals / Observations** |
| [**R4-2408860**](https://urldefense.com/v3/__https%3A/www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_111/Docs/R4-2408860.zip__;!!MyQQGECaxY11k7S_!aOd8Vnq1t6yP9nRo27qchW31HagTTn-euIAjhx_Bcm3DARJ8dnfobFIXqDpfiQ3rI5EcICw7wFKQlJYvHG0toF2Yxua7piym3Es$) | Draft CR for EN-DC Harmonic Mixing clean-up PC3 | Qualcomm France | Corrects MSD test points to meet the guidelines on CBW, LCRB and RB start |
| [**R4-2409422**](https://urldefense.com/v3/__https%3A/www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_111/Docs/R4-2409422.zip__;!!MyQQGECaxY11k7S_!aOd8Vnq1t6yP9nRo27qchW31HagTTn-euIAjhx_Bcm3DARJ8dnfobFIXqDpfiQ3rI5EcICw7wFKQlJYvHG0toF2Yxua73Al16yc$) | Draft CR for EN-DC Uplink Harmonic clean-up PC3 | Skyworks Solutions Inc. | Corrects MSD test points to meet the guidelines on CBW, LCRB and RB start |
| [**R4-2408862**](https://urldefense.com/v3/__https%3A/www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_111/Docs/R4-2408862.zip__;!!MyQQGECaxY11k7S_!a9NfVrtaiq7xZ-wtirgNn0Utrah4fy4cXxqC36-Ib3n1eBy3KWsxYJcPd-Z4fRzj6BEb5MEhxnRy98oagJe7J8lVakbz2_lH$) | Draft CR for NR CA Harmonic Mixing clean-up PC3 PC5 | Qualcomm France | Corrects MSD test points to meet the guidelines on CBW, LCRB and RB start |
| [**R4-2409420**](https://urldefense.com/v3/__https%3A/www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_111/Docs/R4-2409420.zip__;!!MyQQGECaxY11k7S_!a9NfVrtaiq7xZ-wtirgNn0Utrah4fy4cXxqC36-Ib3n1eBy3KWsxYJcPd-Z4fRzj6BEb5MEhxnRy98oagJe7J8lValfUbTfG$) | Draft CR for NR CA Uplink Harmonic clean-up PC3 | Skyworks Solutions Inc. | Corrects MSD test points to meet the guidelines on CBW, LCRB and RB start |
| [**R4-2407224**](https://urldefense.com/v3/__https%3A/www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_111/Docs/R4-2407224.zip__;!!MyQQGECaxY11k7S_!cLEDTbV10_zOQRKALJy1anBxTVIe9J9akUH0N8YlJmHKX1RAfYhUjNhVTFfhQd35InMD2iXuPKyZuN9RNaIznSU4cSLhcBrf$) | CR Bug Fixes 38101-3-i51\_s00-05 | Apple | This is a former CR, and includes several bakset WIDs, so it is not proper to discuss it in one specific basket  WID agenda. It is suggest to move to thread #105 |
| [**R4-2409315**](https://urldefense.com/v3/__https%3A/www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_111/Docs/R4-2409315.zip__;!!MyQQGECaxY11k7S_!cLEDTbV10_zOQRKALJy1anBxTVIe9J9akUH0N8YlJmHKX1RAfYhUjNhVTFfhQd35InMD2iXuPKyZuN9RNaIznSU4cf77UvRS$) | TP for TR 38.718-02-01 to remove brackets and complete CA\_n78A-n104A | Huawei, HiSilicon | Since this TP was discussed in non-block approval in last meeting, so it would be better to move it to thread #105 for further check. (Still there are several barckets kept in the TP)  |

## Open issues summary

### Sub-topic6-1 Draft CR/TPs review

Recommended WF: The CR/TP should be reviewed offline to preserve ad-hoc time. A separate email thread will be used with below table to review offline and check during Ad-hoc.

|  |  |
| --- | --- |
| **T-doc**  | **Company/Review comment** |
| [**R4-2408860**](https://urldefense.com/v3/__https%3A/www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_111/Docs/R4-2408860.zip__;!!MyQQGECaxY11k7S_!aOd8Vnq1t6yP9nRo27qchW31HagTTn-euIAjhx_Bcm3DARJ8dnfobFIXqDpfiQ3rI5EcICw7wFKQlJYvHG0toF2Yxua7piym3Es$) Draft CR for EN-DC Harmonic Mixing clean-up PC3 | Skyworks / Laurent: We would like to thank Qualcomm for bringing these necessary corrections. We have received off-line comments that these changes combined with our changes may be problematic for RAN5 and need to have further offline discussions to find a way to clean-up the Rel-18 harmonic MSD test points. |
| Moderator: Based on discussion with RAN5 a WF will be needed on UL Harmonic and harmonic mixing corrections  |
|  |
| [**R4-2409422**](https://urldefense.com/v3/__https%3A/www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_111/Docs/R4-2409422.zip__;!!MyQQGECaxY11k7S_!aOd8Vnq1t6yP9nRo27qchW31HagTTn-euIAjhx_Bcm3DARJ8dnfobFIXqDpfiQ3rI5EcICw7wFKQlJYvHG0toF2Yxua73Al16yc$) Draft CR for EN-DC Harmonic Mixing clean-up PC3 | Skyworks: Need further offline to address RAN5 concerns. |
| Moderator: Based on discussion with RAN5 a WF will be needed on UL Harmonic and harmonic mixing corrections |
|  |
| [**R4-2408862**](https://urldefense.com/v3/__https%3A/www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_111/Docs/R4-2408862.zip__;!!MyQQGECaxY11k7S_!a9NfVrtaiq7xZ-wtirgNn0Utrah4fy4cXxqC36-Ib3n1eBy3KWsxYJcPd-Z4fRzj6BEb5MEhxnRy98oagJe7J8lVakbz2_lH$)Draft CR for NR CA Harmonic Mixing clean-up PC3 PC5 | Skyworks: same comment as R4-2408860. |
| Moderator: Based on discussion with RAN5 a WF will be needed on UL Harmonic and harmonic mixing corrections |
|  |
| [**R4-2409420**](https://urldefense.com/v3/__https%3A/www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_111/Docs/R4-2409420.zip__;!!MyQQGECaxY11k7S_!a9NfVrtaiq7xZ-wtirgNn0Utrah4fy4cXxqC36-Ib3n1eBy3KWsxYJcPd-Z4fRzj6BEb5MEhxnRy98oagJe7J8lValfUbTfG$)Draft CR for NR CA Uplink Harmonic clean-up PC3 | Skyworks: same comment as R4-2409420. Note that we also have:* a PC2 NR-CA CR R4-2409421 in AI 6.17.2.
* a discussion paper on further corrections needed for the UL configurations of all Harmonic MSD test points in R4-2407164 AI 5.3. This paper proposes a last set of changes for the August meeting where necessary changes are proposed for Lcrb, RBstart=0 to cross-align EN-DC test points with their NR-CA counterparts.
 |
| Moderator: Based on discussion with RAN5 a WF will be needed on UL Harmonic and harmonic mixing corrections |
|  |
| [**R4-2407224**](https://urldefense.com/v3/__https%3A/www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_111/Docs/R4-2407224.zip__;!!MyQQGECaxY11k7S_!cLEDTbV10_zOQRKALJy1anBxTVIe9J9akUH0N8YlJmHKX1RAfYhUjNhVTFfhQd35InMD2iXuPKyZuN9RNaIznSU4cSLhcBrf$)CR Bug Fixes 38101-3-i51\_s00-05 | Company A |
|  |
|  |
| [**R4-2409315**](https://urldefense.com/v3/__https%3A/www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_111/Docs/R4-2409315.zip__;!!MyQQGECaxY11k7S_!cLEDTbV10_zOQRKALJy1anBxTVIe9J9akUH0N8YlJmHKX1RAfYhUjNhVTFfhQd35InMD2iXuPKyZuN9RNaIznSU4cf77UvRS$)TP for TR 38.718-02-01 to remove brackets and complete CA\_n78A-n104A | Skyworks: We are ok to remove theses brackets. This reflects the discussions held in RAN4 meeting #110-bis. |
|  |
|  |

# AI 12.3 Topic #1: Templates and guidelines

## Companies’ contributions summary

|  |  |  |  |
| --- | --- | --- | --- |
| **T-doc number** | **Title** | **Company** | **Proposals / Observations** |
| **[R4-2408359](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_111/Docs/R4-2408359.zip)** | Improved R19 TR templates for PC3 xUL/2DL inter-band NR CA/DC | ZTE Corporation, Sanechips | **Proposal: To approve the** **improved MSD table templates in Table 2.1, Table 2.2, Table 2.3 and Table 2.4 for R19 PC3 TR for 2 bands DL with x bands UL (x=1,2) inter-band NR CA/DC TR.****Proposal 2: To include the band group range table in the Annex part in the TR.**

|  |
| --- |
| FR1 band group range |
| Name | **FR1-a** | **FR1-b** | **FR1-c** | **FR1-d** | **FR1-e** |
| Range (MHz) | 600-1000 | 1400-2200 | 2300-2700 | 3300-5000 | 5150-7125 |
| Duplex mode | Mostly FDD | Mostly FDD | FDD and TDD | TDD only | TDD only |

**Proposal 3: Keep delta T/R part in the TR.****Proposal 4: To endorse the proposed R19 TR template in the section 5.****Moderator: some editorial changes to the R4#110b approved templates, changes may be merged with Skyworks, Nokia Templates for 2 bands and 3 bands** |
| **[R4-2407231](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_111/Docs/R4-2407231.zip)** | Template for 2 band DL 1or2 band UL inter-band combination TR and TP | Skyworks Solutions Inc., Nokia | Proposed enhancements for 2DL/1or2UL bands block approval TP template for Release 19:• Addition at the end of section “5.XX.1.2 Channel bandwidths per operating band for CA” of:o A question related to the support of SimRx/Tx, or otherwise for TDD/TDD cases.o A table that sorts the applicable UL configuration and their related MSD studies• For the 2DL/1UL section:o The addition of a specific section for “Co-existence studies for 1UL band with 1CC” UL harmonic and harmonic mixing tables are updated in a matrix form with additional guidelines as approved in [2] A new calculation table for cross-band isolation MSD is added, as approved in [3]o The addition of a specific section for “Co-existence studies for 1UL band with 2CC intra-band” The IMD range table is updated and simplified as discussed in [4]• For this meeting, the delta T/R, REFSENS and OOB exception sections are not covered. However, these may be part of further guidelines/proposals on how to design MSD test points.• For the 2DL/2UL section:o Slightly updated 2DL 2UL with 1CC/band IMD table, with an analysis and note sectiono Added section “5.XX.2.2.1 Co-existence studies for 2UL band with 3CC (2CC intra-band in one band)”, with a calculation table that includes an analysis and note section, as discussed in [5]• The band group table used in [3] and [5], is added in Annex A (note that the last band group had an error as the starting frequency is 5150MHz and not 5250MHz).• The valid UL configurations up to Release 18 are listed in Annex B.**Moderator: some editorial changes to the R4#110b approved templates, changes may be merged with ZTE input** |
| [**R4-2407232**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_111/Docs/R4-2407232.zip) | Template for 3 band DL 2 band UL inter-band combination TR and TP | Skyworks Solutions Inc., Nokia | Proposed enhancements for 3DL/2UL bands block approval TP template for Release 19:• Addition at the end of section “5.XX.1.2 Channel bandwidths per operating band for CA” of:o A table that sorts the applicable UL configuration and their related MSD studies• For this meeting, the delta T/R and REFSENS sections are not covered. However, these sections may be part of further guidelines/proposals on how to design MSD test points.• For the 2DL/2UL section:o Slightly updated 3DL 2UL with 1CC/band IMD table, including an analysis and note sectiono Added section “5.XX.2.2.1 Co-existence studies for 2UL band with 3CC (2CC intra-band in one band)”, with a calculation table that includes an analysis and note section, as discussed in [2]• The band group table used in [2], is added in Annex A (note that the highest band group had an error, as the starting frequency is 5150MHz and not 5250MHz).• The valid UL configurations up to Release 18 are listed in Annex B.**Moderator: 3DL band template based on the R4#110b approved templates, changes may be merged with ZTE input** |
| [**R4-2407394**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_111/Docs/R4-2407394.zip) | On introducing a TP template for FDD intra-band CA with 1-2ULCC | Skyworks Solutions Inc. | Proposal on block approval template for FDD intra-band DLCA with 1 or 2 UL CC MSD:• Specification framework should mature further to enable a template that can be used in the block approval process.o For example, in terms of ACLR or IMD range to be considered, CBW to be used for PCC/SCC and related RB allocation placement.• The development of such template for block approval is however recommended to pursue in Release 19 with the following goals:o Detect potential MSD issues to PCC/SCC for FDD intra-band ULCA with one or two UL CCs. Both contiguous and non-contiguous DLCA are in scope.o The proponent can design the MSD test point to be evaluated based on restricted guidelines on PCC/SCC CBW and RB allocation placement.o The evaluation of the MSD value can then be proposed or evaluated within the “Not for block approval” AI by experts.• It is not proposed that A-MPR issues resulting from intra-band ULCA are treated by block approval and it should be noted that this applies to both FDD and TDD. |
| [**R4-2407443**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_111/Docs/R4-2407443.zip) | MSD test point guidelines for 2 and 3 band DL TP | Skyworks Solutions Inc. | Proposal for two band DL TP templates to be developed in Release 19:• MSD test point templates are added in the relevant REFSENS sections for one UL band and two UL band of the two band DL TPs based on the specification format. This will cover:o UL harmonic, harmonic mixing and cross-band MSB table templates for 1UL band with one CCo Related IMD MSD table template for 1UL band with two CCo Related IMD MSD table template for 2UL band with one CC/bando Related IMD MSD table template for 2UL band with three CC• MSD test point templates are added in the REFSENS section for two UL band of the three band DL TPs based on the specification format. This will cover third band MSD for:o Related IMD MSD table template for 2UL band with one CC/bando Related IMD MSD table template for 2UL band with three CC• These tables will be followed by notes for the MSD test point design covering:o UL and DL CBWo UL LCRBo UL and DL channel location o UL RBstarto Those notes will not be needed in the submitted TP, but will allow that consistent MSD test points are proposed. |
| [**R4-2409318**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_111/Docs/R4-2409318.zip) | Discussion on TR template for band combination basket WI | Huawei, HiSilicon | ***Proposal 1: To include RF reference architecture, assumptions for RF components and MSD analysis procedure into Rel-19 basket TR report.******Proposal 2: To introduce the following notes for distinguishing mandatory/non-mandatory cases in order to avoid specifying unnecessary cases.***Table 1: UL/DL harmonics collision table

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **UL/DLharmonics** | **nX** | **UL13** | **UL2** | **UL32** | **UL4** | **UL5** | **MSD type** |
| **fLow** | fULlow | 2\*fULlow | 3\*fULlow | 4\*fULlow | 5\*fULlow |
| **nY** | **fLow** | **fHigh** | fULhigh | 2\*fULhigh | 3\*fULhigh | 4\*fULhigh | 5\*fULhigh |
| **DL1** | fDLlow | fDLhigh | N/A |  |  |  |  | **UL harmonic** |
| **DL22** | 2\*fDLlow | 2\*fDLhigh |  | N/A |  | N/A | N/A | **Harmonic mixing** |
| **DL33** | 3\*fDLlow | 3\*fDLhigh |  |  | N/A |  | N/A |
| **DL4** | 4\*fDLlow | 4\*fDLhigh |  | N/A | N/A | N/A | N/A |
| **DL53** | 5\*fDLlow | 5\*fDLhigh |  |  | N/A | N/A | N/A |
| **Analysis** | text |
| **UL/DLharmonics** | **nY** | **UL13** | **UL2** | **UL32** | **UL4** | **UL5** | **MSD type** |
| **fLow** | fULlow | 2\*fULlow | 3\*fULlow | 4\*fULlow | 5\*fULlow |
| **nX** | **fLow** | **fHigh** | fULhigh | 2\*fULhigh | 3\*fULhigh | 4\*fULhigh | 5\*fULhigh |
| **DL1** | fDLlow | fDLhigh | N/A |  |  |  |  | **UL harmonic** |
| **DL22** | 2\*fDLlow | 2\*fDLhigh |  | N/A |  | N/A | N/A | **Harmonic mixing** |
| **DL33** | 3\*fDLlow | 3\*fDLhigh |  |  | N/A |  | N/A |
| **DL4** | 4\*fDLlow | 4\*fDLhigh |  | N/A | N/A | N/A | N/A |
| **DL53** | 5\*fDLlow | 5\*fDLhigh |  |  | N/A | N/A | N/A |
| **Analysis** | text |
| Note 1: When a collision is detected with an overlap >0Hz between the UL(X) with DL(Y) frequency ranges, the UL(X)/DL(Y) cell is marked “D” for direct hit. When the gap between UL(X) and DL(Y) frequency range is from 0Hz to X\*MinULCBW, the UL(X)/DL(Y) cell is marked “N” for Near miss.Note 2: UL3/DL2 harmonic mixing direct hit case for PC3/5 only apply for DL>3GHzNote 3: For harmonic mixing, near-miss cases only apply for UL1 and odd DL orders.Note 4: For Red parts, it is mandatory to specify MSD test configuration based on the previous practice in RAN4. For Yellow parts, whether to specify MSD test configuration depends on technical analysis and conditions, e.g. UL Power Class, components performance and frequency range. |

Table 3: Cross-band isolation analysis of CA\_nXA-nYA with nX and nY UL

|  |  |  |
| --- | --- | --- |
| **Bands3** | **nX** | **nY** |
| **Frequency limit** | **fx\_low / min** | **fx\_high / max** | **fy\_low / min** | **fy\_high / max** |
| **fUL (MHz)** |  |  |  |  |
| **fDL (MHz)** |  |  |  |  |
| **CBW (MHz)2** |  |  |  |  |
| **ACLR1 range** | fxULlow-maxULCBWx | fxULhigh+maxULCBWx | fyULlow-maxULCBWy | fyULhigh+maxULCBWy |
| **ACLR1 (MHz)** |  |  |  |  |
| **ACLR2 range** | fxULlow-2\*maxULCBWx | fxULhigh+2\*maxULCBWx | fyULlow-2\*maxULCBWy | fyULhigh+2\*maxULCBWy |
| **ACLR2 (MHz)** |  |  |  |  |
| **ACLR3 range** | fxULlow-3\*maxULCBWx | fxULhigh+3\*maxULCBWx | fyULlow-3\*maxULCBWy | fyULhigh+3\*maxULCBWy |
| **ACLR3 (MHz)** |  |  |  |  |
| **ACLR4 range** | fxULlow-4\*maxULCBWx | fxULhigh+4\*maxULCBWx | fyULlow-4\*maxULCBWy | fyULhigh+4\*maxULCBWy |
| **ACLR4 (MHz)** |  |  |  |  |
| **ACLR5 range1** | fxULlow-5\*maxULCBWx | fxULhigh+5\*maxULCBWx | fyULlow-5\*maxULCBWy | fyULhigh+5\*maxULCBWy |
| **ACLR5 (MHz)** |  |  |  |  |
| **Analysis** |  |  |
| NOTE 1: For Red parts, it is mandatory to specify MSD test configuration based on the previous practice in RAN4. For Yellow parts, whether to specify MSD test configuration depends on technical analysis and conditions, e.g. UL Power Class, filter performance and PA linearity performance. |

***Proposal 3: To consider the following template.*****Moderator: some recommendation changes to the R4#110b approved templates, changes may be merged with Skyworks, Nokia , ZTE Templates for 2 bands and 3 bands** |

## Open issues summary

### Sub-topic 7-1 Template for FDD intra-band DL CA with 1 or 2 UL CCs

**Issue 7-1:**

* Proposals: Proposal on block approval template for FDD intra-band DLCA with 1 or 2 UL CC MSD:

• Specification framework should mature further to enable a template that can be used in the block approval process.

o For example, in terms of ACLR or IMD range to be considered, CBW to be used for PCC/SCC and related RB allocation placement.

• The development of such template for block approval is however recommended to pursue in Release 19 with the following goals:

o Detect potential MSD issues to PCC/SCC for FDD intra-band ULCA with one or two UL CCs. Both contiguous and non-contiguous DLCA are in scope.

o The proponent can design the MSD test point to be evaluated based on restricted guidelines on PCC/SCC CBW and RB allocation placement.

o The evaluation of the MSD value can then be proposed or evaluated within the “Not for block approval” AI by experts.

* Recommended WF: Companies discuss whether intra-band FDD combination could be subject to block approval at least up to test point proposal and then MSD values may be discussed in not for block approval AI to get experts inputs.
	+ Discuss if template should be developed in R19
	+ Discussion is done offline and companies can provide their input in table below

Offline discussion comments

|  |  |
| --- | --- |
| **Company/Delegate** | **Comment** |
| Skyworks/Dominique | We are interested to get feedback from the group if it makes sense to develop a TP to TR for FDD intra-band cases with 1/2 ULCC such that at least the issues are identified by proponent and possibly the associated test point parameters. The MSD value could still be left for discussion/expert input within the not for block approval AI. We believe that we could develop such a template by end of 2024. |
| Qualcomm | We are not against this, but the amount of such combinations could be pretty limited. |
| Huawei/Mohammad | Thanks for the Templates. It is good to guide delegates on how to analyze the existence of different MSD scenarios, but it is better to add to the MSD Tables that above a certain IMD level (let’s say higher than IMD5) the MSD value of the detected IMD is studied in NR\_Baskets\_Part\_1 WI. The reason is, based on my observation if the MSD analysis seems complicated to the authors, sometimes, they do not propose the UL CA band combinations at all and it will cause spec inconsistency in the long run. Surely for IMD7 and beyond, many contributing companies will not be able to do the proper MSD evaluations.On another note I wanted to propose to remove “5.X.1.1 Operating bands for CA” from all the templates, because it does not have any new information. Either the rapporteur make a reference to TS 38.101-1 Table 5.2-1 or add the operating bands at the beginning of the TR. |

AdHoc minutes

Moderator: lower priority vs 2 band and 3 band cases

### Sub-topic 7-2 Template for 2DL band inter-band DL CA with 1 or 2 UL bands and up to 3CCs

**Issue7-2:**

* Proposals:

• **Skyworks Solutions Inc., Nokia.** Proposes in R4-2407231 a slightly updated (editorial only) TP template based on per MSD type templates approved in R4#110b

• **ZTE Corporation, Sanechips** proposes in R4-2408359 some editorial improvements to the per MSD type templates approved in R4#110b

• **Huawei, HiSilicon,** proposes in R4-2409318 some improvement to the per MSD type templates approved in R4#110b by adding mandatory/optional on harmonic and cross band related MSD orders

* Recommended WF:
* Inputs are very similar and does not revisit the technical aspects so it should be feasible to merge inputs after discussion,
* agreement can be captured captured in a revision of the overall template for 2 band DL from Skyworks, Nokia and co-signing as wished.
* Alternatively some agreements can be captured in a way forward
	+ Both can be led by ZTE as rapporteur
* Companies discuss the notion of MSD orders mandatory/optional to specify versus MSD orders to be considered (means needs to be analyzed and if necessary specified)
* Discussion is done offline and companies can provide their input in table below

Offline discussion comments

|  |  |
| --- | --- |
| **Company/Delegate** | **Comment** |
| Skyworks/Dominique | We are fine with the proposals for the tables in ZTE R4-2408359. And are also OK to discuss if MSD orders should be defined as considered (ie specified if MSD value is not negligible) versus Mandatory/optional as proposed by Huawei (this is under the understanding that a company can flag a TP if it thinks an optional MSD should have been specified). Our preference would be to revise R4-2407231 or have a WF with the same similar content to capture all the changes and have a complete template. |
| Qualcomm | We not see point and do not agree with dividing some requirements as mandatory/optional.  |
| Huawei/Mohammad | same as 7-2 |
| ZTE | We slight prefer not to add Madate/Optional in the template since we should not capture many rules in the TR template. The MSD table aims to propose a guideline for people how many/which order MSD should be calculated.In addtional, how to reflect the optional MSD in the spec?At least TR template approved in this meeting(if possible) is beneficial for the R19 basket WID in Aug meeting.  |
| Huawei/ Peng Zhang | To QC, I can understand your point, but it’s the fact that some band combinations which didn’t specify any MSD for 2nd harmonic mixing and larger than IMD5 MSD were deployed in current network and worked well. My concerns are that more MSD types and test points will lead to more RAN4 efforts and UE test burdens. |

AdHoc minutes

Discussion on mandatory/Optional vs to be considered:

Qualcomm: Prefer “to be considered”, specification is contribution driven. To be considered does not mean that MSD is specified.

Huawei: we have extended the range of IMDs/ACLR for NR. We do not want to introduce too many test points.

ZTE: Share same view than Qualcomm, guidelines to detect issues. Don’t need to capture mandatory/optional in template

Qualcomm: To be considered based on analysis

Skyworks: template is to detect if there is an issue. Specification is based on the technical analysis. May be capture in the template that the tables are to detect potential issues.

Qualcomm: It is good to clarify the group understanding in the template.

ZTE: prefer to capture in TR.

Nokia: need to capture rules and guideline. Better to capture in the band combination TR

AT&T: Still need to find where these guidelines are. Need for maintenance => move to PRD? Allows better maintenance. Templates could be part of this

Skyworks: PRD is interesting but most of the time TPs are copy/paste.

Nokia: how to start PRD. Can we agree on working on capturing rules/guidelines/TRS/TPS in a PRD?

CHTTL: clarification who maintains PRD?

AT&T: MCC publishes PRD and maintains it.

ZTE: PRD was already discussed, some drawbacks was identified. May not be applicable for RAN4.

AT&T: PRD is discussed in Spec improvement.

Moderator: report to chairman that some of our guidelines may be better captured in a PRD. At least it should be I a permanent document that can be maintained.

### Sub-topic 7-3 Template for 3DL band inter-band DL CA with 2 UL bands and up to 3CCs

**Issue7-3:**

* Proposals:

• **Skyworks Solutions Inc., Nokia.** Proposes in R4-2407232 a 3 band TP template based on relevant 2 band per MSD type templates approved in R4#110b

• Some proposals from **ZTE Corporation, Sanechips** **may be relevant for 3 band DL**

* Recommended WF:
* After discussion, agreement can be captured in a revision of the overall template for 3 band DL from Skyworks, Nokia and co-signing as wished.
* Alternatively some agreements can be captured in a way forward
	+ Both can be led by ZTE as rapporteur or Skyworks
* Discussion is done offline and companies can provide their input in table below

Offline discussion comments

|  |  |
| --- | --- |
| **Company/Delegate** | **Comment** |
| Skyworks/Dominique | We believe that it is useful to have such a 3 band TP template and are open to revise based on further inputs and also further check valid triple beat tones for MSD in a third band. |
| Qualcomm | This is beneficial |
| Huawei/Mohammad | same as 7-2 |
| ZTE | Same as 7-2 |

AdHoc minutes

### Sub-topic 7-4 Addition of guidelines on MSD test points for 2 and 3 DL band TPs.

**Issue 7-4:**

* Proposals: Proposal for two band DL TP templates to be developed in Release 19:

• MSD test point templates are added in the relevant REFSENS sections for one UL band and two UL band of the two band DL TPs based on the specification format. This will cover:

o UL harmonic, harmonic mixing and cross-band MSB table templates for 1UL band with one CC

o Related IMD MSD table template for 1UL band with two CC

o Related IMD MSD table template for 2UL band with one CC/band

o Related IMD MSD table template for 2UL band with three CC

• MSD test point templates are added in the REFSENS section for two UL band of the three band DL TPs based on the specification format. This will cover third band MSD for:

o Related IMD MSD table template for 2UL band with one CC/band

o Related IMD MSD table template for 2UL band with three CC

• These tables will be followed by notes for the MSD test point design covering:

o UL and DL CBW

o UL LCRB

o UL and DL channel location

o UL RBstart

o Those notes will not be needed in the submitted TP, but will allow that consistent MSD test points are proposed.

.

* Recommended WF: Companies discuss whether MSD guidelines and templates should be added to 2 and 3 DL band TPs.
	+ Discuss if template should be developed in R19
	+ Discussion is done offline and companies can provide their input in table below

Offline discussion comments

|  |  |
| --- | --- |
| **Company/Delegate** | **Comment** |
| Skyworks/Dominique | With current agreements, the template have tables for the detection of issues but no guidelines for the test point design. We think it would be beneficial to add those and we are sorry if we could not make this happen in time for the beginning of R19 baskets but we think we should be able to add those by end of 2024. |
| Qualcomm | Ideally, this would be good but in practice may turn out to be challenging define especially MSD guidelines |
| ZTE | The guidelines for the MSD test point design would be good.  |

AdHoc minutes

# Topic #2: work plan and baskets

## Companies’ contributions summary

Moderator: the detailled work plan for R19 can only be decided in next RAN plenary. The below documents are thus for discussion on whether RAN4 may have recommendations on the work plan. It is poroposed to discuss these offline between interested companies in a specific thread and check with Chiarman on how to capture potential RAN4 recommendations.

|  |  |  |  |
| --- | --- | --- | --- |
| **T-doc number** | **Title** | **Company** | **Proposals / Observations** |
| [**R4-2407545**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_111/Docs/R4-2407545.zip) | Further discussion on RAN4 basket WI work plan | CATT | **Proposal 1: RAN4 to separate work items (WIs) that require non-block approval and those necessitating block approval. For instance,** **establish a dedicated low-low band combination, which falls under the non-block approval process.****Proposal 2: RAN4 to arrange a preliminary preparation teleconference just before RAN#104, specifically focused on the spectrum-related work items for Rel-19.** |
| [**R4-2407707**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_111/Docs/R4-2407707.zip) | Proposal for FDD+FDD Inter-band PC2 | T-Mobile USA | Proposal: Include FDD+FDD PC2 inter-band UL CA for FDD in the Release-19 inter-band CA-DC WID. |
| [**R4-2408450**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_111/Docs/R4-2408450.zip) | Rel-19 WID Intra-band | Ericsson | Moderator: propose a WI for intra-band DL/UL CA for LTE with up to 3CC UL but say NRCA. Scope should be better clarified: Intra-band CA for NR or LTE? Number of DL and UL CCs in each case. |
| [**R4-2408451**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_111/Docs/R4-2408451.zip) | Rel-19 WID HPUE EN-DC | Ericsson | Moderator: propose a WI for HPUE\_FR1\_DC\_LTE\_NR\_R19 High power UE (power class m with 1<m<3) for a single FR1 band in UL of Dual Connectivity (DC) combinations of x bands (x=1,2,3, 4 for y=1 or x=1, 2 for y=2) LTE inter-band CA (xDL/1UL) and y bands NR inter-band CA (yDL/1UL)May need to clarify if intra-band ULCA is allowed as on of UL band UL configuration or not, also which BC and per band power class are covered |
| [**R4-2409191**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_111/Docs/R4-2409191.zip) | On RAN4 basket WI work planning | Nokia | Proposal 1: The current LTE basket which contains all types of band combinations with only LTE bands should continue in Rel-19.Proposal 2: RAN4 shall consider the proposal for Rel-19 MR-DC baskets presented in Table 2.

|  |  |  |
| --- | --- | --- |
| **Current Rel-18 MR-DC Baskets:** | **New Rel-19 MR-DC Baskets:** | **TR?** |
| DC\_R18\_1BLTE\_1BNR\_2DL2UL | **DC\_1BLTE\_1BNR\_2DL2UL\_R19** | Yes |
| DC\_R18\_2BLTE\_1BNR\_3DL2ULDC\_R18\_xBLTE\_2BNR\_yDL2UL | **DC\_xBLTE\_yBNR\_3DL2UL\_R19**x + y = 3 | Yes |
| DC\_R18\_xBLTE\_1BNR\_yDL2ULDC\_R18\_xBLTE\_2BNR\_yDL2ULDC\_R18\_xBLTE\_yBNR\_zDL2ULDC\_R18\_xBLTE\_yBNR\_zDL3UL | **DC\_xBLTE\_yBNR\_zDLqUL\_R19**x + y > 33 ≤ z ≤ 62 ≤ q ≤ 3 (1BLTE\_1or2BNR) | No |

Proposal 3: RAN4 shall consider the NR CA/DC baskets as shown in Table 3.

|  |  |  |
| --- | --- | --- |
| **Current Rel-18 NR CA/DC Baskets:** | **New Rel-19 NR CA/DC Baskets:** | **TR?** |
| NR\_CA\_R18\_intra | **CA\_NR\_intra\_R19** | Yes |
| NR\_CADC\_R18\_2BDL\_xBUL | **CADC\_NR\_ 2BDL\_xBUL\_R19** | Yes |
| NR\_CADC\_R18\_3BDL\_xBUL | **CADC\_NR\_ 3BDL\_xBUL\_R19** | Yes |
| NR\_CADC\_R18\_yBDL\_xBUL | **CADC\_NR\_ yBDL\_xBUL\_R19**y > 3 | No |

Proposal 4: Rel-19 basket WIs should be power class agnostic.Proposal 5: RAN4 shall consider the HPUE baskets as shown in Table 4 as new and merge the remaining HPUE combinations into the other Rel-19 baskets.

|  |  |  |  |
| --- | --- | --- | --- |
| **Current Rel-18 HPUE Baskets:** | **New Rel-19 Baskets:** | **PC added to Rel-19 Basket(s)** | **PCs** |
| LTE\_NR\_HPUE\_FWVM\_REL18 | **HPUE\_FWVM\_LTE\_NR\_R19** |  | PC1 |
| HPUE\_NR\_FR1\_TDD\_R18 HPUE\_NR\_FR1\_FDD\_R18 | **HPUE\_FR1\_NR\_R19** |  | PC2 and PC1.5 |
| HPUE\_FR1\_TDD\_DC\_LTE\_NR\_R18 | No independent basket | **DC\_1BLTE\_1BNR\_2DL2UL\_R19****DC\_xBLTE\_yBNR\_3DL2UL\_R19****DC\_xBLTE\_yBNR\_zDLqUL\_R19** | PC2 and PC1.5 |
| HPUE\_NR\_FR1\_TDD\_intra\_CA\_R18 | No independent basket | **CA\_NR\_intra\_R19** | PC2 and PC1.5 |
| HPUE\_FR1\_TDD\_NR\_CADC\_SUL\_R18 HPUE\_FR1\_FDD\_NR\_CADC\_R18 | No independent basket | **CADC\_NR\_ 2BDL\_xBUL\_R19****CADC\_NR\_ 3BDL\_xBUL\_R19****CADC\_NR\_ yBDL\_xBUL\_R19** | PC2 and PC1.5 |

Table 4 – HPUE Basket Rel-19 proposal |
| [**R4-2409364**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_111/Docs/R4-2409364.zip) | Rel-19 WID NR Inter-band CA/DC for y bands DL with x bands UL (y=4,5,6, x=1,2) | Ericsson | Moderator: propose a WI for Rel-19 NR Inter-band CADC for y bands DL with x bands UL (y=4,5,6, x=1,2). The new part is 6 bands DL? |

## Open issues summary

### Sub-topic 8-1 need for baskets or combination types ”not for block approval”

**Issue 8-1:**

* Proposals 1: **CATT**:
* establish a dedicated low-low band combination, which falls under the non-block approval process.
* RAN4 to arrange a preliminary preparation teleconference just before RAN#104, specifically focused on the spectrum-related work items for Rel-19.
* Recommended WF
* Discuss if some combination types (including LBLB) need a separate WI with a “not for block approval” process.
	+ LBLB
	+ Others…?
	+ Uses block approval instead?

Offline discussion comments

|  |  |
| --- | --- |
| **Company/Delegate** | **Comment** |
| Skyworks/Dominique | We do not have a strong opinion whether a dedicated WI is still needed but we still think the LBLBand LBLBLB combinations requires the attention of experts and especially discuss the architecture and implementation aspects, at least for the cases for 2UL bands or intra-band CA in one UL. |

AdHoc minutes

### Sub-topic 8-2 power class agnostic baslkets

**Issue 8-1:**

* Proposals 1: **Nokia**: Rel-19 basket WIs should be power class agnostic.
* Proposals 2: **Ericsson**: WI for HPUE\_FR1\_DC\_LTE\_NR\_R19
* High power UE (power class m with 1<m<3) for a single FR1 band in UL of Dual Connectivity (DC) combinations of x bands (x=1,2,3, 4 for y=1 or x=1, 2 for y=2) LTE inter-band CA (xDL/1UL) and y bands NR inter-band CA (yDL/1UL).
	+ Moderator: May need to clarify if intra-band ULCA is allowed as one of UL band UL configuration or not, also which BC and per band power class are covered
* Proposals 3: **TMO US**:
* Include FDD+FDD PC2 inter-band UL CA for FDD in the Release-19 inter-band CA-DC WID.
* Recommended WF
* Discuss if HPUE band combinations can be power class agnostic or have dedicated baskets
	+ Which cases are covered for HPUE? Which cases have general requirements covered?
	+ How are power class requested? Per BC + per band per BC?
	+ How is the sequence done and enforced?

Offline discussion comments

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| **Company/Delegate** | **Comment** |
| Skyworks/Dominique | In our view it depends on what the group decides on simplification of the HPUE MSDs. Also we still think the the PC3 part should be finalized before higher power classes are added so we are not sure how this may be enforced if everything get to block approval. |

AdHoc minutes

### Sub-topic 8-3 baskets for R19

**Issue 8-1:**

* Proposals 1: **Ericsson**:
* WI for intra-band DL/UL CA for LTE with up to 3CC UL. Also include NRCA
	+ Moderator: Scope should be better clarified: Intra-band CA for NR or LTE? Number of DL and UL CCs in each case.
* WI for Rel-19 NR Inter-band CADC for y bands DL with x bands UL (y=4,5,6, x=1,2).
	+ Moderator: The new part is 6 bands DL?
* Proposals 2: **Nokia**:
* Proposal 1: The current LTE basket which contains all types of band combinations with only LTE bands should continue in Rel-19.
* Proposal 2: RAN4 shall consider the proposal for Rel-19 MR-DC baskets presented in Table 2.

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| **Current Rel-18 MR-DC Baskets:** | **New Rel-19 MR-DC Baskets:** | **TR?** |
| DC\_R18\_1BLTE\_1BNR\_2DL2UL | **DC\_1BLTE\_1BNR\_2DL2UL\_R19** | Yes |
| DC\_R18\_2BLTE\_1BNR\_3DL2ULDC\_R18\_xBLTE\_2BNR\_yDL2UL | **DC\_xBLTE\_yBNR\_3DL2UL\_R19**x + y = 3 | Yes |
| DC\_R18\_xBLTE\_1BNR\_yDL2ULDC\_R18\_xBLTE\_2BNR\_yDL2ULDC\_R18\_xBLTE\_yBNR\_zDL2ULDC\_R18\_xBLTE\_yBNR\_zDL3UL | **DC\_xBLTE\_yBNR\_zDLqUL\_R19**x + y > 33 ≤ z ≤ 62 ≤ q ≤ 3 (1BLTE\_1or2BNR) | No |

* Proposal 3: RAN4 shall consider the NR CA/DC baskets as shown in Table 3.

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| **Current Rel-18 NR CA/DC Baskets:** | **New Rel-19 NR CA/DC Baskets:** | **TR?** |
| NR\_CA\_R18\_intra | **CA\_NR\_intra\_R19** | Yes |
| NR\_CADC\_R18\_2BDL\_xBUL | **CADC\_NR\_ 2BDL\_xBUL\_R19** | Yes |
| NR\_CADC\_R18\_3BDL\_xBUL | **CADC\_NR\_ 3BDL\_xBUL\_R19** | Yes |
| NR\_CADC\_R18\_yBDL\_xBUL | **CADC\_NR\_ yBDL\_xBUL\_R19**y > 3 | No |

* Proposal 5: RAN4 shall consider the HPUE baskets as shown in Table 4 as new and merge the remaining HPUE combinations into the other Rel-19 baskets.

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| **Current Rel-18 HPUE Baskets:** | **New Rel-19 Baskets:** | **PC added to Rel-19 Basket(s)** | **PCs** |
| LTE\_NR\_HPUE\_FWVM\_REL18 | **HPUE\_FWVM\_LTE\_NR\_R19** |  | PC1 |
| HPUE\_NR\_FR1\_TDD\_R18 HPUE\_NR\_FR1\_FDD\_R18 | **HPUE\_FR1\_NR\_R19** |  | PC2 and PC1.5 |
| HPUE\_FR1\_TDD\_DC\_LTE\_NR\_R18 | No independent basket | **DC\_1BLTE\_1BNR\_2DL2UL\_R19****DC\_xBLTE\_yBNR\_3DL2UL\_R19****DC\_xBLTE\_yBNR\_zDLqUL\_R19** | PC2 and PC1.5 |
| HPUE\_NR\_FR1\_TDD\_intra\_CA\_R18 | No independent basket | **CA\_NR\_intra\_R19** | PC2 and PC1.5 |
| HPUE\_FR1\_TDD\_NR\_CADC\_SUL\_R18 HPUE\_FR1\_FDD\_NR\_CADC\_R18 | No independent basket | **CADC\_NR\_ 2BDL\_xBUL\_R19****CADC\_NR\_ 3BDL\_xBUL\_R19****CADC\_NR\_ yBDL\_xBUL\_R19** | PC2 and PC1.5 |

* Recommended WF
* Discuss WI types and number with an overall list first
	+ Should clarify number of DL bands for HPUE
		- only 1, 2 and 3? How many UL bands, how many UL CCs….
		- higher order covered by default?
		- Which sequence
	+ Which HPUE cases are ready for R19 in terms of general requirement?
	+ Are they all for block approval
	+ Which needs TR
	+ LTE as in R18
* Capture the overall RAN4 recommendation in a WF if agreeable

Offline discussion comments

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| **Company/Delegate** | **Comment** |
| Skyworks/Dominique | We do not have a strong view on the number of baskets but we think the there two criteria that should drive this:First Whether a band combination requires A-MPR MSD/coex studies and thus also need a sequence of specifying and other cases which only have DeltaT/R but no MSD study. Second load balancing in terms of TP/CR work for rapporteurs.With this we believe that any >3DL band could be a single basket and CR work shared in a proper way. In this case no TP would be required, just draft CRs. For combinations that only require an entry to the spec and derivative of FR1 NRCA or ENDC (FR1+FR2,NRDC…) this could be a single basket with CRs created directly from the request. |

AdHoc minutes

Nokia: a draft WF is in [105] proposing how to organize baskets. RAN guidance is to reduce the number of baskets.

# Recommendations for document handling

### Recommendation for existing documents

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| **T-doc**  | **Title** | **Company** | **Recommendation** | **Comment** |
| [**R4-2407072**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_111/Docs/R4-2407072.zip) | MSD Analysis for CA\_n40A-n41C | Apple | to be noted | Combinations postponed to R19 no consensus on MSD guidelines change. |
| [**R4-2407073**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_111/Docs/R4-2407073.zip) | MSD Analysis for CA\_n41C-n79A | Apple | to be noted |
| [**R4-2407154**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_111/Docs/R4-2407154.zip) | CA\_n41C-n79 MSD | Skyworks Solutions Inc. | to be noted |
| [**R4-2407155**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_111/Docs/R4-2407155.zip) | CA\_n40A-n41C MSD | Skyworks Solutions Inc., ZTE Corporation | to be noted |
| [**R4-2407172**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_111/Docs/R4-2407172.zip) | Discussion on IMD4 MSD for CA\_n41A-n79C and CA\_n41C-n79A | MediaTek Inc. | to be noted |
| [**R4-2409317**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_111/Docs/R4-2409317.zip) | Discussion on MSD for CA\_n41C-n79A with intra-band UL CA\_n41C | Huawei, HiSilicon | to be noted |
| [**R4-2408380**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_111/Docs/R4-2408380.zip) | TP for TR38.718-02-01\_CA\_n40A-n41C | ZTE Corporation, Skyworks Solutions, Inc. | Postponed |
| [**R4-2408381**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_111/Docs/R4-2408381.zip) | TP for TR38.718-02-01\_CA\_n41A-n79C and CA\_n41C-n79A | ZTE Corporation, Mediatek,Sanechips | To be revised | CA\_n41C-n79A UL configuration to be removed |
| [**R4-2408858**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_111/Docs/R4-2408858.zip) | Missing MSD for PC3 CA\_n71B BCS4/5 | Qualcomm France | to be noted | PC3 draft CR to be requested to capture averages of Murata, Qualcomm and Skyworks for n71B and n71(2A). Related PC2 to be done in [113]. |
| [**R4-2407578**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_111/Docs/R4-2407578.zip) | CA\_n71B BCS4/5 PC3, PC2 1TX, PC2 2TX | Murata Manufacturing Co Ltd. | to be noted |
| [**R4-2407082**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_111/Docs/R4-2407082.zip) | On MSD requirements with intra-band contiguous UL CA | Apple | to be noted | There is no consensus on removing or changing guidelines for MSD due to ULCA configurations in release 18. Discussion is postponed to R19. |
| [**R4-2407083**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_111/Docs/R4-2407083.zip) | CR to 38.101-1 on removing MSD requirements with intra-band contiguous UL CA | Apple | Postponed |
| [**R4-2407084**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_111/Docs/R4-2407084.zip) | CR to 38.101-1 on removing MSD requirements with intra-band contiguous UL CA | Apple | Postponed |
| [**R4-2407085**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_111/Docs/R4-2407085.zip) | CR to 38.101-1 on removing MSD requirements with intra-band contiguous UL CA | Apple | Postponed |
| [**R4-2407086**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_111/Docs/R4-2407086.zip) | CR to 38.101-3 on removing MSD requirements with intra-band contiguous UL CA in EN-DC | Apple | Postponed |
| [**R4-2407087**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_111/Docs/R4-2407087.zip) | CR to 38.101-3 on removing MSD requirements with intra-band contiguous UL CA in EN-DC | Apple | Postponed |
| [**R4-2407372**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_111/Docs/R4-2407372.zip) | On UL configuration for intra-band ULCA IMDs | Skyworks Solutions Inc. | To be noted |
| [**R4-2407622**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_111/Docs/R4-2407622.zip) | Discussion on the MSD requirements of intra-band contiguous UL CA with non-contiguous RB allocation | Huawei, HiSilicon | To be noted |
| [**R4-2408731**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_111/Docs/R4-2408731.zip) | Discussion on MSD requirements with intra-band contiguous UL CA | CMCC | To be noted |
| [**R4-2409319**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_111/Docs/R4-2409319.zip) | Discussion on MSD test point trade-off for intra-band UL CA | Huawei, HiSilicon | To be noted |
| [R4-2408357](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_111/Docs/R4-2408357.zip) | On MSD requirements with intra-band contiguous UL CA | ZTE Corporation, Sanechips | To be noted |
| [**R4-2408853**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_111/Docs/R4-2408853.zip) | MSD requirements with intra-band contiguous CA | Qualcomm France | To be noted |
| [**R4-2409316**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_111/Docs/R4-2409316.zip) | Discussion on MSD for CA\_n40A-n41C with intra-band UL CA\_n41C | Huawei, HiSilicon | To be noted |
| [**R4-2408849**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_111/Docs/R4-2408849.zip) | Considerations on CA\_n3A-n39A | Qualcomm France | to be noted | Companies have agreed to converge on Test point definition and MSD and capture it in the TP revision |
| [**R4-2409311**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_111/Docs/R4-2409311.zip) | Discussion and TP for TR 38.718-02-01 to introduce CA\_n3A-n39A | Huawei, HiSilicon | To be revised |
| [**R4-2409312**](https://urldefense.com/v3/__https%3A/www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_111/Docs/R4-2409312.zip__;!!MyQQGECaxY11k7S_!ZOqRL34GFPMG2ajbXt1SO8n1hXltpMGN-riBrg0KNzlGbWw6oEALNEJ4oLYF0Lje7twOZOdX5KrSvTKdspYLuE5fVnLwttVp$) | TP for TR 38.718-03-01 to introduce CA\_n3A-n8A-n39A | Huawei, HiSilicon | To be revised | Need to address comments in [107] |
| [**R4-2409313**](https://urldefense.com/v3/__https%3A/www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_111/Docs/R4-2409313.zip__;!!MyQQGECaxY11k7S_!ZOqRL34GFPMG2ajbXt1SO8n1hXltpMGN-riBrg0KNzlGbWw6oEALNEJ4oLYF0Lje7twOZOdX5KrSvTKdspYLuE5fVi0hR3_3$) | TP for TR 38.718-03-01 to introduce CA\_n3A-n39A-n41A | Huawei, HiSilicon | To be revised | Need to address comments in [107] and concerns raised in [105] about implementation which may impact Delta T/R |
| [**R4-2409314**](https://urldefense.com/v3/__https%3A/www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_111/Docs/R4-2409314.zip__;!!MyQQGECaxY11k7S_!ZOqRL34GFPMG2ajbXt1SO8n1hXltpMGN-riBrg0KNzlGbWw6oEALNEJ4oLYF0Lje7twOZOdX5KrSvTKdspYLuE5fVpU0v5Tq$) | TP for TR 38.718-03-01 to introduce CA\_n3A-n39A-n79A | Huawei, HiSilicon | To be revised | Need to address comments in [107] |
| [**R4-2407577**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_111/Docs/R4-2407577.zip) | UL(n)/DL3 Harmonic Mixing Considerations | Murata Manufacturing Co Ltd. | To be noted | PC3 draftCR to be requested to capture averaging of Murata, Qualcomm and Skyworks values: 2.5/1.5/0.8dB respectively. PC2 to be hndled in [113] |
| [**R4-2407579**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_111/Docs/R4-2407579.zip) | CA\_n25-n41 UL n25 harmonic mixing PC3 and PC2 | Murata Manufacturing Co Ltd. | To be noted |
| [**R4-2408039**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_111/Docs/R4-2408039.zip) | CR for TS 38.307: Updates for new type of NE-DC configurations in Rel.18 | CHTTL | To be revised | Revise to remove brackets |
| [**R4-2408187**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_111/Docs/R4-2408187.zip) | CR for TS 38.846: Corrections on UL triple beat analysis table | CHTTL, Samsung | To be revised. Is CR to SI TS still possible? | Revision needed to account for further clarifications given by Skyworks.  |
| [**R4-2408503**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_111/Docs/R4-2408503.zip) | CR to TS 38.101-3 Rel18 Removal of Unnecessary NE-DC Requirements | Huawei, HiSilicon | To be revised | Revision needed to account for clause voiding  |
| [**R4-2408477**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_111/Docs/R4-2408477.zip) | (DC\_R17\_1BLTE\_1BNR\_2DL2UL-Core) CR to TS 38.101-3 Rel17 Removal of Unnecessary NE-DC Requirements | Huawei, HiSilicon | To be revised | Revision needed to account for clause voiding |
| [**R4-2408490**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_111/Docs/R4-2408490.zip) |  DC\_R16\_1BLTE\_1BNR\_2DL2UL) CR to TS 38.101-3 Rel16 Removal of Unnecessary NE-DC Requirements | Huawei, HiSilicon | To be revised | Revision needed to account for clause voiding |
| [**R4-2409467**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_111/Docs/R4-2409467.zip) | Draft CR for TS 38101-3 to clarify 1 UL configuration for NR Inter-band CA configurations between FR1 and FR2 | Huawei, Hisilicon | To be withdrawn | Already captured in R4#110b BigCR |
| [**R4-2409468**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_111/Docs/R4-2409468.zip) | (NR\_CADC\_R18\_yBDL\_xBUL) CR for TS 38101-2 to clarify 1 UL configuration for CA | Huawei, Hisilicon | To be withdrawn | Already captured in R4#110b BigCR |
| [**R4-2409469**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_111/Docs/R4-2409469.zip) | (NR\_CADC\_R18\_yBDL\_xBUL) CR for TS 38101-1 to clarify 1 UL configuration for NR CA | Huawei, Hisilicon, Skyworks Solutions Inc. | Agreeable | No comment received |
| [**R4-2408860**](https://urldefense.com/v3/__https%3A/www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_111/Docs/R4-2408860.zip__;!!MyQQGECaxY11k7S_!aOd8Vnq1t6yP9nRo27qchW31HagTTn-euIAjhx_Bcm3DARJ8dnfobFIXqDpfiQ3rI5EcICw7wFKQlJYvHG0toF2Yxua7piym3Es$) | Draft CR for EN-DC Harmonic Mixing clean-up PC3 | Qualcomm France | To be postponed | Based on discussion with RAN5 a WF will be needed on UL Harmonic and harmonic mixing corrections |
| [**R4-2409422**](https://urldefense.com/v3/__https%3A/www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_111/Docs/R4-2409422.zip__;!!MyQQGECaxY11k7S_!aOd8Vnq1t6yP9nRo27qchW31HagTTn-euIAjhx_Bcm3DARJ8dnfobFIXqDpfiQ3rI5EcICw7wFKQlJYvHG0toF2Yxua73Al16yc$) | Draft CR for EN-DC Uplink Harmonic clean-up PC3 | Skyworks Solutions Inc. | To be postponed |
| [**R4-2408862**](https://urldefense.com/v3/__https%3A/www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_111/Docs/R4-2408862.zip__;!!MyQQGECaxY11k7S_!a9NfVrtaiq7xZ-wtirgNn0Utrah4fy4cXxqC36-Ib3n1eBy3KWsxYJcPd-Z4fRzj6BEb5MEhxnRy98oagJe7J8lVakbz2_lH$) | Draft CR for NR CA Harmonic Mixing clean-up PC3 PC5 | Qualcomm France | To be postponed |
| [**R4-2409420**](https://urldefense.com/v3/__https%3A/www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_111/Docs/R4-2409420.zip__;!!MyQQGECaxY11k7S_!a9NfVrtaiq7xZ-wtirgNn0Utrah4fy4cXxqC36-Ib3n1eBy3KWsxYJcPd-Z4fRzj6BEb5MEhxnRy98oagJe7J8lValfUbTfG$) | Draft CR for NR CA Uplink Harmonic clean-up PC3 | Skyworks Solutions Inc. | To be postponed |
| [**R4-2407224**](https://urldefense.com/v3/__https%3A/www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_111/Docs/R4-2407224.zip__;!!MyQQGECaxY11k7S_!cLEDTbV10_zOQRKALJy1anBxTVIe9J9akUH0N8YlJmHKX1RAfYhUjNhVTFfhQd35InMD2iXuPKyZuN9RNaIznSU4cSLhcBrf$) | CR Bug Fixes 38101-3-i51\_s00-05 | Apple | To be revised | Account for comments provided in [106] |
| [**R4-2409315**](https://urldefense.com/v3/__https%3A/www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_111/Docs/R4-2409315.zip__;!!MyQQGECaxY11k7S_!cLEDTbV10_zOQRKALJy1anBxTVIe9J9akUH0N8YlJmHKX1RAfYhUjNhVTFfhQd35InMD2iXuPKyZuN9RNaIznSU4cf77UvRS$) | TP for TR 38.718-02-01 to remove brackets and complete CA\_n78A-n104A | Huawei, HiSilicon | Agreable |  |
| [**R4-2408359**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_111/Docs/R4-2408359.zip) | Improved R19 TR templates for PC3 xUL/2DL inter-band NR CA/DC | ZTE Corporation, Sanechips | noted | A way forward is needed to merge ZTE proposals with this content and add text on templates that the tables are to detect potential issues and does not imply that everything should be specified. The group express the need to be able to capture guidelines in a consistent and maintained way, PRD may be an option. |
| [**R4-2407231**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_111/Docs/R4-2407231.zip) | Template for 2 band DL 1or2 band UL inter-band combination TR and TP | Skyworks Solutions Inc., Nokia | noted |
| [**R4-2409318**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_111/Docs/R4-2409318.zip) | Discussion on TR template for band combination basket WI | Huawei, HiSilicon | noted |
| [**R4-2407232**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_111/Docs/R4-2407232.zip) | Template for 3 band DL 2 band UL inter-band combination TR and TP | Skyworks Solutions Inc., Nokia | noted | A way forward is needed to capture the content and add text on templates that the tables are to detect potential issues and does not imply that everything should be specified. |
| [**R4-2407394**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_111/Docs/R4-2407394.zip) | On introducing a TP template for FDD intra-band CA with 1-2ULCC | Skyworks Solutions Inc. | noted | This is not considered as a priority by the group as there is a limited number of cases |
| [**R4-2407443**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_111/Docs/R4-2407443.zip) | MSD test point guidelines for 2 and 3 band DL TP | Skyworks Solutions Inc. | noted | In R19 templates may be further developed to include guidelines on MSD test points. |
| [**R4-2407545**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_111/Docs/R4-2407545.zip) | Further discussion on RAN4 basket WI work plan | CATT | noted | This was discussed offline and a WF is requested to provide RAN4 recommendation on how to split the baskets based on technical aspects |
| [**R4-2407707**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_111/Docs/R4-2407707.zip) | Proposal for FDD+FDD Inter-band PC2 | T-Mobile USA | noted |
| [**R4-2408450**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_111/Docs/R4-2408450.zip) | Rel-19 WID Intra-band | Ericsson | noted |
| [**R4-2408451**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_111/Docs/R4-2408451.zip) | Rel-19 WID HPUE EN-DC | Ericsson | noted |
| [**R4-2409191**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_111/Docs/R4-2409191.zip) | On RAN4 basket WI work planning | Nokia | noted |
| [**R4-2409364**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_111/Docs/R4-2409364.zip) | Rel-19 WID NR Inter-band CA/DC for y bands DL with x bands UL (y=4,5,6, x=1,2) | Ericsson | noted |

### New document requests (side revision of existing documents)

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| **T-doc**  | **Title** | **Company** | **Comment** |
| **R4-24xxxxx** | AdHoc minutes [111][105] NR\_Baskets\_Part\_1 | Skyworks (moderator) | Captures offline and in AdHoc comments and document handling recommendations |
| **R4-24xxxxx** | WF on Harmonic MSD clean-up | Skyworks, [Qualcomm, AT&T ..] | Captures how to bring UL harmonic and Harmonic mixing corrections and address RAN5 concerns |
| **R4-24xxxxx** | draft CR to TS 38.101-1 Rel-18 PC3 FDD intra-band CA REFSENS | Skyworks [Murata, Qualcomm, T-Mobile US] | Captures PC3 n71B and n71(2A) MSDs and general text correction needed |
| **R4-24xxxxx** | draft CR TS 38.101-1 Rel-18 PC3 Inter-band CA REFSENS | Murata, [Skyworks, Qualcomm, T-Mobile US] | Captures PC3 n25-n41 MSDs and general text correction needed |
| **R4-24xxxxx** | WF on two band DL band combination template | ZTE, [Skyworks, Nokia, Huawei] | Captures content of R4-2407231 with improvements discussed in AdHoc |
| **R4-24xxxxx** | WF on three band DL band combination template | Skyworks solutions Inc, Nokia. | Captures content of R4-2407232 with improvements discussed in AdHoc |
| **R4-24xxxxx** | WF on RAN4 baskets | Nokia […] | Captures the basket split recommendation based on technical work required. |