**3GPP TSG-RAN WG4 Meeting # 101-e R4-2119702**

**Electronic Meeting, 1– 12 Nov, 2021**

**Agenda item:** 5.1.1.2, 5.1.6.2.1, 5.1.6.2.2, 5.1.6.2.3, 5.2.2

**Source:** Moderator (OPPO)

**Title:** Email discussion summary for [101-e][102] R16\_Maintenance

**Document for:** Information

# Introduction

This summary covers the papers submitted in agenda 5.1.1.2, 5.1.6.2.1, 5.1.6.2.2, 5.1.6.2.3, 5.2.2 which are targeting R16 maintenance for 38.307, 38.101-1, 38.101-2, 38.101-3 and 36.101.

# Topic #1: 38.307

## Companies’ contributions summary

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| **T-doc number** | **Company** | **Proposals / Observations** |
| R4-2117552 | Nokia | Release independence information for shared spectrum access is added |
| R4-2117534 | Nokia | draftCR 38.307: Addition of release independence information for FR2 PC5 R15 |
| R4-2117535 | Nokia | draftCR 38.307: Addition of release independence information for FR2 PC5 R16 |

## CRs/TPs comments collection

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| **CR/TP number** | **Comments collection** |
| R4-2117552  R4-2117553 | draftCR 38.307: Addition of release independence information for shared spectrum access R16 CATB |
| Nokia 7552 is revised to R4-2119697 and is available  7553 is revised to R4-2119698  Reason for revision is that originals were not draftCRs  Huawei: ok  ZTE: In current TS38.307, NR CA and ENDC are written in different tables in different clauses. However, this CR capture NR CA and ENDC in the same table, which might violate the spec structure. Moreover, sub-clause 5.6 is already for ‘Other release independent requirements for NR frequency range 1’ which means different sub-clause should be used in this CR.  In addition, should we need to add the requirements table in Rel-16 due to the NR-U combs are release indepence from Rel-16? My understanding is these requirements table should be included in Rel-17 spec.  Nokia: To ZTE in our view this approach do not violate specification structure, after all EN-DC and CA have different pointer and we would not artificially like to add more clauses. Whether R16 is needed or not seems have 2 opinions and we are not meaning NR-U only here. We used to update all relevant 307 releases but now there are mixed views. We could be ok to have just R17 CR but a WF would be nice which states rules of which 307 is updated, is it only latest.  CHTTL: Since it is release independent from Rel.16, the list of the requirements table seems not needed for Rel-16 draft CR as mentioned by ZTE. For example, there is no list of the requirements table in Rel.15 38.307. |
| R4-2117534 | draftCR 38.307: Addition of release independence information for FR2 PC5 R15 |
| SoftBank: We are wondering the necessity of this CR. Firstly, the signalling for FR2 PC5 is ‘*ue-PowerClass-v17xy*’, not ‘*powerClassNRPart-r16*’ and it is defined from Rel-17 (See R2-2102451). And RAN4 has already discussed that it is enough that the definition of PC5 is described only in Rel-17 spec (See R4-2103311).  Nokia: Thank you Softbank for the reference. Looking the R4-2103311 it seems that some companies though that REL15 and 16 CRs would be needed. We thought that it would good to capture following note to specification Note: A Rel-15 UE can signal PC5 by using the rel-16 capability ‘powerClassNRPart-r16’  DOCOMO: We are not against this CR. And we have a general question to 38.807. We wonder if the feature which is introduced from Rel-17 but can be release independent from Rel-15 should be specified in Rel-15 TS 38.307? or is it enough to capture it in Rel-17 TS 38.307? We understand capturing the proposed note is helpful and thus it is OK with us, but we would like to know the principle of TS 38.307 for when we consider the maintenance of TS 38.307.  Ericsson: not agreed, the information element only applies for NSA, "This field only applies for MR-DC BCs containing only single CC or intra-band CA in NR side in this release.".  SoftBank-2: Thank you Nokia for the reply. Yes, some companies thought that Rel-15/16 specs need to change, so we discussed this issue in the GTW. And the conclusion was that just updating Rel-17 spec was enough as described in R4-2103311.  CHTTL: In principle, we only need to modify the latest spec 38.307 to address the release indep issue, so the original R17 CR can already address the PC5 is rel indep from Rel.15 clearly. |
| R4-2117535 | draftCR 38.307: Addition of release independence information for FR2 PC5 R16 |
| SoftBank: The same comment of R4-2117534.  CHTTL: In principle, we only need to modify the latest spec 38.307 to address the release indep issue, so the original R17 CR can already address the PC5 is rel indep from Rel.15 clearly. |

## Summary for 1st round

### CRs/TPs

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

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

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| **CR/TP number** | **CRs/TPs Status update recommendation** |
| R4-2117552  R4-2117553 | draftCR 38.307: Addition of release independence information for shared spectrum access R16 CATB |
| Moderator summary:  R4-2117552 is revised to R4-2119697, R4-2117553 is revised to R4-2119698.  No conclusion, return to in 2nd round based on R4-2119697 and R4-2119698 whether this Rel-16 feature needs to be captured in Rel-16 38.307. |
| R4-2117534 | draftCR 38.307: Addition of release independence information for FR2 PC5 R15 |
| Moderator summary:  No conclusion, return to in 2nd round whether this Rel-17 feature needs to be captured in Rel-16 38.307. |
| R4-2117535 | draftCR 38.307: Addition of release independence information for FR2 PC5 R16 |
| Moderator summary:  No conclusion, return to in 2nd round whether this Rel-17 feature needs to be captured in Rel-16 38.307. |

## Discussion on 2nd round

### CRs/TPs

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| **CR/TP number** | **Comments** |
| R4-2117552 ->  R4-2119697  R4-2117553 ->  R4-2119698 | draftCR 38.307: Addition of release independence information for shared spectrum access R16 CATB |
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| R4-2117534 | draftCR 38.307: Addition of release independence information for FR2 PC5 R15 |
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| R4-2117535 | draftCR 38.307: Addition of release independence information for FR2 PC5 R16 |
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# Topic #2: 38.101-1

*Main technical topic overview. The structure can be done based on sub-agenda basis.*

## Companies’ contributions summary

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| **T-doc number** | **Company** | **Proposals / Observations** |
| R4-2117861  R4-2117862 | MediaTek | Draft CR for TS 38.101-1: Missing MOP for NR DC |
| R4-2117512 | Qualcomm | **Observation 1:** If RSS-195 is used, then the link performance will suffer from the extra back-off required for the 5MHz channel BW in Canada and not in the US. The Canadian and US regulatory requirements are usually aligned.  **Proposal 1**: Further clarify from the Canadian authorities as to the intention of RSS-195 to follow the FCC requirement for WCS 2300MHz band. |
| R4-2117960 | Apple | **Observation 1:** Measurement bandwidth for the first for the first one MHz directly adjacent to the channel edge is equal to one MHz but the resolution bandwidth is close to 1% of the channel bandwidth. This requirement is tighter than NR NS\_21 SEM and leads to the issue that power backoff requirements are not correctly reflected for all modulation types with 5MHz CBW.  **Observation 2**: Complying to the adjusted emission limit from Observation 1 is especially challenging for PI/2 BPSK due to low MPR allowance.  **Proposal 1**: Introduce separate SEM table for NS\_21 and update the measurement bandwidth of the first row (ΔfOOB = ± 0-1) from “1 % of channel BW” to “1MHz”. **Proposal 2:** Introduce A-MPR for NS\_21 with 5MHz CBW according to the proposed CR. |
| R4-2117961  R4-2117962 | Apple | draftCR: Rel-16 Additional requirements and A-MPR for NS\_21 and n30 |
| R4-2117956 | Apple | **Observation:** Out-of-band emissions can provide challenges for implementation when inter-band CA combinations are used with bands featuring low frequency separation between each other. Due to this issue some combinations specify the minimum requirements only for non-simultaneous Rx/Tx operation.  **Proposal 1**: Due to low frequency separation between band n40 and n41, explicitly capture that CA\_n40-n41 is only for non-simultaneous Rx/Tx.  **Proposal 2**: Due to low minimum frequency separation between band n39, n40 and n41 the combinations CA\_n39-n40 and CA\_n39-n41 should only be specified for non-simultaneous Rx/Tx. |
| R4-2117957 | Apple | draftCR: Rel-16 Inter-band CA Operating Bands |
| R4-2117959 | Apple | **Proposal:** Agree on option 1 from WF of RAN4#101-e, which means that the transient and EVM requirements are kept as is and only the [] are removed. |
| R4-2118783 | Qualcomm | **Proposal:** tpstart=[-0.6] for 2us capability (to be verified with both 15kHz and 30kHz SCS) and tpstart=[-2.7]us for 7us capability(to be verified with 15kHz SCS). Tighten EVM to [6%] for 256QAM. |
| R4-2117977 | Apple | Draft CR for TS 38.101-1: MSD test configurations modification for US inter-band CA combinations with n77 |
| R4-2118120 | Ericsson | **Observation 1:**   * **for operations with 2 UL symbols in special slot**, AS or AS+FH cannot be used at all (i.e., for any of 1T2R, 2T4R, 1T4R) since there is no room for a guard period G; * **for operations with 3-4 UL symbols in special slot**, AS+FH cannot be used at all. AS only (without FH) can be used for 1T2R and 2T4R, 1T4R cannot be used in a single slot at all (the latter for periodic/semi-persistent SRS)   we make the following  **Proposal 1: remove the guard period between the SRS resources of the SRS set used for antenna switching in the SRS time mask for SCS = 15k and 30k with a view to solve the problematic cases with AS use in the special slot. A guard period is only motivated for accommodating transients for SCS = 60k for UEs not supporting the transient-period capability. RAN1 to be informed accordingly to align specifications.**  **Proposal 2: send the LS in the attached to RAN1.** |
| R4-2118121  R4-2118122 | Ericsson | Correction to SRS time mask for SRS usage set to antenna switching |
| R4-2118455  R4-2118456 | Xiaomi | Draft CR for 38.101-1 to correct the note in table 5.3.5-1 for Rel-16 |
| R4-2118704  R4-2118705 | Huawei | Draft CR for 38.101-1 to clarify the ASE requirements for NS\_52 (Rel-16) |
| R4-2118880 | OPPO | Draft R16 CR on SRS IL |
| R4-2119081  R4-2119082 | ZTE | Draft CR to TS 38.101-1 on UE maximum output power reduction (Rel-16) |
| R4-2119291  R4-2119292 | Apple | draftCR: Rel-16 Correction on Channel Raster |
| R4-2119435  R4-2119436 | Qualcomm | DeltaT\_RxSRS for PC5 |
| R4-2119567 | Huawei | draft CR for TS 38.101-1 correction of IE for DC location for CA (R16) |
| R4-2119497  R4-2119498 | Qualcomm | V2X pcmax corrections |

## Open issues summary

*Before e-Meeting, moderators shall summarize list of open issues, candidate options and possible WF (if applicable) based on companies’ contributions.*

### Sub-topic 2-1 NS\_21 Regulatory Requirement

**Issue 2-1-1: Whether it is needed to further clarify from the Canadian authorities as to the intention of RSS-195 to follow the FCC requirement for WCS 2300MHz band. (R4-2117512)**

* + Option 1: Yes
  + Option 2: No, and alternative is

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| **Company** | **Comments** |
| Qualcomm | Option 1 |
| Ericsson | One could always ask for clarification why the requirement in the first 1 MHz is more stringent than the standard FCC requirement, the same otherwise. Option 1.  In the meantime, one could check the unwanted emissions requirements for the first 1MHz of other bands used in Canada. |
| Apple | Option 1: Having a clarification could help to resolve the issue |
| Moderator summary: Option 1. LS can be prepared for 2nd round discussion. | |

**Issue 2-1-2: Whether it is acceptable to introduce separate SEM table for NS\_21 and update the measurement bandwidth of the first row (ΔfOOB = ± 0-1) from “1 % of channel BW” to “1MHz”**. **(R4-2117960)**

* + Option 1: Yes
  + Option 2: No, and alternative is

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| **Company** | **Comments** |
| Qualcomm | We understand the Canadian regulatory requirement and the need for backoff. Our concern is that if UEs are already certified, then it is hard to justify extra backoff for newly introduced UEs and worse link performance, hence the need to get clarification from TELUS, Canada. Perhaps, we can delay to 2nd round for further information and keep requirements in square brackets. |
| Apple | Having updated requirements in square brackets would be an acceptable solution. |
| Moderator summary: Further discuss in 2nd round with requirements in square brackets. | |

**Issue 2-1-3: Whether it is acceptable to introduce A-MPR for NS\_21 with 5MHz CBW according to the proposed CR** **R4-2117961.**

* + Option 1: Yes
  + Option 2: No, and alternative is

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| **Company** | **Comments** |
| Qualcomm | We understand the Canadian regulatory requirement and the need for backoff. Our concern is that if UEs are already certified, then it is hard to justify extra backoff for newly introduced UEs and worse link performance, hence the need to get clarification from TELUS, Canada. Perhaps, we can delay to 2nd round for further information and keep requirements in square brackets. |
| Apple | Having updated requirements in square brackets would be an acceptable solution. |
| Moderator summary: Further discuss in 2nd round with requirements in square brackets. | |

### Sub-topic 2-2 non-simultaneous Rx/Tx

**Issue 2-2-1: Whether it is acceptable to capture that CA\_n40-n41 is only for non-simultaneous Rx/Tx. (R4-2117956)**

* + Option 1: Yes
  + Option 2: No, and alternative is

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| --- | --- |
| **Company** | **Comments** |
| SoftBank | We are wondering which threads are more suitable for discussing this issue, this or [118] Topic#3 (Simultaneous Rx/Tx). |
| Huawei | Option 2, if MSD is needed, we are open to specify it. Adding this note may have some restriction on the deployment. Currently, it’s up to UE to optionally report this capability.  Besides, The same changes in different release spec (7957, 7958) with discussion paper should be submitted into one agenda. Otherwise, we have to discuss same topic twice. Currently, we have to do the duplicated discussion in both thread [102] and [103]. |
| Qualcomm | The UE should have option no to support simultaneous RX/TX. According to the TR38.716, the focus of this combination is not supporting simultaneous Tx/Rx. R4-1900455, TP for TR38.716-02-00: 1UL and 2UL for CA\_n40-n41, ZTE Corporation, CMCC |
| ZTE | Option 2.  As mentioned by QC, CA\_n40-n41 was introduced by us long time ago(in Rel-15), and at that time we only focus on non-simultaneous Rx/Tx. Later, per operator’s demand, band n40 and n41 can be unsynchronous operation, which make it feasible to support simultaneous Rx/Tx, which pending on UE’s choise. Therefore, simultaneous Rx/Tx is possible for CA\_n40+n41, the MSD requirements can be studied further. |
| CMCC | Option 2.  We disagree with Option1. From the CMCC point of view, we can't rule out the simultaneous TX/RX scenario. For example, some industrial indoor and outdoor macro stations cooperate with each other, MSD issues can be addressed through RB configuration and transmission power implementations, etc. We object to setting such limitations on the relevant bands that do not support simultaneous TX/RX. |
| Apple | Thank you for all the comments and advices on the topic also for the example on indoor and outdoor stations. It is good to know that with cooperation the desensitivity can be addressed. Would there still exist some residual need for MSD?  The reason for the proposal is that in general for CA\_n40-n41 with simultaneous Rx/Tx the receiver performance can considerably degrade for UEs due to strong emissions falling into the receiving band. Simultaneous Rx/Tx would require considerable MSD. Minimum requirements would not be sufficient. Instead of restricting simultaneous Rx/Tx, could it be acceptable if the note would state the following:    “The minimum requirements apply only when there is non-simultaneous Rx/Tx operation between the two NR carriers. This restriction applies also for these carriers when applicable NR CA configuration is part of a higher order configuration.”    This would not rule out simultaneous Rx/Tx but clarify that this operation would need further requirements such as MSD. And MSD could be defined when needed. |
| Moderator summary: No conclusion, suggest to postpone. | |

**Issue 2-2-2: Whether it is acceptable to capture that CA\_n39-n40 and CA\_n39-n41 are only for non-simultaneous Rx/Tx. (R4-2117956)**

* + Option 1: Yes
  + Option 2: No, and alternative is

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| --- | --- |
| **Company** | **Comments** |
| SoftBank | We are wondering which threads are more suitable for discussing this issue, this or [118] Topic#3 (Simultaneous Rx/Tx). |
| Huawei | Option 2, if MSD is needed, we are open to specify it. Adding this note may have some restriction on the deployment. Currently, it’s up to UE to optionally report this capability.  Besides, The same changes in different release spec (7957, 7958) with discussion paper should be submitted into one agenda. Otherwise, we have to discuss same topic twice. Currently, we have to do the duplicated discussion in both thread [102] and [103]. |
| Qualcomm | The UE should have option no to support simultaneous RX/TX. According to the TR38.716, the focus of this combination is not supporting simultaneous Tx/Rx. See R4-1812606, TP for TR 38.716-02-00: CA\_n39A-n41A, ZTE corporation, CMCC |
| ZTE | Option 2.  Same situation with CA\_n40+n41. |
| CMCC | Option 2.  We disagree with Option1. From the CMCC point of view, we can't rule out the simultaneous TX/RX scenario. For example, some industrial indoor and outdoor macro stations cooperate with each other, MSD issues can be addressed through RB configuration and transmission power implementations, etc. We object to setting such limitations on the relevant bands that do not support simultaneous TX/RX. |
| Moderator summary: Same as issue 2-2-1 | |

### Sub-topic 2-3 Transient period capability

**Issue 2-3-1: Which option is acceptable for transient period definition?**

* + Option 1: Remove [] for EVM metric, keep requirements for shorter transient as they are
  + Option 2: tpstart=[-0.6] for 2us capability (to be verified with both 15kHz and 30kHz SCS) and tpstart=[-2.7]us for 7us capability(to be verified with 15kHz SCS). Tighten EVM to [6%] for 256QAM.

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| **Company** | **Comments** |
| Qualcomm (Valentin Gheorghiu) | Option 2 was the proposal from last time, we stick to this proposal as being the balanced WF considering the data brought by Skyworks some meetings ago. |
| Apple | Tightening of EVM was not something we were proposing during last meetings and reducing to 6% for 256QAM is not an option for us. We therefore propose to agree on option 1. |
| Ericsson | Option 2 |
| Huawei | Option 1.  For EVM, as we have explained in the last meeting, 25% cp window of measurement does not impact the performance gain on shorter transient period, it just observe the EVM from gNB perspective which also need to ensure on anti multi-path. Thus we prefer remove [] for EVM metric rather than 6%.  For Tpstart, our proposal is also based on the gNB demodulation performance on dealing with multi-path and timing error. If the value is changed, then UE would need different implementation to satisfy the test requirement for real deployment. |
| Skyworks | We are willing to compromise on this topic by providing the following way forward:   * 1) Adopt option 2 for tpstart adjustments: ie change tpstart=[-0.6]usec for 2usec capability (to be verified with both 15kHz and 30kHz SCS) and tpstart=[-2.7]usec for 7usec capability(to be verified with 15kHz SCS). * 2) adopt bracket removal of option 1 for EVM metric,   Justification: Our biggest concern is the fact it is not acceptable that the UE Tx EVM floor is artificially increased during conformance test only because of WOLA effect induced by too aggressive tpstart values,  For EVM metric, we are Ok to compromise on testability issues and remove [ ].  We hope this compromise addresses the concern of all companies. |
| Moderator summary: No conclusion, continue to discuss in 2nd round with a WF further consider the potential compromised solution provided by skyworks. | |

### Sub-topic 2-4 Guard period between the SRS resources

**Issue 2-4-1: Whether it is acceptable to remove the guard period between the SRS resources of the SRS set used for antenna switching in the SRS time mask for SCS = 15k and 30k?**

* + Option 1: Yes
  + Option 2: No, and alternative is

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| **Company** | **Comments** |
| Qualcomm | Option 2. Edited: it seems this is against discussion in RAN1 and alternative approach is to increase the number of SRS resource sets to overcome this problem. |
| Huawei | Option 2. The issue can be left to RAN1 for further discussion |
| Nokia | Option 2. We would need to study which ways would be better in terms of system. With the current specification, almost entire symbols for SRS can be used while it takes time to finish sounding channels. With the proposed way, some part of SRS symbols cannot be utilized while it some sounding can be finished in a slot. Specifically, 30 kHz SCS may have more negative impact than 15 kHz due to less CP length. We are fine to study it but it’s premature to conclude this in this meeting. |
| Apple | Option2: With removal of guard symbols between SRS resources we expect to have significant quality degradation of SRS. It is unclear how the degradation affects the channel estimation. |
| Ericsson | Option 1. This is a resolution of a real problem for DL CSI acquisition SRS antenna switching (AS) in the field.  The RAN1 alternative approach to increase the number of SRS sets is *optional* for Rel-17 and implies that the SRS transmissions are distributed over multiple slots for different UE antennas, the channel sampled in different slots for different UE antennas. For some TDD configurations and deployments, this may lead to a CSI acquisition prone to channel aging and issues with phase coherency in case of DL-UL switching between the said slots, which altogether degrades the MU-MIMO precoding performance for the downlink PDSCH.  Alternatively, for resolving the channel aging issue or for UEs not supporting the above option, SRS antenna switching must be configured entirely in the UL slot with the UL part of the special slot either unused or granted to transmit an inefficient short mini-slot PUSCH with substantial DMRS overhead. This implies a reduced downlink spectral efficiency.  We therefore propose to remove the guard symbol if this is not needed and make this mandatory for Rel-16 (an indication of support is nevertheless needed). Removing the guard symbol as per the initial version of the RAN4 specification would allow antenna switching (AS) of all antennas for special slot patterns with 2UL symbols such as 10:2:2 and AS+FH of all antennas for slot patterns with 4 UL symbols such as 6:4:4 without any further RAN1 changes of the SRS functionality other than the guard Y. DL CSI acquisition would be improved.  To Apple: note that in the current mask    there is no guard symbol between SRS sets despite the antenna switch between resources. Why is this only needed for switching between resources within the SRS set for AS? This makes configuration within the special slot of TDD configuration not possible! |
| Vivo | Option 2. This would implementation impact and is not an error. In addition, RAN1 is already optimizing this in Rel-17 and the need to do this is also degraded. |
| Skyworks | Option 2. RAN4 agreements still holds. Y period is a RAN1 discussion. In addition, transient period capability was never intended to be applied to the case of SRS-AS. The objective of this feature is to focus on transients due to large power steps that may occur at slot/sub-slot boundaries due to sudden large RB allocation change. |
| Moderator summary: No conclusion, continue to discuss in 2nd round with a WF to capture the status. | |

**Issue 2-4-2: Whether it is acceptable to send LS to RAN1 as R4-2118120?**

* + Option 1: Yes
  + Option 2: No, and alternative is

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| **Company** | **Comments** |
| Qualcomm | We can send an LS but we need to send it in a form of a question before agreeing to anything since this has been sensitive topic in ran1 and this same proposal has been already discussed in ran1. |
| Huawei | To our knowledge, the issue is still under discussion in RAN1. We can wait for the discussion conclusion in RAN1. For the moment, seems not necessary to send an LS to RAN1. |
| Nokia | OK to send an LS, but it depends on the content of the LS. It would be good to share the practical issue we are facing as Ericsson’s paper mentioned. That aspect may not have been discussed in RAN1. |
| Apple | We do not see a need to send an LS. |
| Ericsson | Option 1 as proponent. We can work further on the LS text. |
| Moderator summary: No conclusion on whether send LS to RAN1, suggest to focus on the WF. | |

## Companies views’ collection for 1st round

### 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** |
| R4-2117861  R4-2117862 | Draft CR for TS 38.101-1: Missing MOP for NR DC |
| Huawei: In clause 5.5B, there is no UL configuration DC\_n3A-n77(2A). Not sure if we can specify the MOP for UL DC\_n3A-n77(2A).  ZTE: After checking with the Rel-17 basket WID, we found the NR DC configurations of ‘DC\_n3A-n28A’,’DC\_n3A-n77A’,’DC\_n3A-n77(2A)’,’DC\_n3A-n78A’,’DC\_n28A-n77A’ and ‘DC\_n28A-n78A’ belong to Rel-17 configuration, but were wrongly introduced in Rel-16 spec. We think all of these configurations should be removed from Rel-16 spec. No need to add MOP for these configuration just because they are ‘illegal’ configuration in Rel-16. |
| R4-2117961  R4-2117962 | draftCR: Rel-17 Additional requirements and A-MPR for NS\_21 and n30  Moderator note: rely on the outcome of Issue 2-1-3 |
| Huawei: For band n30, supported CBW are 5 and 10MHz. Not sure where 20/30/40 come from.  There are two AMPR tables for NS\_21, but the applicability is missing. |
| R4-2117957 | draftCR: Rel-16 Inter-band CA Operating Bands  Moderator note: rely on the outcome of sub-topic 2-2 |
| Huawei: if MSD is needed, we are open to specify it. Adding this note may have some restriction on the deployment. Currently, it’s up to UE to optionally report this capability.  Besides, The same changes in different release spec (7957, 7958) with discussion paper should be submitted into one agenda. Otherwise, we have to discuss same topic twice. Currently, we have to do the duplicated discussion in both thread [102] and [103]. |
| CMCC: We disagree with this CR. From the CMCC point of view, we can't rule out the simultaneous TX/RX scenario. For example, some industrial indoor and outdoor macro stations cooperate with each other, MSD issues can be addressed through RB configuration and transmission power implementations, etc. We object to setting such limitations on the relevant bands that do not support simultaneous TX/RX. |
| R4-2117977 | Draft CR for TS 38.101-1: MSD test configurations modification for US inter-band CA combinations with n77 |
| Huawei: After offline discussion, the note can be improved as below.  *“For a UE which supports this band combination only when the Band n77 frequency range restriction defined in NOTE 12 of Table 5.2-1 applies, the MSD test point(s) cannot be verified for the band combination and the test point(s) can be skipped.”* |
| R4-2118121  R4-2118122 | Correction to SRS time mask for SRS usage set to antenna switching  Moderator note: rely on the outcome of sub-topic 2-4 |
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| R4-2118455  R4-2118456 | Draft CR for 38.101-1 to correct the note in table 5.3.5-1 for Rel-16 |
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| R4-2118704  R4-2118705 | Draft CR for 38.101-1 to clarify the ASE requirements for NS\_52 (Rel-16) |
| Ericsson: a note is not needed if the requirements are in between square brackets. |
| R4-2118880 | Draft R16 CR on SRS IL |
| Nokia: Though it is not a problem to add capabilities defined in Rel-16, why do we need to delete capabilities specified in Rel-15? |
| Ericsson: missing downgrading configurations should be included, perhaps align with the Rel-17 work on SRS IL (thread [123]) |
| R4-2119081  R4-2119082 | Draft CR to TS 38.101-1 on UE maximum output power reduction (Rel-16) |
| Ericsson: the grammar should be corrected (last change) |
| ZTE: Thanks Ericsson for the comment. The grammar correction will be made in the revision for the last change. |
| R4-2119291  R4-2119292 | draftCR: Rel-16 Correction on Channel Raster |
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| R4-2119435  R4-2119436 | DeltaT\_RxSRS for PC5 |
| Huawei: PC5 is only defined for band n46 and n96. FUL\_low for n46 and n96 is higher than band n79 which is not aligned with the statement. |
| R4-2119567 | draft CR for TS 38.101-1 correction of IE for DC location for CA (R16) |
|  |
| R4-2119497  R4-2119498 | V2X pcmax corrections |
|  |

## 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.*

**Sub-topic 2-1 NS\_21 Regulatory Requirement**

|  |  |
| --- | --- |
|  | **Status summary** |
| * Issue 2-1-1: Whether it is needed to further clarify from the Canadian authorities as to the intention of RSS-195 to follow the FCC requirement for WCS 2300MHz band. (R4-2117152) | *Tentative agreements:* Option 1 is agreed, i.e. need to further clarify from the Canadian authorities as to the intention of RSS-195 to follow the FCC requirement for WCS 2300MHz band.  *Candidate options:*  *Recommendations for 2nd round:* LS can be prepared for 2nd round discussion. |
| * Issue 2-1-2: Whether it is acceptable to introduce separate SEM table for NS\_21 and update the measurement bandwidth of the first row (ΔfOOB = ± 0-1) from “1 % of channel BW” to “1MHz”. (R4-2117960) | *Tentative agreements:* No agreement can be reached.  *Candidate options:*  *Recommendations for 2nd round:* Further discuss in 2nd round with requirements in square brackets. |
| * Issue 2-1-3: Whether it is acceptable to introduce A-MPR for NS\_21 with 5MHz CBW according to the proposed CR R4-2117961. | *Tentative agreements:* No agreement can be reached.  *Candidate options:*  *Recommendations for 2nd round:* Further discuss in 2nd round with requirements in square brackets. |

**Sub-topic 2-2 non-simultaneous Rx/Tx**

|  |  |
| --- | --- |
|  | **Status summary** |
| * Issue 2-2-1: Whether it is acceptable to capture that CA\_n40-n41 is only for non-simultaneous Rx/Tx. (R4-2117956) | *Tentative agreements:* No agreement can be reached  *Candidate options:*  *Recommendations for 2nd round:* suggest to postpone. |
| * Issue 2-2-2: Whether it is acceptable to capture that CA\_n39-n40 and CA\_n39-n41 are only for non-simultaneous Rx/Tx. | *Tentative agreements:* No agreement can be reached.  *Candidate options:*  *Recommendations for 2nd round:* suggest to postpone. |

**Sub-topic 2-3 Transient period capability**

|  |  |
| --- | --- |
|  | **Status summary** |
| * Issue 2-3-1: Which option is acceptable for transient period definition? | *Tentative agreements:* No agreement can be reached  *Candidate options:*  *Recommendations for 2nd round:* continue to discuss in 2nd round with a WF further consider the potential compromised solution provided by skyworks. |

**Sub-topic 2-4 Guard period between the SRS resources**

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| --- | --- |
|  | **Status summary** |
| * Issue 2-4-1: Whether it is acceptable to remove the guard period between the SRS resources of the SRS set used for antenna switching in the SRS time mask for SCS = 15k and 30k? | *Tentative agreements:* No agreement can be reached  *Candidate options:*  *Recommendations for 2nd round:* continue to discuss in 2nd round with a WF to capture the status |
| * Issue 2-4-2: Whether it is acceptable to send LS to RAN1 as R4-2118120? | *Tentative agreements:* No agreement can be reached.  *Candidate options:*  *Recommendations for 2nd round:* suggest to focus on the WF. |

### CRs/TPs

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

|  |  |
| --- | --- |
| **CR/TP number** | **CRs/TPs Status update recommendation** |
| R4-2117861  R4-2117862 | Draft CR for TS 38.101-1: Missing MOP for NR DC |
| Moderator summary: To be revised. |
| R4-2117961  R4-2117962 | draftCR: Rel-17 Additional requirements and A-MPR for NS\_21 and n30  *Moderator note: rely on the outcome of Issue 2-1-3* |
| Moderator summary: To be revised, taken issue 2-1-3 outcome into account. |
| R4-2117957 | draftCR: Rel-16 Inter-band CA Operating Bands  *Moderator note: rely on the outcome of sub-topic 2-2* |
| Moderator summary: Not pursued. |
| R4-2117977 | Draft CR for TS 38.101-1: MSD test configurations modification for US inter-band CA combinations with n77 |
| Moderator summary: To be revised |
| R4-2118121  R4-2118122 | Correction to SRS time mask for SRS usage set to antenna switching  *Moderator note: rely on the outcome of sub-topic 2-4* |
| Moderator summary: Not pursued. |
| R4-2118455  R4-2118456 | Draft CR for 38.101-1 to correct the note in table 5.3.5-1 for Rel-16 |
| Moderator summary: Agreeable |
| R4-2118704  R4-2118705 | Draft CR for 38.101-1 to clarify the ASE requirements for NS\_52 (Rel-16) |
| Moderator summary: To be revised |
| R4-2118880 | Draft R16 CR on SRS IL |
| Moderator summary: To be revised |
| R4-2119081  R4-2119082 | Draft CR to TS 38.101-1 on UE maximum output power reduction (Rel-16) |
| Moderator summary: To be revised |
| R4-2119291  R4-2119292 | draftCR: Rel-16 Correction on Channel Raster |
| Moderator summary: Agreeable |
| R4-2119435  R4-2119436 | DeltaT\_RxSRS for PC5 |
| Moderator summary: To be revised |
| R4-2119567 | draft CR for TS 38.101-1 correction of IE for DC location for CA (R16) |
| Moderator summary: Agreeable |
| R4-2119497  R4-2119498 | V2X pcmax corrections |
| Moderator summary: Agreeable |

## Discussion on 2nd round

### WFs/Open issues

#### Sub-topic 2-1 NS\_21 Regulatory Requirement

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| --- | --- |
|  | **Comments** |
| WF on NS\_21 regulatory requirements |  |

#### Sub-topic 2-2 non-simultaneous Rx/Tx

**Moderator note: Updated proposal from 1st round of issue 2-2-1 and 2-2-2 from proponent.**

**Instead of restricting simultaneous Rx/Tx, could it be acceptable if the note would state the following:**

* **“The minimum requirements apply only when there is non-simultaneous Rx/Tx operation between the two NR carriers. This restriction applies also for these carriers when applicable NR CA configuration is part of a higher order configuration.”**
  + Option 1: Yes
  + Option 2: No, and alternative is

|  |  |
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| **Company** | **Comments** |
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#### Sub-topic 2-3 Transient period capability

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| --- | --- |
|  | **Comments** |
| WF on transient period capability |  |

#### Sub-topic 2-4 Guard period between the SRS resources

|  |  |
| --- | --- |
|  | **Comments** |
| WF on guard period between the SRS resources |  |

### CRs/TPs

|  |  |
| --- | --- |
| **CR/TP number** | **Comments** |
| Rev of R4-2117861  Rev of R4-2117862 | Draft CR for TS 38.101-1: Missing MOP for NR DC |
|  |
| Rev of R4-2117961  Rev of R4-2117962 | draftCR: Rel-17 Additional requirements and A-MPR for NS\_21 and n30  *Moderator note: rely on the outcome of Issue 2-1-3* |
|  |
| Rev of R4-2117977 | Draft CR for TS 38.101-1: MSD test configurations modification for US inter-band CA combinations with n77 |
|  |
| Rev of R4-2118704  Rev of R4-2118705 | Draft CR for 38.101-1 to clarify the ASE requirements for NS\_52 (Rel-16) |
|  |
| Rev of R4-2118880 | Draft R16 CR on SRS IL |
|  |
| Rev of R4-2119081  Rev of R4-2119082 | Draft CR to TS 38.101-1 on UE maximum output power reduction (Rel-16) |
|  |
| Rev of R4-2119435  Rev of R4-2119436 | DeltaT\_RxSRS for PC5 |
|  |

# Topic #3: 38.101-2

*Main technical topic overview. The structure can be done based on sub-agenda basis.*

## Companies’ contributions summary

|  |  |  |
| --- | --- | --- |
| **T-doc number** | **Company** | **Proposals / Observations** |
| R4-2117422 | Apple | Propose two options to address the inconsistency between RAN4 R16 beam correspondence requirements and RAN2 UE capability. It is recommended RAN4 adopt either option.   * Option 1: RAN4 sends an LS to RAN2 asking RAN2 to correct the capabilities * Option 2: This inconsistency is captured in RAN4 chairman’s note and companies can submit a CR in RAN2 with a reference to RAN4 chairman’s note. |
| R4-2117423 | Apple | Correction of UE enhanced beam correspondence requirements |
| R4-2117424 | Apple | Correction of UE enhanced beam correspondence requirements |
| R4-2117546  R4-2117547 | Nokia | draft CR removal of FR2 MPR brackets REL16 CATF |
| R4-2117978 | Apple | FR2 A-MPR requirements for intra-band non-contiguous UL CA |
| R4-2117979  R4-2117980 | Apple | Draft CR for TS 38.101-2: FR2 CA\_NS\_202 and CA\_NS\_203 A-MPR requirements for intra-band non-contiguous UL CA |
| R4-2119083  R4-2119084 | ZTE | Draft CR to TS 38.101-2 on configurations for intra-band contiguous CA (Rel-16) |
| R4-2119538  R4-2119539 | Huawei | draft CR for TS 38.101-2: Alignment of description of mpr-PowerBoost-Fr2-r16 (R16) |

## Open issues summary

*Before e-Meeting, moderators shall summarize list of open issues, candidate options and possible WF (if applicable) based on companies’ contributions.*

### Sub-topic 3-1 Beam correspondence capability

**Issue 3-1-1: Which option below is acceptable to solve the beam correspondence capability inconsistency between RAN4 R16 requirements and RAN2 UE capability. (R4-2117422)**

* + Option 1: RAN4 sends an LS to RAN2 asking RAN2 to correct the capabilities
  + Option 2: This inconsistency is captured in RAN4 chairman’s note and companies can submit a CR in RAN2 with a reference to RAN4 chairman’s note.

|  |  |
| --- | --- |
| **Company** | **Comments** |
| Nokia | We prefer Option 1 to clearly formulate RAN4’s view in an la and thus, all companies understand the needed corrections the same way and we can avoid further differences between the RAN4 and RAN2 specifications. |
| MediaTek | Prefer Option 1. |
| Apple | We are ok with the comments and will share the draft LS soon. |
| OPPO | We noticed that RAN2 is discussing the changes of this inconsistency. Depending on RAN2 status, the LS might not be needed. Can further check in 2nd round. |
| Vivo | Prefer Option 1. A LS may be more clear and helpful for RAN2 to treat this issue. |
| Moderator summary: Option 1 is agreeable, LS can be prepared and discussed in 2nd round meanwhile checking with RAN2 whether the changes in RAN2 is agreed or not. | |

## CRs/TPs comments collection

|  |  |
| --- | --- |
| **CR/TP number** | **Comments collection** |
| R4-2117423 | Correction of UE enhanced beam correspondence requirements |
|  |
| R4-2117424 | Correction of UE enhanced beam correspondence requirements |
|  |
| R4-2117546  R4-2117547 | draft CR removal of FR2 MPR brackets REL16 CATF |
|  |
| R4-2117979  R4-2117980 | Draft CR for TS 38.101-2: FR2 CA\_NS\_202 and CA\_NS\_203 A-MPR requirements for intra-band non-contiguous UL CA |
| Qualcomm: The original thinking behind the NC ULCA feature CR is that since NC UL combos are only defined in n260 (2A and 3A), it was not necessary to treat AMPRs (no AMPRs defined for n260). This effort can be postponed until NC \_ULCA is introduced to n257 or n258.  Nokia: Agree with Qualcomm.  DOCOMO: Agree with Qualcomm. |
| R4-2119083  R4-2119084 | Draft CR to TS 38.101-2 on configurations for intra-band contiguous CA (Rel-16) |
|  |
| R4-2119538  R4-2119539 | draft CR for TS 38.101-2: Alignment of description of mpr-PowerBoost-Fr2-r16 (R16) |
|  |

## 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.*

**Sub-topic 3-1 Beam correspondence capability**

|  |  |
| --- | --- |
|  | **Status summary** |
| * Issue 3-1-1: Which option below is acceptable to solve the beam correspondence capability inconsistency between RAN4 R16 requirements and RAN2 UE capability. (R4-2117422) | *Tentative agreements:* Option 1 is agreed  *Candidate options:*  *Recommendations for 2nd round:* LS can be prepared for 2nd round discussion. Meanwhile checking with RAN2 whether the changes in RAN2 is agreed or not. |

### CRs/TPs

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

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

|  |  |
| --- | --- |
| **CR/TP number** | **CRs/TPs Status update recommendation** |
| R4-2117423 | Correction of UE enhanced beam correspondence requirements |
| Moderator summary: Agreeable. |
| R4-2117424 | Correction of UE enhanced beam correspondence requirements |
| Moderator summary: Agreeable. |
| R4-2117546  R4-2117547 | draft CR removal of FR2 MPR brackets REL16 CATF |
| Moderator summary: Agreeable. |
| R4-2117979  R4-2117980 | Draft CR for TS 38.101-2: FR2 CA\_NS\_202 and CA\_NS\_203 A-MPR requirements for intra-band non-contiguous UL CA |
| Moderator summary: Postponed. |
| R4-2119083  R4-2119084 | Draft CR to TS 38.101-2 on configurations for intra-band contiguous CA (Rel-16) |
| Moderator summary: Agreeable. |
| R4-2119538  R4-2119539 | draft CR for TS 38.101-2: Alignment of description of mpr-PowerBoost-Fr2-r16 (R16) |
| Moderator summary: Agreeable. |

## Discussion on 2nd round

### LS/Open issues

**Sub-topic 3-1 Beam correspondence capability**

|  |  |
| --- | --- |
|  | **Comment**  Moderator note: checking with RAN2 whether the changes in RAN2 is agreed or not. |
| LS on beam correspondence capability inconsistency |  |

# Topic #4: 38.101-3

*Main technical topic overview. The structure can be done based on sub-agenda basis.*

## Companies’ contributions summary

|  |  |  |
| --- | --- | --- |
| **T-doc number** | **Company** | **Proposals / Observations** |
| R4-2117666 | SoftBank | Observation 1: For DC\_42\_n77/78 and DC\_48\_n77, the Option 1a/1b indicates that two DL carriers are placed contiguously.  Observation 2: For DC\_42\_n77/78 and DC\_48\_n77, the UE supports intra-band non-contiguous EN-DC requirements as a default considering the UE capability signaling *interBandContiguousMRDC*.  Proposal: The concept of Option 2, two DL carriers are placed non-contiguously, should be included in the requirements. |
| R4-2117855 | Qualcomm | **Proposal 1**: Focus on option 3 in WF and choose an imbalance that covers all frequency offsets.  **Observation 1**: REFSENS is tested with limited UL configuration. REFSENS should also be tested with a limited power imbalance at the closest frequency offset.  **Observation 2**: At the worst-case power imbalance of 30dB, the ACS 1 test case is no longer reflective of the UE to be tested at the edge of cell since all UE RX power level and ACS jammer are raised by 14dB. A lower REFSENS relaxation of 1dB retains the ability to test at edge of cell.  **Proposal 2**: Specify a power imbalance limit of 25dB, which is consistent to allow UE to be tested according for RX requirements at the cell edge case.  **Proposal 3**: Choose the power imbalance and frequency offset relationship as shown in Table 2.3-1.  **Observation 3:** No significant impact on RX requirements if the power imbalance is limited to 25dB due to OOB blocking range 3 requirement. |
| R4-2118698 | Huawei | Observation 1: At least 25dB power imbalance should be considered for type 2 UE Rx requirements considering the network deployment.  Observation 2: Both option 1a and option 1b can be met by the UE with 33dB ACS implementation based on the link budget evaluation.  Observation 3: Option 2 can be met by UE with 33dB ACS implementation.  Proposal 3: To specify the power imbalance requirements for Type 2 UE as below. |
| R4-2118699  R4-2118700 | Huawei | DraftCR for 38.101-3 to specify type 2 UE requirements(Rel-16) |
| R4-2118540 | NTT DOCOMO | Observation 1: The advantage of option 1 is that it can cover the frequency allocation of any operators since it defines the frequency separation as worst case.  Observation 2: The advantage of option 2 is to optimize the value of Rx power imbalance considering actual spectrum allocation.  Observation 3: Option 2 does not cover the frequency allocation of some operators. It is better to avoid such situation to enhance the size of market as large as possible.  Observation 4: If interBandContiguousMRDC is absent, it means that the UE does not support intra-band contiguous requirements, and thus we do not need to test under the contiguous CCs placement.  Observation 5: Applicability of Rx power imbalance requirements for EN-DC in TS 38.101-4 is based on whether or not UE indicate interBandContiguousMRDC  Proposal:  For inter-band EN-DC which is subject to interBandContiguousMRDC capability:   * If interBandContgiuousMRDC is indicated, place two DL carriers as close as possible * If interBandContiguousMRDC is not indicated, define frequency offset from the edge of wanted carrier to the center frequency of another carrier as “DL CBW of another carrier”.   For inter-band EN-DC which is not subject to interBandContiguousMRDC capability:   * [Define frequency separation as placing two DL carriers as close as possible] |
| R4-2117981  R4-2117982 | Apple | Draft CR for TS 38.101-3: Corrections for intra-band EN-DC configurations |
| R4-2118450 | Xiaomi | Observation: If a UE is capable of supporting contiguous configuration in DL, it can support contiguous or non-contiguous configuration in UL; but if a UE is capable of supporting non-contiguous configuration in DL, it only supports non-contiguous configuration in UL.  Proposal 1: RAN4 should define the contiguous and non-contiguous intra-band ENDC based on the aggregated status of DL intra-band ENDC.  Proposal 2: Move DL DC\_48A-(n)48AA with UL DC\_(n)48AA and DC\_48A\_n48A from Table 5.3B.1.3-1 to Table 5.3B.1.2-1 in TS 38.101-3.  Proposal 3: Apply Option 2, IE *IntraBandENDC-Support* should be indicated in UL and DL separately per band combination. Send LS to RAN2 to introduce new UE capability on distinguish intra-band ENDC UL and DL contiguous/non-contiguous support. |
| R4-2119318 | Google | **Proposal 1: To introduce the new UE capability signaling from Rel-16 for intra-band EN-DC UL and DL configuration.**  **Proposal 2: If proposal 1 is not agreed, it is proposed that the contiguous or non-contiguous intra-band EN-DC is determined by the configuration between primary cell in each cell group**   * **Redefine the following intra-band EN-DC combinations**    + **DC\_(n)48CA and DC\_(n)48DA with UL DC\_48A\_n48A are intra-band non-contiguous EN-DC combination**   + **DC\_48A\_(n)48AA with UL DC\_(n)48AA is intra-band contiguous EN-DC combination** |

## Open issues summary

### Sub-topic 4-1 Type 2 UE RX Imbalance Requirement

*Sub-topic description: Below options are from RAN4#100e agreed WF R4-2114905*

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| * **Alt 1a:**  |  |  |  |  | | --- | --- | --- | --- | | **Carriers** | **Power in transmission bandwidth configuration (dBm)** | **channel bandwidth** | **Frequency relationship** | | Wanted carrier | REFSENS + 14 dB | BWwanted ≤ BWanother | Place two DL carriers as close as possible | | Another carrier with overlapping DL bands | Power of wanted carrier + 31.5 dB | | Wanted carrier | REFSENS + 14 dB | BWwanted > BWanother | | Another carrier with overlapping DL bands | Power of wanted carrier + 31.5 – 10\*log10(BWwanted /BWanother) dB |  * **Alt 1b:**  |  |  |  |  | | --- | --- | --- | --- | | **Carriers** | **Power in transmission bandwidth configuration (dBm)** | **channel bandwidth** | **Frequency relationship** | | Wanted carrier | REFSENS + 1 dB | BWwanted ≤ BWanother | Place two DL carriers as close as possible | | Another carrier with overlapping DL bands | Power of wanted carrier + 25 dB | | Wanted carrier | REFSENS + 1 dB | BWwanted > BWanother | | Another carrier with overlapping DL bands | Power of wanted carrier + 25 – 10\*log10(BWwanted /BWanother) dB |  * **Alt 2 (Gap between DL carriers ≥ 50MHz):**  |  |  |  |  | | --- | --- | --- | --- | | **Carriers** | **Power in transmission bandwidth configuration (dBm)** | **channel bandwidth** | **Frequency relationship** | | Wanted carrier | REFSENS + 1 dB | BWwanted ≤ BWanother | max (5/2\*another DL BW, 50MHz) | | Another carrier with overlapping DL bands | Power of wanted carrier + 25 dB | | Wanted carrier | REFSENS + 1 dB | BWwanted > BWanother | | Another carrier with overlapping DL bands | Power of wanted carrier + 25 dB – 10\*log10(BWwanted /(5\*min(BWanother, 20MHz))) |  * **Alt 3: Combination of option 1 and option 2** |

**Issue 4-1-1: Whether it is acceptable to specify 25 dB power imbalance for type 2 UE Rx requirements (R4-2117855)**

* + Option 1: Yes
  + Option 2: No, and alternative is

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| --- | --- |
| **Company** | **Comments** |
| SoftBank | Support Option 1 considering the Alts in Issue 4-1-2. |
| Huawei | Option 1 |
| Qualcomm | Option 1 |
| DOCOMO | Option 1 |
| Ericsson | Option 1 |
| Moderator summary: Option 1 is agreed, i.e. specify 25 dB power imbalance for type 2 UE Rx requirements | |

**Issue 4-1-2: Which Alt is acceptable for the power imbalance testing**

* + **Alt 2 in RAN4#100e agreed WF R4-2114905**
  + **Alt 3 in RAN4#100e agreed WF R4-2114905**
  + **Alt 4 (R4-2117855):**

|  |  |  |  |
| --- | --- | --- | --- |
| Carriers | Power in transmission bandwidth configuration (dBm) | channel bandwidth | Frequency relationship  (Center of BWanother Relative to edge of BWwanted) |
| Wanted carrier | REFSENS + 1 dB | BWwanted ≤ BWanother | < max (5/2\* BWanother, 50MHz) |
| Another carrier with overlapping DL bands | Power of wanted carrier + 25 dB |
| Wanted carrier | REFSENS + 1 dB | BWwanted > BWanother |
| Another carrier with overlapping DL bands | Power of wanted carrier + 25 – 10\*log10(BWwanted /BWanother) dB |
| Wanted carrier | REFSENS + 1 dB | N/A | ≥ max (5/2\* BWanother, 50MHz) |
| Another carrier with overlapping DL bands | Power of wanted carrier + 25 dB |

* + **Alt 5 (R4-2118698)**

|  |  |  |  |
| --- | --- | --- | --- |
| Carriers | Rx Power in transmission bandwidth configuration (dBm) | channel bandwidth | Frequency relationship |
| Wanted carrier | REFSENS + 14 dB | BWwanted ≤ BWanother | Place two DL carriers as close as possible |
| Another carrier with overlapping DL bands | Power of wanted carrier + 31.5 dB |
| Wanted carrier | REFSENS + 14 dB | BWwanted > BWanother |
| Another carrier with overlapping DL bands | Power of wanted carrier + 31.5 – 10\*log10(BWwanted /BWanother) dB |
| NOTE 1: The transmitter shall be set to 4 dB below PCMAX\_L,f,c at the minimum UL configuration specified in Table 7.3.2-3 with PCMAX\_L,f,c defined in clause 6.2.4. | | | |

|  |  |
| --- | --- |
| **Company** | **Comments** |
| SoftBank | Support Alt-4. As proposed in our contribution (R4-2117666), we prefer Alt-2/3/4 since they include non-contiguous spectrum. It seems that Alt-4 is the most flexible. |
| Huawei | We are OK to choose alt-4 based on our analysis. However, it should be clarified that only one test configuration can be tested based on the UE capabilities instead of test all the cases. |
| Qualcomm | Alt-4: The intention is flexibility and simplicity. We are flexible on the test case. |
| DOCOMO | Question for clarification to Alt-4 is that alt-4 defines power imbalance requirements under any frequency offsets as minimum requirement while testing points will be further discussed, is it correct understanding? If yes, we are OK with alt-4. |
| Ericsson | Alt-4. |
| Skyworks | We are ok with alt. 4 but would like to ask a question for clarification for the case of DC\_42\_n77  For the case of a UE that only supports 4 Rx in the n77/B42 frequency range, would this requirement be also applicable if only 2 Rx path can be supported in each range (2 in B42, 2 in n77)? Such UE implementation would enable economy of scale. |
| Moderator summary: Alt 4 is agreed. Further clarify the following questions in 2nd round with WF  Question 1: test configurations whether only one test configuration can be tested based on the UE capabilities or test all the cases.  Question 2: For the case of a UE that only supports 4 Rx in the n77/B42 frequency range, would this requirement be also applicable if only 2 Rx path can be supported in each range (2 in B42, 2 in n77)? | |

**Issue 4-1-3: Whether it is acceptable to define frequency offset from the edge of wanted carrier to the center frequency of another carrier as “DL CBW of another carrier” if interBandContiguousMRDC is not indicated (R4-2118540)**

* + Option 1: Yes
  + Option 2: No, and alternative is

|  |  |
| --- | --- |
| **Company** | **Comments** |
| Huawei | No strong view on this. But it should be clarified that only one test configuration can be tested based on the UE capabilities instead of test all the cases. |
| Qualcomm | Neutral. |
| DOCOMO | Option 1, but the exact value of frequency offset can be further discusses. The intention of this proposal is to test Rx power imbalance with contiguous CC condition when interBandContiguousMRDC is indicated since contiguous EN-DC is not supported by UE not indicating interBandContiguousMRDC. |
| Ericsson | Option 1 when the UE indicates interBandMRDC-WithOverlapDL-Bands-r16 but with interBandContiguousMRDC absent (‘If the field is absent for such an inter-band (NG)EN-DC/NE-DC combination, the UE supports intra-band non-contiguous (NG)EN-DC/NE-DC requirements’). |
| Moderator summary: Option 1 is agreed, i.e. define frequency offset from the edge of wanted carrier to the center frequency of another carrier as “DL CBW of another carrier” if *interBandContiguousMRDC* is not indicated. | |

**Issue 4-1-4: For inter-band EN-DC which is not subject to interBandContiguousMRDC capability, whether it is acceptable to “Define frequency separation as placing two DL carriers as close as possible” (R4-2118540)**

* + Option 1: Yes
  + Option 2: No, and alternative is

|  |  |
| --- | --- |
| **Company** | **Comments** |
| Huawei | No strong view on this. But it should be clarified that only one test configuration can be tested based on the UE capabilities instead of test all the cases. |
| Qualcomm | Neutral. |
| Ericsson | Option 1 when the UE indicates interBandMRDC-WithOverlapDL-Bands-r16 and interBandContiguousMRDC. |
| Moderator summary: Option 1 is agreed, i.e. for inter-band EN-DC which is not subject to *interBandContiguousMRDC* capability, define frequency separation as placing two DL carriers as close as possible | |

### Sub-topic 4-2 IntraBandENDC-Support

**Issue 4-2-1: Which option can be used to determine the contiguous or non-contiguous intra-band EN-DC**

* + Option 1: based on the aggregated status of DL intra-band ENDC and (R4-2118450)
    - Move DL DC\_48A-(n)48AA with UL DC\_(n)48AA and DC\_48A\_n48A from Table 5.3B.1.3-1 to Table 5.3B.1.2-1 in TS 38.101-3
  + Option 2: determined by the configuration between primary cell in each cell group and Redefine the following intra-band EN-DC combinations (R4-2119318)
    - DC\_(n)48CA and DC\_(n)48DA with UL DC\_48A\_n48A are intra-band non-contiguous EN-DC combination
    - DC\_48A\_(n)48AA with UL DC\_(n)48AA is intra-band contiguous EN-DC combination

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| **Company** | **Comments** |
| Xiaomi | I don’t think redefining intra-band ENDC according to the configuration between primary cell in each cell group can resolve the conflict that the aggregated status are different between UL and DL. It just transfers the conflict from UL configuration to DL configuration.  I.e., in current Spec, DL DC\_(n)48CA with UL DC\_(n)48AA and UL DC\_48A\_n48A belongs to intra-band contiguous ENDC, the UL may not be configured correctly no matter the UE report contiguous or both vis IE IntraBandENDC-Support. Now, if RAN4 redefines intra-band ENDC according to the configuration between primary cell in each cell group, UL DC\_48A\_n48A with DL DC\_(n)48CA and DL DC\_n48C\_n48A all belong to non-contiguous intra-band ENDC, in this case, the network will not know whether the DL combination should be DC\_(n)48CA or DC\_n48C\_n48A no matter the UE report non-contiguous or both vis IE IntraBandENDC-Support.  It’s not necessary to change current definition of contiguous or non-contiguous EN-DC based on DL configuration. Only need move DL DC\_48A-(n)48AA with UL DC\_(n)48AA and DC\_48A\_n48A from non-contiguous table to contiguous table in TS 38.101-3.  And the conflict only can be resolved by   * Indicating IE IntraBandENDC-Support in UL and DL separately per band combination   or   * RAN4 need clearly specify that the inconsistent aggregated status of UL and DL are not allowed. i.e., DC\_(n)48CA and DC\_(n)48DA with UL DC\_48A\_n48A are not allowed |
| Ericsson | None of the options. DL/UL band combinations not compatible with the intrabandENDC-Support indication in the MRDC-parameters and the fall-back rules in 38.306 should be removed as proposed in the CR in R4-2117981.  DC\_(n)48CA is contiguous in the DL with two possible UL configurations, DC\_(n)48AA and DC\_48A-n48A in the UL. This DL configuration must also support fallback to DC\_48A-n48A in the DL since this is a valid UL configuration, a general rule in clause 4.2. The UE has to report the existing DC\_48A-n48A combination with *intrabandENDC-Support* = “non-contiguous” in addition. |
| Google | If Issue 4-2-2 is agreed as option 2, both option is fine as long as no configuration would be deleted. |
| Apple | Option 2 has been our proposal. If Option 2 can be agreed, we can add back DC\_(n)48CA with UL DC\_48A\_n48A to intra-band non-contiguous EN-DC table. |
| Moderator summary: No agreement can be reached. | |

**Issue 4-2-2: Whether it is acceptable to indicate IE IntraBandENDC-Support in UL and DL separately per band combination？**

* + Option 1: Yes
  + Option 2: No

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| **Company** | **Comments** |
| Xiaomi | Option 1  As our comments above, redefining intra-band ENDC according to the configuration between primary cell in each cell group can’t resolve the conflict that the aggregated status are different between UL and DL. And the configurations of intra-band ENDC come from the operators’ request, RAN4 shouldn’t have any restriction since there is no any technical issue. |
| Huawei | Option 1.  Agree with the observations and proposal by Xiaomi in R4-2118450 |
| Ericsson | This would solve the problem with BCs only supporting *intrabandENDC-Support* = “both” in the DL, e.g. DC\_48A-(n)48AA in the DL combined with DC\_(n)48AA in the UL (contiguous only). It would be the only change needed with a limitation of maximum two sub-blocks for combinations of contiguous and non-contiguous intra-band EN-DC combinations (otherwise DC\_48A-48A-n48A would also be possible in in the DL in the example). Then further changes to the Rel-16 RRC signaling can be avoided. |
| Qualcomm | Option 1 |
| Google | Option 1 |
| Apple | Option 2: We do not think IntraBandENDC-Support should be defined in UL and DL separately. If we do so, does it mean that we allow DC\_(n)48CA with UL DC\_48A\_n48A, not being able to fall back to DC\_48A\_n48A which is the fundamental DC combination? |
| Moderator summary: No agreement can be reached. | |

## CRs/TPs comments collection

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| --- | --- |
| **CR/TP number** | **Comments collection** |
| R4-2118699  R4-2118700 | DraftCR for 38.101-3 to specify type 2 UE requirements(Rel-16)  Moderator note: rely on the outcome of Issue 4-1-2 |
|  |
| R4-2117981  R4-2117982 | Draft CR for TS 38.101-3: Corrections for intra-band EN-DC configurations |
| Xiaomi: this draft CR should depend on the discussion of sub-topic 4-2  Nokia: This issue exists also in REL15 38.101-3. Furthermore Table 5.5B.2-1 needs similar fix.  Ericsson: the changes in Table 5.3B.1.3-1 are not needed with a limitation of maximum two sub-blocks for combinations of contiguous and non-contiguous intra-band EN-DC combinations. Then the UE can indicate *intrabandENDC-Support* = “both” (both non-contiguous and contigous supported in the DL and UL). We propose to add this limitation, see also comments to 4-2-2.  Qualcomm: Agree with Xiaomi’s comment.  Apple: The reason we remove UL DC\_(n)48AA in DC\_48A\_(n)48AA from Table 5.3B.1.3-1 is that in our view this is a contiguous combination from EN-DC point of view. The non-contiguous part in DL is signaled in LTE CA configuration separately. |

## 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.*

**Sub-topic 4-1 Type 2 UE RX Imbalance Requirement**

|  |  |
| --- | --- |
|  | **Status summary** |
| * Issue 4-1-1: Whether it is acceptable to specify 25 dB power imbalance for type 2 UE Rx requirements (R4-2117855) | *Tentative agreements:* Option 1 is agreeable, i.e. specify 25 dB power imbalance for type 2 UE Rx requirements  *Candidate options:*  *Recommendations for 2nd round:* |
| * Issue 4-1-2: Which Alt is acceptable for the power imbalance testing | *Tentative agreements:* Alt-4 is agreeable  *Candidate options:*  *Recommendations for 2nd round:*  Further clarify the following questions in 2nd round with WF  Question 1: test configurations whether only one test configuration can be tested based on the UE capabilities or test all the cases.  Question 2: For the case of a UE that only supports 4 Rx in the n77/B42 frequency range, would this requirement be also applicable if only 2 Rx path can be supported in each range (2 in B42, 2 in n77)? |
| * Issue 4-1-3: Whether it is acceptable to define frequency offset from the edge of wanted carrier to the center frequency of another carrier as “DL CBW of another carrier” if interBandContiguousMRDC is not indicated (R4-2118540) | *Tentative agreements:* Option 1 is agreeable, i.e. define frequency offset from the edge of wanted carrier to the center frequency of another carrier as “DL CBW of another carrier” if *interBandContiguousMRDC* is not indicated.  *Candidate options:*  *Recommendations for 2nd round:* |
| * Issue 4-1-4: For inter-band EN-DC which is not subject to interBandContiguousMRDC capability, whether it is acceptable to “Define frequency separation as placing two DL carriers as close as possible” (R4-2118540) | *Tentative agreements:* Option 1 is agreeable, i.e. for inter-band EN-DC which is not subject to *interBandContiguousMRDC* capability, define frequency separation as placing two DL carriers as close as possible  *Candidate options:*  *Recommendations for 2nd round:* |

**Sub-topic 4-2 IntraBandENDC-Support**

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| --- | --- |
|  | **Status summary** |
| * Issue 4-2-1: Which option can be used to determine the contiguous or non-contiguous intra-band EN-DC | *Tentative agreements:* No agreement can be reached  *Candidate options:*  *Recommendations for 2nd round:* Not pursued |
| * Issue 4-2-2: Whether it is acceptable to indicate IE IntraBandENDC-Support in UL and DL separately per band combination? | *Tentative agreements:* No agreement can be reached  *Candidate options:*  *Recommendations for 2nd round:* Not pursued |

### CRs/TPs

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

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

|  |  |
| --- | --- |
| **CR/TP number** | **CRs/TPs Status update recommendation** |
| R4-2118699  R4-2118700 | DraftCR for 38.101-3 to specify type 2 UE requirements(Rel-16)  *Moderator note: rely on the outcome of Issue 4-1-2* |
| Moderator summary: Postpone to next meeting. |
| R4-2117981  R4-2117982 | Draft CR for TS 38.101-3: Corrections for intra-band EN-DC configurations |
| Moderator summary: Not pursued. |

## Discussion on 2nd round

### WF/Open issues

**Sub-topic 4-1 Type 2 UE RX Imbalance Requirement**

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| --- | --- |
|  | **Comments** |
| WF on type 2 UE RX Imbalance Requirement |  |

# Topic #5: 36.101

*Main technical topic overview. The structure can be done based on sub-agenda basis.*

## Companies’ contributions summary

|  |  |  |
| --- | --- | --- |
| **T-doc number** | **Company** | **Proposals / Observations** |
| R4-2117965 | Apple | draftCR: Rel-16 36.101 Corrections on spurious emission band UE co-existence |
| R4-2119422 | Qualcomm | Alignment of out-of-band blocking between LAA and NR-U |
| R4-2119423  R4-2119424 | Qualcomm | Out-of-band blocking for Band 46 |

## CRs/TPs comments collection

|  |  |
| --- | --- |
| **CR/TP number** | **Comments collection** |
| R4-2117965 | draftCR: Rel-16 36.101 Corrections on spurious emission band UE co-existence |
|  |
| R4-2119423  R4-2119424 | Out-of-band blocking for Band 46 |
| Huawei: we support the change to align with NR-U.  Ericsson: a good change facilitating support of both B46 and n46, agreed.  Apple: We need time to check and would like to come back to this in the 2nd round. |

## Summary for 1st round

### CRs/TPs

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

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

|  |  |
| --- | --- |
| **CR/TP number** | **CRs/TPs Status update recommendation** |
| R4-2117965 | draftCR: Rel-16 36.101 Corrections on spurious emission band UE co-existence |
| Moderator summary: Agreeable |
| R4-2119423  R4-2119424 | Out-of-band blocking for Band 46 |
| Huawei: we support the change to align with NR-U.  Ericsson: a good change facilitating support of both B46 and n46, agreed.  Apple: We need time to check and would like to come back to this in the 2nd round.  Moderator summary: Return to in 2nd round |

## Discussion on 2nd round

### CRs/TPs

|  |  |
| --- | --- |
| **CR/TP number** | **Comments** |
| R4-2119423  R4-2119424 | Out-of-band blocking for Band 46 |
|  |

# Recommendations for Tdocs

## 1st round

1. **New tdocs**

|  |  |  |
| --- | --- | --- |
| **Title** | **Source** | **Comments** |
| WF on NS\_21 regulatory requirements | Qualcomm |  |
| WF on transient period capability | Qualcomm |  |
| WF on guard period between the SRS resources | Ericsson |  |
| LS on beam correspondence capability inconsistency | Apple |  |
| WF on type 2 UE RX Imbalance Requirement | Huawei |  |

1. **Existing tdocs for 38.307**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Tdoc number** | **Title** | **Source** | **Recommendation** | **Comments** |
| R4-2117552  R4-2117553 | draftCR 38.307: Addition of release independence information for shared spectrum access R16 CATB | Nokia | R4-2117552 is revised to R4-2119697  R4-2117553 is revised to R4-2119698 | The revised CRs has been uploaded in 1st round.  2nd round discussion can be based on these revised CRs |
| R4-2117534 | draftCR 38.307: Addition of release independence information for FR2 PC5 R15 | Nokia | Return to |  |
| R4-2117535 | draftCR 38.307: Addition of release independence information for FR2 PC5 R16 | Nokia | Return to |  |

1. **Existing tdocs for 38.101-1**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Tdoc number** | **Title** | **Source** | **Recommendation** | **Comments** |
| R4-2117861  R4-2117862 | Draft CR for TS 38.101-1: Missing MOP for NR DC | MediaTek | revised |  |
| R4-2117961  R4-2117962 | draftCR: Rel-17 Additional requirements and A-MPR for NS\_21 and n30 | Apple | revised |  |
| R4-2117957 | draftCR: Rel-16 Inter-band CA Operating Bands | Apple | Not pursued |  |
| R4-2117977 | Draft CR for TS 38.101-1: MSD test configurations modification for US inter-band CA combinations with n77 | Apple | revised |  |
| R4-2118121  R4-2118122 | Correction to SRS time mask for SRS usage set to antenna switching | Ericsson | Not pursued |  |
| R4-2118455  R4-2118456 | Draft CR for 38.101-1 to correct the note in table 5.3.5-1 for Rel-16 | Xiaomi | Agreeable |  |
| R4-2118704  R4-2118705 | Draft CR for 38.101-1 to clarify the ASE requirements for NS\_52 (Rel-16) | Huawei | revised |  |
| R4-2118880 | Draft R16 CR on SRS IL | OPPO | revised |  |
| R4-2119081  R4-2119082 | Draft CR to TS 38.101-1 on UE maximum output power reduction (Rel-16) | ZTE | revised |  |
| R4-2119291  R4-2119292 | draftCR: Rel-16 Correction on Channel Raster | Apple | Agreeable |  |
| R4-2119435  R4-2119436 | DeltaT\_RxSRS for PC5 | Qualcomm | revised |  |
| R4-2119567 | draft CR for TS 38.101-1 correction of IE for DC location for CA (R16) | Huawei | Agreeable |  |
| R4-2119497  R4-2119498 | V2X pcmax corrections | Qualcomm | Agreeable |  |

1. **Existing tdocs for 38.101-2**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Tdoc number** | **Title** | **Source** | **Recommendation** | **Comments** |
| R4-2117423 | Correction of UE enhanced beam correspondence requirements | Apple | Agreeable |  |
| R4-2117424 | Correction of UE enhanced beam correspondence requirements | Apple | Agreeable |  |
| R4-2117546  R4-2117547 | draft CR removal of FR2 MPR brackets REL16 CATF | Nokia | Agreeable |  |
| R4-2117979  R4-2117980 | Draft CR for TS 38.101-2: FR2 CA\_NS\_202 and CA\_NS\_203 A-MPR requirements for intra-band non-contiguous UL CA | Apple | Postponed |  |
| R4-2119083  R4-2119084 | Draft CR to TS 38.101-2 on configurations for intra-band contiguous CA (Rel-16) | ZTE | Agreeable |  |
| R4-2119538  R4-2119539 | draft CR for TS 38.101-2: Alignment of description of mpr-PowerBoost-Fr2-r16 (R16) | Huawei | Agreeable |  |

1. **Existing tdocs for 38.101-3**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Tdoc number** | **Title** | **Source** | **Recommendation** | **Comments** |
| R4-2118699  R4-2118700 | DraftCR for 38.101-3 to specify type 2 UE requirements(Rel-16) | Huawei | Postpone |  |
| R4-2117981  R4-2117982 | Draft CR for TS 38.101-3: Corrections for intra-band EN-DC configurations | Apple | Not pursued |  |

1. **Existing tdocs for 36.101**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Tdoc number** | **Title** | **Source** | **Recommendation** | **Comments** |
| R4-2117965 | draftCR: Rel-16 36.101 Corrections on spurious emission band UE co-existence | Apple | Agreeable |  |
| R4-2119423  R4-2119424 | Out-of-band blocking for Band 46 | Qualcomm | Return to |  |

## 2nd round

# Annex

Contact information

|  |  |  |
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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)