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

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

**Agenda item:** 10.15.3

**Source:** Moderator (CATT)

**Title:** Email discussion summary for [102-e][131] NRSL\_enh\_Part\_2

**Document for:** Information

# Introduction

This email discussion summary provides the discussion of remaining RF requirements for intra-band V2X operation.

The agenda items involved are as follows:

*10.15.3 Intra-band con-current operation between NR SL and NR Uu [NR\_SL\_enh-Core]*

*10.15.3.1 RF requirements for intra-band V2X con-current (including MPR) [NR\_SL\_enh-Core]*

*10.15.3.2 Synchronous operation between SL and Uu (including switching time mask, SL transmission timing)*

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

* 1st round
  + Companies to provide comments on each sub-topic and try to converge.
  + Companies to check TP/CR and provide comments
  + Assign WF after the 1st round discussion.
* 2nd round
  + Capture the agreements and open issues if any in WF and further discuss the WF.
  + Recommend the final status of the WFs and TPs.

# Topic #1: RF requirements for intra-band V2X

## Companies’ contributions summary

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| **T-doc number** | **Company** | **Proposals / Observations** |
| [R4-2204153](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_102-e/Docs/R4-2204153.zip) | LG Electronics France | TP on the RF requirements for the remaining open issues for SL enhancements |
| [R4-2205133](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_102-e/Docs/R4-2205133.zip) | Xiaomi | On switching time mask  **Observation 1: For band n79, use timing difference as 0 minimum and 7us maximum.**  **Observation 2: For switching time, 140 us is agreed for different carrier case.**  **Observation 3: The last punctured symbol of SL is at most 71us for 15kHz SCS.**  **Proposal 1: To consider the TA in the switching time mask.**  **Proposal 2: Worst case scenario, e.g. maximum/minimum TA should be considered for RF requirements.**  **Proposal 3: Only define the intra-band concurrent operation requirement for band n79 in Rel-17.**  **Proposal 4: To agree the above switching time mask for different carriers.**  **Proposal 5: To agree the above switching time mask for same carriers.**  **Proposal 6: For UL switching to NR SL while switching occurs in UL, wait for RRM session agreement.**  **Proposal 7: To inform RRM session about the same carrier switching scenario and to further discuss the scheduling restriction.** |
| [R4-2203912](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_102-e/Docs/R4-2203912.zip) | CATT | Draft CR for TS 38.101-1, Remaining RF requirements for intra-band con-current operation |
| [R4-2204144](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_102-e/Docs/R4-2204144.zip) | LG Electronics | MPR for NR V2X intra-band con-current operation with Uu  **Proposal 1: Define MPR for intra-band con-current operation in a licensed band with one option among the following 3 options.**  **- Option1: Define MPR with Table 2.5 and Table 2.6 for Power Class 2, Table 2.7 and Table 2.8 for Power Class 3 considering all combinations of SL MO and UL MO.**  **- Option 2: Define MPR with Table 2.9 and Table 2.10 for Power Class 2, Table 2.11 and Table 2.12 for Power Class 3 considering the combination of SL MO and highest UL MO(256QAM).**  **- Option 3: Define MPR with Table 2.13 and Table 2.14 for Power Class 2, Table 2.15 and Table 2.16 for Power Class 3 considering the higher MO between SL MO and UL MO.**  **Proposal 2: Update TP for MPR with one option in Proposal 1.**  **Proposal 3: MPR of intra-band UL CA should not be reused for intra-band con-current operation.** |
| [R4-2204155](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_102-e/Docs/R4-2204155.zip) | LG Electronics France | Draft CR on MPR and ON/OFF time mask for intra-band con-current V2X operation in Rel-17 |
| R4-2204174 | CATT | Draft big CR for TS 38.101-1, RF requirements for intra-band con-current operation  **This draft big CR will be used to merge all the endorsed draft CR.** |
| [R4-2204931](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_102-e/Docs/R4-2204931.zip) | vivo | Further discussion on switching time mask for intra-band V2X con-current operation  **Proposal 1: No RF test is needed for the switching time mask in intra-band TDMed con-current operation.** |
| [R4-2205137](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_102-e/Docs/R4-2205137.zip) | Xiaomi | draft CR for TS 38.101-1 on switching time mask between SL and Uu |
| [R4-2205584](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_102-e/Docs/R4-2205584.zip) | Huawei, HiSilicon | On MPR for intra-band con-current operation  **Observation 1: For singe Tx implementation, even for CA bandwidth class B, the MPR for CA is relaxed for 0.5-1.5dB for different modulation schemes.**  **Observation 2: For both singe Tx and dual Tx implementation, the requirements for PC3 UE for UL CA are the same.**  **Observation 3: For singe Tx implementation, for CA bandwidth class B and DFT-s-OFDM, the MPR for CA continuous inner RB allocation is relaxed for 0.5-2 dB for different modulation schemes, while for outer RB allocation, the relaxation is larger, i.e. 1.5-3dB.**  **Observation 4: MPR for non-contiguous RB allocation are larger than those for contiguous RB allocation**  **Observation 5: For dual Tx implementation, the requirements for PC2 UE are further relaxed.**  **Observation 6: It is observed that the PC3 and PC2 MPR values for intra-band con-current operation are based on simulation assumptions in TR section 5.2.4.2.2. While for 2Tx requirements no matter for single carrier or UL intra-band CA, the requirements are mainly based on measurement, in which the reverse IMD impact has been considered.**  **Observation 7: MPR for the proposed intra-band con-current operation are quite smaller than those for single carrier, even the values are based on 2Tx assumptions.**  **Proposal 1: It is proposed to agree the MPR values for PC3 and PC2 NR V2X intra-band con-current operation in Tables 2.3.2-1 to 2.3.2-4.** |
| [R4-2203911](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_102-e/Docs/R4-2203911.zip) | CATT | Time mask for Uu and SL switching  **Proposal 1: To consider TA difference in the switching time masks.**  **Proposal 2: To consider the Uu to SL and SL to Uu switching time mask in Figure 2-1 and figure 2-2 for same carrier case.**  **Proposal 3: To consider the Uu to SL and SL to Uu switching time mask in Figure 2-3, 2-4, 2-5, 2-6 for different carrier case.** |
| [R4-2204015](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_102-e/Docs/R4-2204015.zip) | Qualcomm Incorporated | RF switching for V2X intra-band con-current operation with different carriers in TDD bands  **Proposal 1: No RF test is required for testing Uu to SL or SL to Uu TDM intra-band con-current RF switching time**  **Proposal 2: The agreement stating that a test for intra-band con-current RF switching time is not required should be captured in TR38.785**  **Proposal 3: Send LS to RAN5 stating that no RF test is required for Uu to SL or SL to Uu TDM intra-band con-current RF switching time.** |
| [R4-2204920](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_102-e/Docs/R4-2204920.zip) | ZTE Corporation | Synchronous operation between SL and Uu  **Observation 1: TA and switching time mask are two concepts and no relation between them.**  **Proposal 1: TA shouldn’t be included in the time mask.** |
| [R4-2205135](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_102-e/Docs/R4-2205135.zip) | Xiaomi | TP to TR 38.785 switching time mask between SL and Uu for different carriers |
| [R4-2205136](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_102-e/Docs/R4-2205136.zip) | Xiaomi | draft CR for TS 38.101-1 on default power class for intra-band concurrent operation |
| [R4-2205585](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_102-e/Docs/R4-2205585.zip) | Huawei, HiSilicon | On time mask for SL intra-band con-current operation  **Proposal 1: Specify switching time mask requirement without considering TA.** |
| [R4-2205586](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_102-e/Docs/R4-2205586.zip) | Huawei, HiSilicon | draft CR for TS 38.101-1: On time mask for SL intra-band con-current operation |

## Open issues summary

Based on above contributions, the following sub-topics and issues regarding RF requirements for partially used SL operation in a licensed band are summarized.

### Sub-topic 1-1: Switching time mask

**Issue 1-1-1: Whether to include TA difference into switching time mask**

* Proposals
  + Option 1: Yes.
  + Option 2: No.
* Recommended WF
  + TBA

Discussion:

Huawei: more companies prefer not to include TA difference. In RRM session, they had agreement. There is no necessity to include TA, which is not a fixed value. For the switching time make, usually we are considering the hardware implementation. Regarding other aspect, we can leave to RAN1.

Xiaomi: Support Option1. Regarding other time mask, there are no timing difference because the frame is quite aligned. In EN-DC, the TA difference is included in the spec. We propose the worst the case to solve the issue for TA fixed value.

VIVO: We prefer Option 2. We agree with Huawei. If there is not test, we are OK with either way.

LGE: Support Option 1. NR sidelink and NR Uu has different timing. If not considering, it does not reflect the UE behaviour. RAN4 can add the timing difference between sidelink and Uu.

CATT: support Option 1.

Agreement: Define the switching time mask requirement only considering the hardware limitation

* Add the note to clarify that there will be additional TA difference included in the switching time in the real field.
* There is no test case for it.

**Issue 1-1-2: Whether to consider the worst case with maximum or minimum TA for switching time mask**

* Proposals
  + Option 1: Yes.
  + Option 2: No.
* Recommended WF
  + TBA

**Issue 1-1-3: Scheduling restriction for same carrier switching and different carrier switching**

* Proposals
  + Option 1: Inform RRM session of the difference between same carrier switching and different carrier switching and how to define the scheduling restriction for same carrier switching and different carrier switching is left up to RRM session.
  + Option 2: No need to inform.
* Recommended WF
  + TBA

LGE: RRM has endorsed the CR for scheduling restriction.

Huawei: agree that the issue needs be discussed in RRM session. There is no difference between same and different switching.

CATT: We also support Option 1.

**Issue 1-1-4: RF test for switching time**

* Proposals
  + Option 1: No RF test is needed for the switching time for TDM intra-band con-current operation.
  + Option 2: Other option is not precluded.
* Recommended WF
  + TBA

**Issue 1-1-5: Whether to capture into TR 38.785 the statement that no RF test for switching time is needed if agreed.**

* Proposals
  + Option 1: Yes.
  + Option 2: No.
* Recommended WF
  + TBA

**Issue 1-1-6: Whether to send LS to RAN5 for indication of no RF test for switching time**

* Proposals
  + Option 1: Yes.
  + Option 2: No.
* Recommended WF
  + TBA

Agreement: Send LS to RAN5 for indication of no RF test for switching time.

**Issue 1-1-7: Switching time mask for same carrier case**

* Proposals
  + Option 1: Consider the time mask for same carrier case in LGE paper R4-2204153.
  + Option 2: Consider the time mask for same carrier case in CATT paper [R4-2203911](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_101-e/Docs/R4-2118279.zip).
  + Option 3: Consider the time mask for same carrier case in Xiaomi paper [R4-2205133.](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_101-e/Docs/R4-2118279.zip)
  + Option 4: Consider the time mask for same carrier case in Huawei paper R4-2205586.
* Recommended WF
  + TBA

**Issue 1-1-8: Switching time mask for different carrier case**

* Proposals
  + Option 1: Consider the time mask for same carrier case in LGE paper R4-2204153.
  + Option 2: Consider the time mask for same carrier case in CATT paper [R4-2203911](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_101-e/Docs/R4-2118279.zip).
  + Option 3: Consider the time mask for same carrier case in Xiaomi paper [R4-2205133.](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_101-e/Docs/R4-2118279.zip)
  + Option 4: Consider the time mask for same carrier case in Huawei paper R4-2205586.
* Recommended WF
  + TBA

### Sub-topic 1-2: MPR

**Issue 1-2-1: MPR for intra-band V2X con-current operation**

* Proposals
  + Option 1: Consider the MPR in LGE paper [R4-](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_101-e/Docs/R4-2117831.zip)2204144.
  + Option 2: Consider the MPR in Huawei paper [R4-2](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_101-e/Docs/R4-2118707.zip)205584.
* Recommended WF
  + TBA

Huawei: we have two different views for MPR requirement. One from LGE, the requirement is defined for.. Based on observation that the requirement should not be smaller than single carrier case. For the simultaneous transmission, we do not have FDM or TDM capabilities. We should consider them together. Whether it is FDM or TDM should depend on the scheduling. The same requirement can be defined for con-current operation to cover both FDM and TDM.

LGE: we are fine to find the common ground for MPR. But the agreement should be based on agreed way forward. We should consider the PRB allocations. RAN4 should consider high moderator order. RAN4 should consider 10 RB for sidelink.

Qualcomm: with the simulation, there are so many difference parameters. There is quite big difference between the numbers. The MPR numbers are lower than what we measured in the lab. There is complex simulation and the measurement should be best way to go.

Huawei: Tend to agree with Qualcomm. For 2Tx, we derive the requirement based on measurement. The minimum RB number should be 10 RB. Based on the discussion for uplink CA, we see some similarity. Can we use UL CA requirement as reference?

LGE: It is difficult to derive the requirement. We can have principle. RAN4 should consider the highest modulation order for sidelink. RB size should be 10 RB for the sidelink.

Agreement: Agree with following high level principles

* Use the highest modulation order between sidelink and NR Uu
* RB size allocated for sidelink is 10 RB
* Taking intra-band UL CA requirement into account
* Have one requirement for con-current operation.

## Companies views’ collection for 1st round

### Open issues

**Issue 1-1-1: Whether to include TA difference into switching time mask**

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| **Company** | **Comments** |
| LGE | Prefer option 1. To allow real UE behavior between NR SL and NR Uu operation as TDM manner, RAN4 shall allow to include TA difference in On/Off time mask. |
| Huawei | Prefer option 2, no need to consider TA in the time mask requirement. If large scheduling restriction is specified in RRM session, no test is performed for the mask similar to that in Rel-16, then what’s the necessity to consider the TA in the RF requirement? Note that TA is not a fixed value. |
| Qualcomm | Option 1. As TA is present in NR SL to NR Uu switching we think that it should be included in the switching time mask |
| CATT | Prefer option 1 to include TA difference in the switching time mask since it would be helpful to reflect the switching process and position. |
| Xiaomi | Option 1. The timing difference has already be considered in TS 38.101-3 for EN-DC uplink switching cases. Furthermore, the slot boundary is not aligned for UL and SL hence it is needed to consider the timing difference when these two slots switching. |
| Vivo | Prefer Option 2. If no test for this time mask requirement, whether or not to introduce TA is insignificant. |

**Issue 1-1-2: Whether to consider the worst case with maximum or minimum TA for switching time mask**

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| **Company** | **Comments** |
| LGE | The worst case with maximum TA will be considered for switching time mask. |
| Huawei | No need to consider TA. |
| Qualcomm | Option 2. Indicating the TA in the time mask should be sufficient. No need to indicate maximum and minimum values. |
| CATT | Prefer option 2. We think no need to consider the worst case with maximum or minimum TA for switching time mask. Instead the actual TA difference can be considered during the switching. |
| Xiaomi | Option 1. The requirement should be defined based on max or min timing difference which is already used in current TS 38.101-3. |
| vivo | Option 2. Share the same view with Qualcomm. |

**Issue 1-1-3: Scheduling restriction for same carrier switching and different carrier switching**

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| **Company** | **Comments** |
| LGE | In RF session, the 140us switching time was considered for different carrier between NR SL and NR Uu. And RRM session already endorsed Draft CR for the scheduling restriction requirements for 4 test cases. Also they will decide whether to consider RAN1 preparation time or not for the scheduling restriction. Therefore, it is up to RRM session decision and do not need to give information from RF session. |
| Huawei | RRM session already endorsed the draft CR for scheduling restriction in last meeting. |
| Qualcomm | We do not think that RRM session needs any further information. |
| CATT | Prefer option 2. |
| Xiaomi | Option 1. The question is that for scheduling restriction, the Rel-16 manner is reused while in Rel-16, only different carrier switching was considered. But for Rel-17, same carrier switching is defining different switching time and time mask which is not considered in current scheduling restriction requirement. Especially if the guard symbol of sidelink can cover the switching time plus transient time then there is no need for scheduling restriction in this case which can save a large payload. |
| vivo | Option 2. RRM already made an agreement on scheduling restriction and no need to inform. |

**Issue 1-1-4: RF test for switching time**

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| **Company** | **Comments** |
| LGE | Prefer option 1 and send LS to RAN5 as proposed Qualcomm. This is same approach for the TDM operation between LTE SL and NR SL in n47. |
| Huawei | No strong view. The way adopted in Rel-16 is also acceptable. |
| Qualcomm | Option 1. This aligns with the decision on intra-RAT switching in Rel-16. |
| CATT | OK with option 1 that is similar to the intra-band SL switching in Rel-16. |
| Xiaomi | Ok with option 1. |
| vivo | Option 1. |

**Issue 1-1-5: Whether to capture into TR 38.785 the statement that no RF test for switching time is needed if agreed.**

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| **Company** | **Comments** |
| LGE | Both are fine to us |
| Huawei | If something is captured in the TR, at least the switching time should also be clearly recorded, i.e. 140us for different carriers. |
| Qualcomm | Option 1. This aligns with the decision on intra-RAT switching in Rel-16. We are agreeable to capturing the RF switching time in TR 38.785 as well. |
| CATT | OK with option 1. |
| Xiaomi | Ok with option 1. |
| vivo | Option 1. |
| vivo | Option 1. |

**Issue 1-1-6: Whether to send LS to RAN5 for indication of no RF test for switching time**

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| **Company** | **Comments** |
| LGE | Prefer option 1 and send LS to RAN5 as proposed Qualcomm. This is same approach for the TDM operation between LTE SL and NR SL in n47. |
| Qualcomm | Option 1. This aligns with the decision on intra-RAT switching in Rel-16. |
| CATT | Both options are OK for us. |
| Xiaomi | Ok with option 1. |
| vivo | Option 1. |

**Issue 1-1-7: Switching time mask for same carrier case**

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| **Company** | **Comments** |
| LGE | Prefer option 1. |
| Huawei | Prefer simple time mask requirement. No TA is needed. |
| Qualcomm | Option 1 |
| CATT | If RAN4 agree on the TA inclusion, the switching time mask for same carrier can be merged based on the proposals from contributing companies. |
| Xiaomi | We see some consensus of different time masks and a merged version will be agreed after the discussion, |

**Issue 1-1-8: Switching time mask for different carrier case**

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| **Company** | **Comments** |
| LGE | Prefer option 1. |
| Huawei | Prefer simple time mask requirement. No TA is needed. |
| Qualcomm | Option 1 |
| CATT | If RAN4 agree on the TA inclusion, the switching time mask for same carrier can be merged based on the proposals from contributing companies. |
| Xiaomi | We see some consensus of different time masks and a merged version will be agreed after the discussion, |

**Issue 1-2-1: MPR for intra-band V2X con-current operation**

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| **Company** | **Comments** |
| LGE | Prefer option 1. RAN4 already agree to update the MPR requirements based on the simulation/ measurement results. But the HW proposed MPR values are not based on the agreed WF and simulation assumptions. Therefore the proposed MPR values from HW are not sufficient to the intra-band con-current V2X UE. We can close these MPR requirements based on the LGE simulation results in this meeting. |
| Huawei | Given the similarity of intra-band con-current operation, we need to take the requirements for intra-band CA into consideration. We think the MPR for con-current operation is smaller than that for single carrier even considering the 2Tx assumption may not be reasonable if we do believe the measurement data for UL CA, which includes requirements for both 1Tx and 2Tx. To move forward, we need to find some common ground which can be acceptable for all interested companies. |
| Qualcomm | Given that intra-band CA values are much larger than the values given in R4-2204144 we think that the intra-band V2X MPR values should be larger than those currently proposed in R4-2204144. If the MPR values are specified too small, then companies will have difficulty implementing this feature. Adopting larger MPR values does not in any way hurt those who can meet the specifications with lower values. |

### CRs/TPs comments collection

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

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| **CR/TP number** | **Comments collection** |
| [R4-2204153](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_102-e/Docs/R4-2204153.zip)  (TP on the RF requirements for the remaining open issues for SL enhancements) | LGE: Support these contents to complete the intra-band con-current V2X UE. |
|  | Huawei: Depends on the discussion for above issues. |
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| [R4-2203912](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_102-e/Docs/R4-2203912.zip)  (Draft CR for TS 38.101-1, Remaining RF requirements for intra-band con-current operation) | LGE: It was missing the MPR requirements and RAN4 already agreed to use the terminology with switching period to cover the 10us + RF switching time + 10us. So same approach will be applied for On/off time mask in TS38.101-1. So prefer to apply the contents in R4-2204155 |
|  | Huawei: Depends on the discussion for above issues. |
|  |  |
| [R4-2204155](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_102-e/Docs/R4-2204155.zip)  (Draft CR on MPR and ON/OFF time mask for intra-band con-current V2X operation in Rel-17) | LGE: Support these contents to complete the intra-band con-current V2X UE. |
|  | Huawei: Depends on the discussion for above issues. |
|  |  |
| [R4-2205137](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_102-e/Docs/R4-2205137.zip)  (draft CR for TS 38.101-1 on switching time mask between SL and Uu) | LGE: in the CR, the switching period was located in the middle of SL slot and Uu slot. So it was not same the on/off time mask from other companies. We prefer the switching period will be located in the low priority RAT between NR SL and NR Uu. |
|  | Huawei: Depends on the discussion for above issues. Fundamental issue is whether we need to consider TA in the time mask requirement. |
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| [R4-2205135](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_102-e/Docs/R4-2205135.zip)  (TP to TR 38.785 switching time mask between SL and Uu for different carriers) | LGE: same comment in R4-2205137 |
|  | Huawei: Depends on the discussion for above issues. |
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| [R4-2205136](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_102-e/Docs/R4-2205136.zip)  (draft CR for TS 38.101-1 on default power class for intra-band concurrent operation) | LGE: RAN4 agree to send capability per band and per band combinations for NR V2X UE. So the default power class do not defined in TS38.101-1. It is up to UE capability report. |
|  | Huawei: Depends on the discussion for above issues. |
|  |  |
| [R4-2205586](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_102-e/Docs/R4-2205586.zip)  (draft CR for TS 38.101-1: On time mask for SL intra-band con-current operation) | LGE: they do not consider the TA difference between NR SL and NR Uu. The majority view is to consider the TA difference between NR SL and NR Uu. So we prefer to consider the TA difference in On/off time mask. |
|  | Huawei: Depends on the discussion for above issues. Our preference is not to consider TA. |
|  |  |

## Summary for 1st round

### Open issues

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

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| --- | --- |
|  | **Status summary** |
| **Sub-topic#1** | *Tentative agreements:*  *Candidate options:*  *Recommendations for 2nd round:* |
| **Issue 1-1-1: Whether to include TA difference into switching time mask** | Tentative agreements:  Agreement: Define the switching time mask requirement only considering the hardware limitation   * Add the note to clarify that there will be additional TA difference included in the switching time in the real field. * There is no test case for it.   Candidate options: NONE  Recommendations for 2nd round: No further discussion is needed. |
| **Issue 1-1-2: Whether to consider the worst case with maximum or minimum TA for switching time mask** | Tentative agreements:   * Do not consider the worst case with maximum or minimum TA for switching time mask.   Candidate options: NONE.  Recommendations for 2nd round: No further discussion is needed. |
| **Issue 1-1-3: Scheduling restriction for same carrier switching and different carrier switching** | Tentative agreements:   * No need to inform RRM session of the difference between same carrier switching and different carrier switching for scheduling availability requirements.   Candidate options: NONE.  Recommendations for 2nd round: No further discussion is needed. |
| **Issue 1-1-4: RF test for switching time** | Tentative agreements:   * No RF test is needed for the switching time for TDM intra-band con-current operation.   Candidate options: NONE  Recommendations for 2nd round: No further discussion is needed. |
| **Issue 1-1-5: Whether to capture into TR 38.785 the statement that no RF test for switching time is needed if agreed.** | Tentative agreements:   * Capture into TR 38.785 the statement that no RF test for switching time is needed and the switching time for different carrier case is 140us.   Candidate options: NONE  Recommendations for 2nd round: No further discussion is needed. |
| **Issue 1-1-6: Whether to send LS to RAN5 for indication of no RF test for switching time** | Tentative agreements:   * Send LS to RAN5 for indication of no RF test for switching time   Candidate options: NONE  Recommendations for 2nd round: Further discuss the LS in 2nd round. |
| **Issue 1-1-7: Switching time mask for same carrier case** | Tentative agreements: NONE  Candidate options: NONE  Recommendations for 2nd round: Further discuss the draft CR on time mask based on GTW agreements. |
| **Issue 1-1-8: Switching time mask for different carrier case** | Tentative agreements: NONE  Candidate options: NONE  Recommendations for 2nd round: Further discuss the draft CR on time mask based on GTW agreements. |
| **Issue 1-2-1: MPR for intra-band V2X con-current operation** | Tentative agreements:  Agreement: Agree with following high level principles   * Use the highest modulation order between sidelink and NR Uu * RB size allocated for sidelink is 10 RB * Taking intra-band UL CA requirement into account * Have one requirement for con-current operation.   Candidate options: NONE  Recommendations for 2nd round: Further discuss the draft CR on MPR based on GTW agreements. |

*Recommendations on WF/LS assignment*

|  |  |  |
| --- | --- | --- |
|  | **WF/LS t-doc Title** | **Assigned Company,**  **WF or LS lead** |
| #1 | WF on switching time mask for intra-band V2X con-current operation | CATT |
| #2 | LS on time mask for intra-band SL and Uu switching | Qualcomm Incorporated |
| #3 | WF on MPR for intra-band V2X con-current operation | Huawei, HiSilicon |

### CRs/TPs

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

|  |  |
| --- | --- |
| **CR/TP number** | **CRs/TPs Status update recommendation** |
| XXX | *Based on 1st round of comments collection, moderator can recommend the next steps such as “agreeable”, “to be revised”* |
| [R4-2204153](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_102-e/Docs/R4-2204153.zip) | To be revised. Remove the time mask and keep other part for TR 38.785. |
| [R4-2203912](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_102-e/Docs/R4-2203912.zip) | To be revised. Capture the time mask. |
| [R4-2204155](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_102-e/Docs/R4-2204155.zip) | To be revised. Capture MPR and remove the time mask. |
| [R4-2205137](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_102-e/Docs/R4-2205137.zip) | To be noted. Merged in revised [R4-2204155](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_102-e/Docs/R4-2204155.zip). |
| [R4-2205135](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_102-e/Docs/R4-2205135.zip) | To be revised. Capture the time mask for TR 38.785. |
| [R4-2205136](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_102-e/Docs/R4-2205136.zip) | To be returned. Need more discussion in 2nd round. |
| [R4-2205586](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_102-e/Docs/R4-2205586.zip) | To be noted. Merged in revised [R4-2204155](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_102-e/Docs/R4-2204155.zip). |

## Discussion on 2nd round (if applicable)

## Companies views’ collection for 2nd round

### Open issues

**The time mask and MPR will be further discussed in 2nd round based on the respective draft CR. The leading companies have already shared the draft CR in 1st round for review. The respective TP can be revised accordingly once the draft CR is stable. The LS on time mask will be further discussed in 2nd round.**

**Also the draft CR [R4-2205136](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_102-e/Docs/R4-2205136.zip) on default power class will be further discussed.**

**The agreements and remaining issues if any will be captured in the respective WF.**

### CRs/TPs comments collection

|  |  |
| --- | --- |
| **CR/TP number** | **Comments collection** |
| Revision of [R4-2204153](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_102-e/Docs/R4-2204153.zip) | LGE: This is aligned with WF on MPR for intra-band con-current V2X operation and add conclusion part. We support this TP. |
|  |
|  |
| Revision of [R4-2203912](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_102-e/Docs/R4-2203912.zip) | Huawei: Thanks for the revised draft CR. Huawei, HiSilicon would like to be the co-sourcing company. We also want to co-sign the big CR for intra-band con-current operation. |
|  |
|  |
| Revision of [R4-2204155](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_102-e/Docs/R4-2204155.zip) | Huawei, HiSilicon: Thanks for the revised draft CR. Huawei, HiSilicon would like to be the co-sourcing company. |
| LGE: the draft CR is aligned with WF on MPR for intra-band con-current V2X operation. We support this draft CR. |
|  |
| Revision of [R4-2205135](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_102-e/Docs/R4-2205135.zip) | Xiaomi: The proposed time mask figure is trying to illustrate the timing difference influence on the real filed especially the time mask location. The agreed note to specify that no influence to the requirement itself. Moreover it has been agreed that no RF test for this requirement hence the figure is only to show the location of time mask. |
| LGE: We support this TP to complete on/off time mask for TDM operation of intra-band con-current V2X UE. |
|  |
| [R4-2205136](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_102-e/Docs/R4-2205136.zip) | Xiaomi: The default power class has been clarified in TS 38.101-3 for the intra-band EN-DC combinations so we believe it is needed. If companies want to wait for the response of the LS, we are ok to postpone it to the next meeting. |
| LGE : Support the draft CR for default power class |
|  |
| R4-2204174 | LGE: support the draft big CR to add the RF requirements for intra-band con-current V2X operation. |
|  |
|  |

## Summary on 2nd round (if applicable)

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

|  |  |
| --- | --- |
| **CR/TP/LS/WF number** | **T-doc Status update recommendation** |
| XXX | *Based on 2nd round of comments collection, moderator can recommend the next steps such as “agreeable”, “to be revised”* |
| R4-2206528 (Revision of [R4-2204153](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_102-e/Docs/R4-2204153.zip)) | To be approved. |
| R4-2206529 (Revision of [R4-2203912](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_102-e/Docs/R4-2203912.zip)) | To be endorsed. |
| R4-2206530 (Revision of [R4-2204155](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_102-e/Docs/R4-2204155.zip)) | To be endorsed. |
| R4-2206531 (Revision of [R4-2205135](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_102-e/Docs/R4-2205135.zip)) | To be approved. |
| [R4-2205136](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_102-e/Docs/R4-2205136.zip) | To be endorsed. |
| R4-2204174 | To be endorsed. |
| R4-2206525 | To be approved. |
| R4-2206526 | To be approved. |
| R4-2206527 | To be approved. |

# Recommendations for Tdocs

## 1st round

**New tdocs**

|  |  |  |
| --- | --- | --- |
| **Title** | **Source** | **Comments** |
| WF on … | YYY |  |
| LS on … | ZZZ | To: RAN\_X; Cc: RAN\_Y |
| WF on switching time mask for intra-band V2X con-current operation | CATT |  |
| LS on time mask for intra-band SL and Uu switching | Qualcomm Incorporated | To RAN5 |
| WF on MPR for intra-band V2X con-current operation | Huawei, HiSilicon |  |

**Existing tdocs**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Tdoc number** | **Title** | **Source** | **Recommendation** | **Comments** |
| R4-210xxxx | CR on … | XXX | Agreeable, Revised, Merged, Postponed, Not Pursued |  |
| [R4-2204153](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_102-e/Docs/R4-2204153.zip) | TP on the RF requirements for the remaining open issues for SL enhancements | LG Electronics | To be revised. | Remove the time mask and keep other part for TR 38.785. |
| [R4-2203912](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_102-e/Docs/R4-2203912.zip) | Draft CR for TS 38.101-1, Remaining RF requirements for intra-band con-current operation | CATT | To be revised. | Capture the time mask. |
| [R4-2204155](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_102-e/Docs/R4-2204155.zip) | Draft CR on MPR and ON/OFF time mask for intra-band con-current V2X operation in Rel-17 | LG Electronics | To be revised. | Capture MPR and remove the time mask. |
| [R4-2205137](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_102-e/Docs/R4-2205137.zip) | draft CR for TS 38.101-1 on switching time mask between SL and Uu | Xiaomi | To be noted. | Merged in revised [R4-2204155](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_102-e/Docs/R4-2204155.zip). |
| [R4-2205135](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_102-e/Docs/R4-2205135.zip) | TP to TR 38.785 switching time mask between SL and Uu for different carriers | Xiaomi | To be revised. | Capture the time mask for TR 38.785. |
| [R4-2205136](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_102-e/Docs/R4-2205136.zip) | draft CR for TS 38.101-1 on default power class for intra-band concurrent operation | Xiaomi | To be returned. | Need more discussion in 2nd round. |
| [R4-2205586](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_102-e/Docs/R4-2205586.zip) | draft CR for TS 38.101-1: On time mask for SL intra-band con-current operation | Huawei, HiSilicon | To be noted. | Merged in revised [R4-2204155](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_102-e/Docs/R4-2204155.zip). |
| R4-2204174 | Draft big CR for TS 38.101-1, RF requirements for intra-band con-current operation | CATT | To be returned. | Used to merge all endorsed draft CR |

Notes:

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

## 2nd round

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Tdoc number** | **Title** | **Source** | **Recommendation** | **Comments** |
| R4-210xxxx | CR on … | XXX | Agreeable, Revised, Merged, Postponed, Not Pursued |  |
| R4-2206528 | TP on the RF requirements for the remaining open issues for SL enhancements | LG Electronics | To be approved. |  |
| R4-2206529 | Draft CR for TS 38.101-1, Remaining RF requirements for intra-band con-current operation | CATT, LG Electronics, Huawei, HiSilicon, Xiaomi | To be endorsed. |  |
| R4-2206530 | Draft CR on MPR and ON/OFF time mask for intra-band con-current V2X operation in Rel-17 | LG Electronics | To be endorsed. |  |
| R4-2206531 | TP to TR 38.785 switching time mask between SL and Uu for different carriers | Xiaomi, CATT | To be approved. |  |
| [R4-2205136](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_102-e/Docs/R4-2205136.zip) | draft CR for TS 38.101-1 on default power class for intra-band concurrent operation | Xiaomi | To be endorsed. |  |
| R4-2204174 | Draft big CR for TS 38.101-1, RF requirements for intra-band con-current operation | CATT, Huawei, HiSilicon | To be endorsed. |  |
| R4-2206525 | WF on switching time mask for intra-band V2X con-current operation | CATT | To be approved. |  |
| R4-2206526 | LS on time mask for intra-band SL and Uu switching | Qualcomm Incorporated | To be approved. |  |
| R4-2206527 | WF on MPR for intra-band V2X con-current operation | Huawei, HiSilicon | To be approved. |  |

Notes:

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

# Annex

Contact information

|  |  |  |
| --- | --- | --- |
| **Company** | **Name** | **Email address** |
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Note:

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