**3GPP TSG-RAN WG4 Meeting #102-e R4-21xxxxx**

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

**Agenda item:** 5.1.1.1, 5.1.5.2, 5.1.5.2.1, 5.1.5.2.2, 5.1.5.2.3, 5.2.2

**Source:** Moderator (OPPO)

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

**Document for:** Information

# Introduction

This summary covers the papers submitted in agenda 5.1.1.1, 5.1.5.2, 5.1.5.2.1, 5.1.5.2.2, 5.1.5.2.3, 5.2.2 which are targeting R16 maintenance for 38.307, 38.101-1, 38.101-2, 38.101-3, 38.104 and 36.101.

# Topic #1: 38.307

## Companies’ contributions summary

|  |  |  |
| --- | --- | --- |
| **T-doc number** | **Company** | **Proposals / Observations** |
| R4-2204065R4-2204066 (CAT-A) | CHTTL, China Unicom, ZTE | draft CR to TS 38.307 on Release independence of FDD-TDD EN-DC High Power UE |
| R4-2203988R4-2203989 (CAT-A) | ZTE | Draft CR to TS 38.307 on NR UE power class |
| R4-2203992 | ZTE | Draft CR to TS 38.307 on NR intra-band CA BW class within FR1 (Rel-16) |
| R4-2204975R4-2204976 (CAT-A) | vivo | Resubmission of CR to TS 38.307 on Release independence of FDD-TDD EN-DC High Power UE |

## CRs/TPs comments collection

|  |  |
| --- | --- |
| **CR/TP number** | **Comments collection** |
| R4-2204065R4-2204066 (CAT-A) | draft CR to TS 38.307 on Release independence of FDD-TDD EN-DC High Power UE |
|  |
| R4-2204975R4-2204976 (CAT-A) | Resubmission of CR to TS 38.307 on Release independence of FDD-TDD EN-DC High Power UE*Note: These two CR changes are same as R4-2204065 and its CAT-A CR, only one of them is needed.* |
| vivo: These two CRs can be noted since they are identical to R4-2204065. CHTTL: Thank you vivo. |
| R4-2203988R4-2203989 (CAT-A) | Draft CR to TS 38.307 on NR UE power class |
| Huawei: We don’t agree with this CR. There is no need to remove these sentences.ZTE: The CR is not to move a sentence but a table number. For Table B.4.3-1, it is for release independent SUL. The Table name for Table B.4.3-1 is as follows:Table B.4.3-1: Common UE RF requirements for a release independent SUL .In Table 5.1-2, what we removed is for PC which has no SUL impact. |
| R4-2203992 | Draft CR to TS 38.307 on NR intra-band CA BW class within FR1 (Rel-16) |
| Huawei: this CR is spread in three thread. We should avoid to discuss one topic three times.ZTE: Since the content of these three CRs are different, they could not be regarded as mirror CR as CAT A. This is the reason why we submit in three threads. Sorry for the inconvenience. |

## Summary for 1st round

### CRs/TPs

|  |  |
| --- | --- |
| **CR/TP number** | **CRs/TPs Status update recommendation**  |
| R4-2204065R4-2204066 (CAT-A) | draft CR to TS 38.307 on Release independence of FDD-TDD EN-DC High Power UE |
| Agreeable |
| R4-2204975R4-2204976 (CAT-A) | Resubmission of CR to TS 38.307 on Release independence of FDD-TDD EN-DC High Power UE*Note: These two CR changes are same as R4-2204065 and its CAT-A CR, only one of them is needed.* |
| Not pursued |
| R4-2203988R4-2203989 (CAT-A) | Draft CR to TS 38.307 on NR UE power class |
| Different view, continue discuss in 2nd round with some clarification. |
| R4-2203992 | Draft CR to TS 38.307 on NR intra-band CA BW class within FR1 (Rel-16) |
| Different view, continue discuss in 2nd round with some clarification. |

## Discussion on 2nd round

### CRs/TPs

|  |  |
| --- | --- |
| **CR/TP number** | **CRs/TPs Status update recommendation**  |
| R4-2203988R4-2203989 (CAT-A) | Draft CR to TS 38.307 on NR UE power class |
|  |
| R4-2203992 | Draft CR to TS 38.307 on NR intra-band CA BW class within FR1 (Rel-16) |
|  |

# Topic #2: 38.101-1

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

## Companies’ contributions summary

|  |  |  |
| --- | --- | --- |
| **T-doc number** | **Company** | **Proposals / Observations** |
| R4-2203613R4-2203614 (CAT-A) | Rohde & Schwarz | Correction to n46 channel raster |
| R4-2204602R4-2204603 (CAT-A) | Ericsson | Correction to the note on the use of operating bands for shared spectrum access |
| R4-2203676R4-2203677 (CAT-A) | Apple | draftCR to 38.101-1 on new NS for Canadian WCS regulation R16 |
| R4-2204199R4-2204200 (CAT-A) | Qualcomm | n1 and n65 coexistence fix CR Cat-F rel 16 |
| R4-2204210 | Qualcomm | n65 AMPR discrepancies |
| R4-2204208R4-2204209 (CAT-A) | Qualcomm | n65 AMPR discrepancies rel 16 CR Cat-F rel 16 |
| R4-2204512 | China Telecom | Draft CR to 38.101-1 Correction on UE maximum output power for intra-band CA (R16) |
| R4-2204737R4-2204738 (CAT-A) | ZTE | Draft CR to TS38.101-1: Corrections on REFSEN for CA |
| R4-2205184R4-2205185 (CAT-A) | Huawei, HiSilicon | Draft CR for 38.101-1 updating note in MSD tables (Rel-16) |
| R4-2205186R4-2205187 (CAT-A) | Huawei, HiSilicon | Draft CR for 38.101-1 updating references in V2X test cases (Rel-16) |
| R4-2205297R4-2205298 (CAT-A) | Huawei, HiSilicon | Draft CR for 38.101-1 to correct configured transmit power for V2X(R16) |
| R4-2205881R4-2206093 (CAT-A) | Qualcomm | Corrections on carrier leakage requirement |
| R4-2206011 | Qualcomm | Proposal: Based on these 3 observations, no new NS is required for WCS band n30 in Canada. |
| R4-2203686 | Apple | **Observation 1**: Additional distortions might occur on a signal traveling through the UE RF path. **Proposal 1:** Keep the average EVM level for 256QAM at 8% and remove the brackets.**Observation 2:** Our understanding is that the main purposes for the start position of EVM exclusion window is to provide a basis for test requirements at TE and it is therefore unclear what it means for testing when choosing between two different start positions. |
| R4-2204823 | Huawei, HiSilicon | ***Observation 1: 25% CP is only the theoretical WOLA window length. Shorter WOLA window can be applied to alleviate the spectrum emission in the real implementation especially when the issue is less serious for large RB allocation***.***Observation 2: Anti-multipath is a major factor that is considered for gNB FFT window placement.******Observation 3: Sync error among all access UEs is another important factor that is considered for gNB FFT window placement.******Observation 4: Due to the trade-off among all possible factors, gNB solution is fixed FFT window placement rather than floating for all access UEs. UE implementation should be adaptable to gNB for better UL performance.*** ***Observation 5: The transient period capabilities’ test design, e.g., the asymmetric transient period position, currently captured in TS 38.101-1 has already considered for both UE testability/implementation and gNB demodulation implementation.******Proposal 1: WOLA window length assumption needs to be clarified for the measurements in R4-2111539***.***Proposal 2: Remove all the bracket for shorter transient period requirements, including tpstart value for each Tp and relaxed EVM requirements.*** |
| R4-2206125 | Skyworks | CR to R16 TS38.101-1 on transient period capability |
| R4-2204518 | 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.** |
| R4-2203687 | Apple | **Observation 1**: RAN1 definition of guard period exists since Rel-15 and is the basis for RAN4 SRS antenna switching time mask definition.**Observation 2**: There seems to be no need to send an LS to RAN1 as the specification does not leave room for interpretations and there is no fundamental flaw in the design. **Proposal 1**: RAN4 should follow corresponding RAN1 specification to avoid inconsistencies.**Proposal 2**: Regarding Rel-16 SRS antenna switching for SRS resources of the same set there should be no changes made to the time mask. |
| R4-2204621 | 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: for FeMIMO, remove the guard period *Y* 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. This should apply at least for*** **UEs capable of the transient-time capability reducing the overall transient time excluding the switch**
* **SRS transmissions SRS resources associated with different antenna ports of the same bandwidth (PRBs as set by mSRS,b) significantly reducing the power changes**

to allow efficient use of the special slot without requiring changes of the special slot patterns used for TDD coordination.For transmissions between SRS resource sets, we propose **Proposal 2: in view of the 15 us transient time (notwithstanding the transient-time capability, transmissions of PUCCH and PUSCH can be transmitted between SRS resource sets with usage ‘antennawitching’ without *mandated* guard symbols for SCS = 15k and 30k.****Observation 2: not being able to transmit e.g. PUCCH between SRS resource sets for AS in DL-heavy TDD configurations would be inefficient.** |

## 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 2-2 NS for WCS band n30 in Canada

**Issue 2-2-1: Whether it is acceptable for below proposal from R4-2206011**

* Proposal: Based on these 3 observations, no new NS is required for WCS band n30 in Canada.
	+ Option 1: Yes
	+ Option 2: No, and reason

|  |  |
| --- | --- |
| **Company** | **Comments** |
| Apple | Thank you for bringing up the concerns. We understand that there might be certain challenges with introducing a new network signaling for Canadian requirements. In summary, it has been realized during the discussion in RAN4#101-e and captured in WF R4-2119840 that the Canadian regulatory emission requirements are sharper at the channel edges compared to FCC regulations. The new NS value intendeds to close the gap and cover those requirements. It is true that the difference between FCC 27.53 and RSS-195 was not recognized since it was introduced to LTE with NS\_21. However, we do not consider this to be a valid reason to not correct an oversight. Our understanding is that 3GPP specs should follow regulatory requirements as best as possible. This drive to correct specification (even if the oversight is years old) could recently been observed with the update on additional emission requirements for CA/DC. In this case it has been found that combined emission requirements of CA/DC have not been handled correctly. This was corrected by introducing new sets of requirements. And we think the same should be done here. LTE devices with NS\_21 seem to be able to comply with RSS-195, as there has not been raised compliance issues by regulatory bodies for years. With the introduction of n30 to NR in Rel-16 it is not granted that this will continue as NR features several differences in spectrum usage and waveforms e.g. CP-OFDM with increased power backoff. Therefore, we propose to introduce the new network signaling to circumvent the future issue of millions of legacy devices not correctly implementing RSS-195 requirements.We would therefore like to propose to follow the agreed WF R4-2119840 and implement the CR on Canadian requirements for n30. |
| Qualcomm | Our main concern is that will legacy LTE devices (that are attaching to Network with NS\_21) be able to attach to the network when NS\_57 is signaled. It is unclear how multiple NS will work. Can Apple or others clarify how this will work for the legacy device? |
| Ericsson | Legacy UEs can attach if the NS\_21 is listed after NS\_57 in the *NR-NS-PmaxList.* The first supported value is applied, then new UEs apply NS\_57. This has been in the RRC specification since Rel-17, from 38.331 v15.3.0>    apply the first listed *additionalSpectrumEmission* which it supports among the values included in *NR-NS-PmaxList* within *frequencyBandList*;to enable addition of new NS for a band. If NS\_21 is not listed, then legacy UEs are barred. Now, if all UEs in the field actually support this is another question… |
| Apple | Thanks to Ericsson for providing those insights. We checked RAN2 specs and have similar understanding. Here are our results:To our understanding multiple NS are possible according to the RRC specs (36.331 and 38.331). We would like to share our understanding by using the description of NR SIB1 as an example. The other SIBs are similar with respect to handling NS flags. Also, LTE behaves quite similar if we just consider selection of multiple NS flags. The RRC specs refer to NS flags as additionalSpectrumEmission values.When a UE receives the SIB1 from the network it is instructed to execute different tasks. At first it shall store the SIB1 for further reference. Next it shall check the SIB for cell related information and other tasks. After having executed different instructions, it eventually comes to the point where it has to select a frequency band being provided by the SIB. The instruction is worded as follows:According to the description the network provides a list of bands and NS flags. The NS flags are embedded in IE NR-NS-PmaxList which is specified per band. The specification of IE NR-NS-PmaxList is provided below. It features a list of *additionalSpectrumEmission* which means that the network can signal multiple NS flags and Pmax values for a single band:After the UE selected a band with the side condition of knowing at least one of the NS flags, it processes further tasks until it reaches the following instruction:The UE must select the first supported NS flag and ignore the unknown ones. Multiple NS flags could be handled that the newest is signaled first and the older one second, so that a UE will choose the newest flag first while legacy would choose the second one.As mentioned earlier, the procedure for selection with multiple NS flags in LTE and NR are quite similar and we are convinced that legacy LTE devices would not be locked out or bared with introducing the new flag. This is under the assumption that legacy LTE devices comply to RSS-195 even with NS\_21. If not, they should not be able to camp on a cell in regions falling under the RSS-195 requirements. As stated above we do not think that it is guaranteed that NR devices can comply to RSS-195 without some additional A-MPR due to differences in spectrum usage and waveforms. And therefore the new NS flag should be introduced. |
| Qualcomm | Thanks Apple and Ericsson for the detailed response. We will double check to make sure NS\_21 is indeed signaled to the legacy devices. |

### Sub-topic 2-1 n65 AMPR

**Issue 2-1-1: Whether it is acceptable for below two proposals from R4-2204210**

* Proposal 1: Modify NS\_51 A1 AMPR in Table 6.2.3.28-2 in the specification from 15dB to 17dB to address specification alignment and measurement margin.
* Proposal 2: Modify NS\_24 region A and region C boundaries to the highlighted values shown in Table 2.2-1 and Table 6.2.3.15-1 in the specification.
	+ Option 1: Yes
	+ Option 2: No, and reason

|  |  |
| --- | --- |
| **Company** | **Comments** |
| Skyworks | We are fine with the changes proposed by Qualcomm. Our measurement data in R4-2008133 indicated between 18dB and 20dB was required as a result of multiple PA VCC voltage change required. As mentioned by Qualcomm, the agreed values were the results of a compromise between companies at the time. |
|  |  |

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

**Issue 2-3-1: Whether it is acceptable for below proposal 1 from R4-2203686 and proposal 2 from R4-2204823**

* Proposal 1: Keep the average EVM level for 256QAM at 8% and remove the brackets.
* Proposal 2: Remove all the bracket for shorter transient period requirements, including tpstart value for each Tp and relaxed EVM requirements.
	+ Option 1: Yes
	+ Option 2: No, and reason

|  |  |
| --- | --- |
| **Company** | **Comments** |
| Qualcomm | Issue 2-3-1 and Issue 2-3-2 are not mutually exclusive, these should have been combined into a single issue. We are fine with the agreement in Issue in 2-3-1 or 2-3-2, we would like to close this discussion. We prefer to agree on Issue 2-3-2 if it will be easier to agree. We would be fine to proposal in Issue 2-3-1 and tighten EVM to 6% also. |
| Huawei | We also would like to finish the discussion in this meeting. For this issue we feel the above two proposals are overlapped. As for the EVM, we prefer to keep the 8% for 256QAM.  |
| Apple | We prefer to keep the tentative agreed EVM level (proposal 1). As a compromise in order to conclude the discussion we would accept removing the brackets and keep the tentative agreed tpstart values (proposal 2). |
| Skyworks | We would also like to close this topic at this meeting. We proposed a compromise at last meeting to accept 8% rms EVM. For bracket removal, we invite companies to indicate if the measured EVM degradation due to WOLA (induced by the proposed tpstart values) should be resolved or not. We provide our views and further compromise in issue 2-3-3 for the sake of closing this topic. |

**Issue 2-3-2: Whether it is acceptable for below proposal from R4-2204518**

* 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
	+ Option 1: Yes
	+ Option 2: No, and reason

|  |  |
| --- | --- |
| **Company** | **Comments** |
| Qualcomm | See our comments on Issue 2-3-1. We are fine with either proposal, would prefer to agree to a tighter EVM of 6% |
| Huawei | In issue 2-3-1 we already shared our preference on the 8% EVM for 256QAM.Regarding the tpstart change, we have provided our analysis from both gNB and UE perspective in our Tdoc. So we still against the above change and prefer to keep the tpstart value in current spec by removing the bracket.  |
| Apple | Please observe our comment on Issue 2-3-1. |
| Skyworks | Same comment as at RAN4 # 101-bis-e: we are fine with keeping the 8% rms EVM for 256QAM. For tpstart change proposal, please see our comments in issue 2-3-3.To Huawei: tpstart should not be considered as a mandatory requirement for all UEs in a cell to trigger their transient response at exactly tpstart. Tpstart defines the start of a measurement exclusion period, i.e., it is the time index at which the test equipment should start excluding the measurements of the metric under test: power measurements for ON/OFF time-masks, EVM measurements for EVM with transients. A UE is free to trigger its transient response at any time relative to tpstart as long as the core requirements are met, e.g., for 256QAM EVM with transients, as long as the measured rmsEVM<8%. |

**Issue 2-3-3: Clarification question from R4-2204823**

* Proposal 1: WOLA window length assumption needs to be clarified for the measurements in R4-2111539.

|  |  |
| --- | --- |
| **Company** | **Comments** |
| Qualcomm | We do not think there is any need for any clarification since this is just an assumption. What the UE actually uses does not matter as long as requirements are met. |
| Huawei | Our intention is to know whether it is consensus that in real test or implementation, 50% CP WOLA window is always used, since it was also touched in R4-2014489. However we believe the current tpstart value in the spec is already considered the WOLA effect. |
| Skyworks | To Huawei: in R4-2111539/R4-2114583, the rise / degradation of the measured EVM floor is due to FFT windows whose start positions are set too late (relative to the slot boundaries) due to the proposed tpstart values. The reported EVM rise was measured using waveforms with 25% CP windowing. Having FFT windows “hitting” the 25%CP length windowing is what we refer to as WOLA and what causes EVM rise. For the example of a UE that declares tp=7usec, we showed this WOLA/EVM rise can be eliminated if tpstart is retarded from -2usec to -2.7usec (verified at SCS15kHz). The simplified explanation is that by specifying tpstart = -2us we place one FFT start position at +5us for 7us EVM exclusion period. 25% CP windowing means EVM rises at 25/75% CP length (early / late FFTs). At +5us SCS15, since CP length is approximately 5.2us, it can be seen that the FFT defined by tpstart = -2us exceeds 75% of CP length, that’s why the EVM rises for waveforms with 25% CP length windowing. It is not clear from R4-2204823 what is the UL SNR loss this 700ns delay “advance” would cause, so it is difficult to agree to removing brackets without a quantified SNR loss. We have brought data to quantify the impact on the UE side.To Qualcomm:We agree with your statement: 25%CP windowing is only an assumption we made in our measurements because it is a valid trade-off between out of band emissions and static EVM performance. The EVM measurements were brought because we believed WOLA was overlooked when tpstart values were initially proposed. But the UE is free to use any windowing as long as the requirements are met. So, if the consensus is that eliminating WOLA for waveforms with 25% CP length windowing is not needed, and for the sake of closing this topic, we are open to removing all brackets in round 2. The changes could be captured in our CR. |

### Sub-topic 2-4 Guard period for SRS antenna switching

**Issue 2-4-1: Whether it is acceptable for below proposals from R4-2203687**

* Proposal 1: RAN4 should follow corresponding RAN1 specification to avoid inconsistencies.
* Proposal 2: Regarding Rel-16 SRS antenna switching for SRS resources of the same set there should be no changes made to the time mask.
	+ Option 1: Yes
	+ Option 2: No, and reason

|  |  |
| --- | --- |
| **Company** | **Comments** |
| Nokia(HU) | Option 2: In fact, Figure 6.3.3.6-5 says that the required time to switch from x to y is 15 us for usage of other sets while antenna y to x is one symbol. Though some consideration of RAN1 spec is needed if necessary, as the RF performance, we don’t dare to select one symbol instead of 15 us. |
| Huawei | Both proposals are acceptable. |
| Apple | Obviously, we support keeping the requirements in Rel-16 as is. The 15us between different resource sets could be an oversight, meaning that a proper gap is missing and it should be similar to switching between resources in one set. |
| Qualcomm | Not sure what does it mean if we agree a proposal not to do changes. Corrections still can be made if needed. I suppose the meaning was not to tighten the requirements in earlier releases. Regarding the proposal 1, the text says there are no flaws or inconsistencies. This proposals would be more understandable if there is an inconsitency and ran4 needs to decide iif to change the ran4 spec to aling or then ask ran1 to change the spec.Just saying, agree proposals or not, what is the difference?  |
| Apple | To Qualcomm: This contribution was made to further respond to the discussion in RAN4#101-e on SRS guard gap removal. We initially thought the Rel-16 discussion will continue this meeting. |
| Skyworks | Rel-16 ON/OFF time mask should not changed. |
| Ericsson | Proposal 1: RAN4 must follow the RAN1 specifications. This is the issue with the *mandated* guard symbols Y. RAN4 initially specified a time mask without a guard period between SRS resources used for antenna switching (AS) for SCS of 15k and 30k. RAN1, on the other hand, specified in 38.214 a guard period of Y symbols configured between SRS resources for *all* SCS, Y = 1 except for SCS = 120k for which Y = 2. Much later, the SRS time mask in 38.101-1 was aligned with the 38.214 in the 2021-03 version. The SRS-PUSCH transition is usually worse due to large power changes. However, NR offers flexibility for the network to configure guard symbols if needed, but there is no possibility to remove the guard symbols between SRS resources of sets with usage AS due to the *mandated* Y in 38.214 even though the switch time is 15 us. RAN4 should also be involved in RAN1 discussions on the impact of transients.Proposal 2: Option 2 for the reasons stated above. Making changes to the Rel-17 specifications would also be acceptable recognizing that Rel-16 is implemented (isolated impact). |

**Issue 2-4-2: Whether it is acceptable for below proposals from R4-2204621**

* Proposal 1: for FeMIMO, remove the guard period Y 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. This should apply at least for
	+ UEs capable of the transient-time capability reducing the overall transient time excluding the switch
	+ SRS transmissions SRS resources associated with different antenna ports of the same bandwidth (PRBs as set by mSRS,b) significantly reducing the power changes
* Proposal 2: in view of the 15 us transient time (notwithstanding the transient-time capability, transmissions of PUCCH and PUSCH can be transmitted between SRS resource sets with usage ‘antennawitching’ without *mandated* guard symbols for SCS = 15k and 30k.
	+ Option 1: Yes
	+ Option 2: No, and reason

|  |  |
| --- | --- |
| **Company** | **Comments** |
| OPPO | Understand the intention and for clarification, if remove the guard period for 15khz and 30khz, is there NBC issue, e.g. legacy gNB, legacy UE, new gNB, new UE? And from which release this change is intended to? |
| Nokia(HU) | We support the proposals, but even if UEs capable of the transient-time capability, this may not work if the capability is 4 or 7 us since it exceeds CP length. |
| Huawei | We are against to remove Y symbol guard period since it is already implemented since Rel-15. Even in RAN1 Rel-17 feMIMO discussion, RAN1 has agreed that when SRS are in different sets but in consecutive slots, there is also a guard period. |
| Apple | Not sure about the placement of this topic as it considers FeMIMO. As laid out in R4-2203687, RAN1 clearly specifies gap requirements. We strongly prefer to not alter the Rel-16 gap requirements so late in the release cycle as it would only affect RAN4 but also RAN1 specs. |
| Qualcomm | The short transient period is for faster ON-ON transient. The antenna switching time contains three parts, ON-OFF, Switching of the PA to new antenna connector, OFF-ON. None of those are ON-ON so connection between shorter transient and antenna switching is not direct. However, we can consider the case that UE that has faster ON-ON would also have faster OFF-ON-OFF but need more time. So not ok to agree at this time. Agree with Apple that the FeMIMO part should be in FeMIMO WI discussions. |
| Ericsson | The guard symbols Y make SRS AS less efficient and prevents use in the special subframe for many TDD applications -- is this important? Then SRS must be configured in normal UL slots, which is less straightforward particularly for DL-heavy TDD configurations. The proposed changes are for Rel-17 given the discussions at RAN4#101-e. Proposal 1: we expect improved performance for ON-OFF transitions for UEs indicating the transient capability (along the lines discussed by Qualcomm above) such that the transient capability could also be applicable for AS. Moreover, we do not expect large power changes between SRS resources associated with SRS ports/antenna connectors. The latter could also be a condition (SRS bandwidth the same for all resources in AS sets) for allowing Y = 0 for 15k and 30k. But we recognize more time is needed. Proposal 2: this proposal is for FeMIMO. Yes, given that transmissions of other signals between SRS sets for AS is already possible according to the existing specifications (e.g. aperiodic triggering for 1T4R AS with SRS transmissions in the last six symbols per slot), there should be no mandated guard symbols Y between SRS resource *sets* for AS. The latter should be liaised with RAN1. |

## 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.*

|  |  |
| --- | --- |
| **CR/TP number** | **Comments collection** |
| R4-2203613R4-2203614 (CAT-A) | Correction to n46 channel raster |
| Qualcomm: The change isn’t strictly necessary because the only valid channel numbers are listed inside the table, not necessarily within the range. That being said, correcting the range is ok for us also. |
| R4-2204602R4-2204603 (CAT-A) | Correction to the note on the use of operating bands for shared spectrum access |
| Nokia: We think these CRs should be treated in Thread [106] NR\_6GHz\_unlic\_full since the discussion related to these are captured there. Before an agreement on these notes are achieved, we cannot agree these CRs. Huawei: Similar view as Nokia, this is not the right thread for the discussion. Also we don’t agree with proposed changes in the draft CR.Skyworks, this should be aligned with the discussion in #105/106. Best is to move these CRs to #106Ericsson: OK to treat these in thread #106. |
| R4-2203676R4-2203677 (CAT-A) | draftCR to 38.101-1 on new NS for Canadian WCS regulation R16 |
|  |
| R4-2204199R4-2204200 (CAT-A) | n1 and n65 coexistence fix CR Cat-F rel 16 |
|  |
| R4-2204512 | Draft CR to 38.101-1 Correction on UE maximum output power for intra-band CA (R16) |
|  |
| R4-2204737R4-2204738 (CAT-A) | Draft CR to TS38.101-1: Corrections on REFSEN for CA |
| Qualcomm: This note is not required since the CA REFSENS was updated. Draft CR R4-2119866 was endorsed in RAN4#101-e to only include test points for 2UL/2DL, so no need for this change since 1UL/2DL REFSENS refers to single CC REFSENS due to placement of SCC DL further away from PCC UL.ZTE: To QC: This note is for 2UL/2DL since Table 7.3A.2.1-1 is for 2UL/2DL, so the reference sensitivity power level increased by ΔRIBNC given in Table 7.3A.2.1-1 should be applied, as stated in the CR. For 1UL/2DL, yes, single CC REFSENs was refered.Huawei: I share the similar view with QC. This CR is not needed. The statement is done in 3rd paragraph under this clause. |
| R4-2205184R4-2205185 (CAT-A) | Draft CR for 38.101-1 updating note in MSD tables (Rel-16) |
| CHTTL: one minor question that maybe the work item code is NR\_CADC\_R16\_3BDL\_2BUL-Core? |
| Huawei 2: Thanks for the comment. The WIC should be corrected in revision. |
| R4-2205186R4-2205187 (CAT-A) | Draft CR for 38.101-1 updating references in V2X test cases (Rel-16) |
| Qualcomm: Section 6.2E.3.1 refers to outer and inner notation used in clause 6.2E.3.2. However, clause 6.2E.3.2 does not use outer and inner notation.  |
| Huawei 2: Inner / Outer is used in table Table 6.2E.3.2-2.There is additional reference error in the NOTE 1 of Table 6.2E.3.2-2: 6.2E.2.1 should be 6.2E.2.2.Revision of R4-2205186 is needed to correct this error. |
| R4-2205297R4-2205298 (CAT-A) | Draft CR for 38.101-1 to correct configured transmit power for V2X(R16) |
|  |
| R4-2205881R4-2206093 (CAT-A) | Corrections on carrier leakage requirement |
| OPPO: Ok with changes.Huawei: We disagree with the proposed changes. This part has been changed once, the previous endorsed CR has some problems, but this CR does not solve the issue as well. The very early version includes both UE supporting R16 capability and not supporting R16 capability cases, if UE does not support the capability, then the Rel-15 signaling would be used. Also we don’t agree to remove the clarification of “those that are enclosed either in the RB containing the carrier leakage frequency, or in the two RBs immediately adjacent to the carrier leakage frequency but excluding any allocated RB”. We only agree to make the applicable signaling clear with further revisions. Skyworks: if we are fine to provide further clarification on Carrier leakage aspects but the CR also removes text about image leakage that can also fall in gap in certain cases. In any case there are two separate aspects: the carrier leakage specification and the fact that for 1LO case in R17 the carrier and image leakage may fall in gap but anyhow requires better values than the spec. at least both carrier and image should be covered. |
| R4-2204208R4-2204209 (CAT-A) | n65 AMPR discrepancies rel 16 CR Cat-F rel 16*Note: depends on Issue 2-1-1* |
| Huawei: There are two A5 in Table 6.2.3.28-2.Qualcomm: Thanks Huawei for spotting the editorial error in the Table header. The revision is placed in the draft round 1 folder. |
| R4-2206125 | CR to R16 TS38.101-1 on transient period capability*Note: depends on sub-topic 2-3* |
|  |

## 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 n65 AMPR**

|  |  |
| --- | --- |
|  | **Status summary**  |
| * Issue 2-1-1: Whether it is acceptable for below two proposals from R4-2204210
 | *Tentative agreements:* Proposals are agreeable*Recommendations for 2nd round:* Focusing on CRs in 2nd round |

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

|  |  |
| --- | --- |
|  | **Status summary**  |
| * Issue 2-2-1: Whether it is acceptable for below proposal from R4-2206011
 | *Tentative agreements:* No conclusion in 1st round pending on further check whether NS\_21 is signaled to the legacy devices.*Recommendations for 2nd round:* Continue discuss in 2nd round |

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

|  |  |
| --- | --- |
|  | **Status summary**  |
| * Issue 2-3-1: Whether it is acceptable for below proposal 1 from R4-2203686 and proposal 2 from R4-2204823
 | *Tentative agreements:* All companies are ok with keep the average EVM level for 256QAM at 8% and remove the EVM requirement brackets. No consensus on the TPstart. Moderator suggest to agree on the average EVM level for 256QAM at 8%, and continue discuss the Tpstart in 2nd round with a WF.*Recommendations for 2nd round:* Further discuss in 2nd round with WF. |
| * Issue 2-3-2: Whether it is acceptable for below proposal from R4-2204518
 | *Tentative agreements:* No conclusion and is overlapping with Issue 2-3-1*Recommendations for 2nd round:* No further discuss in 2nd round and focus on WF. |
| * Issue 2-3-3: Clarification question from R4-2204823
 | *Tentative agreements:* No conclusion and most companies think there is no need to further clarify since this is just an assumption and it doesn’t restrict UE implementation as long as requirements are met.*Recommendations for 2nd round:* None |

**Sub-topic 2-4 Guard period for SRS antenna switching**

|  |  |
| --- | --- |
|  | **Status summary**  |
| * Issue 2-4-1: Whether it is acceptable for below proposals from R4-2203687
 | *Tentative agreements:* Most companies agree that Rel-16 SRS antenna switching time mask shall not be changed considering there already products on the market. Therefore, it can be agreed that no changes to Rel-16 SRS antenna switching time mask.*Recommendations for 2nd round:* No more discussion. |
| * Issue 2-4-2: Whether it is acceptable for below proposals from R4-2204621
 | *Tentative agreements:* No agreement can be reached and there are against from two companies.*Recommendations for 2nd round:* No more discussion. |

### CRs/TPs

|  |  |
| --- | --- |
| **CR/TP number** | **Comments collection** |
| R4-2203613R4-2203614 (CAT-A) | Correction to n46 channel raster |
| Agreeable. |
| R4-2204602R4-2204603 (CAT-A) | Correction to the note on the use of operating bands for shared spectrum access |
| Return to. |
| R4-2203676R4-2203677 (CAT-A) | draftCR to 38.101-1 on new NS for Canadian WCS regulation R16 |
| Return to. |
| R4-2204199R4-2204200 (CAT-A) | n1 and n65 coexistence fix CR Cat-F rel 16 |
| Agreeable. |
| R4-2204512 | Draft CR to 38.101-1 Correction on UE maximum output power for intra-band CA (R16) |
| Agreeable. |
| R4-2204737R4-2204738 (CAT-A) | Draft CR to TS38.101-1: Corrections on REFSEN for CA |
| No consensus, suggest to be revised |
| R4-2205184R4-2205185 (CAT-A) | Draft CR for 38.101-1 updating note in MSD tables (Rel-16) |
| WI code is incorrect, revise and discuss in 2nd round. |
| R4-2205186R4-2205187 (CAT-A) | Draft CR for 38.101-1 updating references in V2X test cases (Rel-16) |
| Revise and discuss in 2nd round. |
| R4-2205297R4-2205298 (CAT-A) | Draft CR for 38.101-1 to correct configured transmit power for V2X(R16) |
| Agreeable. |
| R4-2205881R4-2206093 (CAT-A) | Corrections on carrier leakage requirement |
| Revise and discuss in 2nd round. |
| R4-2204208R4-2204209 (CAT-A) | n65 AMPR discrepancies rel 16 CR Cat-F rel 16*Note: depends on Issue 2-1-1* |
| Revise and discuss in 2nd round. |
| R4-2206125 | CR to R16 TS38.101-1 on transient period capability*Note: depends on sub-topic 2-3* |
| Revise to capture the agreements |

## Discussion on 2nd round

### WFs/Open issues

#### Sub-topic 2-2 NS for WCS band n30 in Canada

|  |  |
| --- | --- |
|  | **Comments** |
| **Issue 2-2-1:** * **Based on discussion in 1st round moderator proposes to check whether it is agreeable to follow the agreed WF R4-2119840 and implement the CR on Canadian requirements for n30.**

*Moderator note: This proposal is from Apple comment in 1st round, and pending on QC check whether NS\_21 is signaled to the legacy devices.* |  |

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

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

### CRs/TPs

|  |  |
| --- | --- |
| **CR/TP number** | **Comments collection** |
| Rev of R4-2205184R4-2205185 (CAT-A) | Draft CR for 38.101-1 updating note in MSD tables (Rel-16) |
|  |
| Rev of R4-2205186R4-2205187 (CAT-A) | Draft CR for 38.101-1 updating references in V2X test cases (Rel-16) |
|  |
| Rev of R4-2205881R4-2206093 (CAT-A) | Corrections on carrier leakage requirement |
|  |
| Rev of R4-2204208R4-2204209 (CAT-A) | n65 AMPR discrepancies rel 16 CR Cat-F rel 16*Note: depends on Issue 2-1-1* |
|  |
| R4-2204602R4-2204603 (CAT-A) | Correction to the note on the use of operating bands for shared spectrum access |
|  |
| R4-2203676R4-2203677 (CAT-A) | draftCR to 38.101-1 on new NS for Canadian WCS regulation R16 |
|  |
| Rev of R4-2206125 | CR to R16 TS38.101-1 on transient period capability*Note: depends on sub-topic 2-3,* *Revise to capture the agreements* |
|  |
| Rev of R4-2204737R4-2204738 (CAT-A) | Draft CR to TS38.101-1: Corrections on REFSEN for CA |
|  |

# 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** |
| R4-2203611R4-2203612 (CAT-A) | Rohde & Schwarz | Correction to Rel-16 FR2 RMCs |
| R4-2204739R4-2204740 (CAT-A) | ZTE | Draft CR to TS38.101-2: Add default power class for NR inter-band CA combination |

## CRs/TPs comments collection

|  |  |
| --- | --- |
| **CR/TP number** | **Comments collection** |
| R4-2203611R4-2203612 (CAT-A) | Correction to Rel-16 FR2 RMCs |
|  |
| R4-2204739R4-2204740 (CAT-A) | Draft CR to TS38.101-2: Add default power class for NR inter-band CA combination |
| Qualcomm: We are not opposed to the intent of the CR, but would like to establish a way that is consistent with existing single band default power class specification in 6.2.1.0. Perhaps we move the default power class statement to 6.1 from 6.2.1.0 rather than duplicating it in section 5.5A.MediaTek: We are fine for the CR intent, and make it clearer in TS is fine.ZTE: To Qualcomm: The main purpose to add the default power class statement in section 5.5A is to specific the current band combination is PC3 band combination. In Rel-16, only 1UL/2DL inter-band CA combs were supported, so the default power class in the uplink is PC3. The other PCx band combination would be supported (actually it was already proposed during Rel-18 WID discussion, i.e. vehicular FR2-FR2 combs (PC2)). So if other than PC3 FR2-FR2 combs are introduced, then the configuration table may keep the same.Also, in Rel-17, inter-band UL CA will be supported, we believe the default power class for inter-band UL CA is also PC3. However, the statement in 6.2.1.0 is for the single band. So we prefer to add such statement in section 5.5A. OPPO: Understand the intention, and probably change it to a note in the CA configuration table as what has been done in FR1.ZTE: To OPPO, we can revise this CR to include it as a note in the table.Huawei: we think the CR is not needed. The table here is for DL CA, and in the spec it already specified the band combination is for PC3 in clause 7.3A.2.3. If later UL CA for the band combinations are introduced, as the requirements are power class specific, we don’t see there could be ambiguity. DOCOMO: Thank you for bringing this CR for clarification. We are fine with the content. |

## Summary for 1st round

### CRs/TPs

|  |  |
| --- | --- |
| **CR/TP number** | **Comments collection** |
| R4-2203611R4-2203612 (CAT-A) | Correction to Rel-16 FR2 RMCs |
| Agreeable |
| R4-2204739R4-2204740 (CAT-A) | Draft CR to TS38.101-2: Add default power class for NR inter-band CA combination |
| Revise and discuss in 2nd round. |

## Discussion on 2nd round

|  |  |
| --- | --- |
| **CR/TP number** | **Comments collection** |
| Rev of R4-2204739R4-2204740 (CAT-A) | Draft CR to TS38.101-2: Add default power class for NR inter-band CA combination |
|  |

# 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** |
| R4-2203673R4-2203674 (CAT-A) | Apple | draftCR for TS 38.101-3 Rel-16: Corrections on UE co-existence |
| R4-2203995R4-2203996 (CAT-A) | ZTE | Draft CR to TS 38.101-3 on corrections to inter-band EN-DC configurations including FR1 and FR2 |
| R4-2205115 | Xiaomi | Draft CR for 38.101-3 Rel-16 to modify the notes and correct the configurations for inter-band EN-DC configurations |
| R4-2205182R4-2205183 (CAT-A) | Huawei | Draft CR for 38.101-3 updating note in MSD tables (Rel-16) |
| R4-2205273R4-2205274 (CAT-A) | Huawei | Draft CR for 38.101-3 to specify type 2 UE requirements(Rel-16) |
| R4-2205299R4-2205300 (CAT-A) | Huawei | Draft CR for 38.101-3 to add MOP for band combination related to band 3C(R16) |
| R4-2205311R4-2205312 (CAT-A) | Huawei | Draft CR for 38.101-3 to delete the MSD frequency test points for DC\_1A\_n5A(R16) |
| R4-2205612R4-2205613 (CAT-A) | Anritsu | Draft CR to correct DC\_3A\_n38A test frequencies |
| R4-2205706 | Ericsson | draft Rel-16 CR 38101-3-ga0 to align spurious emission between R15 and R16 |
| R4-2206009R4-2206010 (CAT-A) | Qualcomm | draft CR for Type II UE Cat-F rel 16*Note: No submission paper before meeting.* |
| R4-2205112 | Xiaomi | **Proposal 1: The DL intra-band contiguous ENDC more than 2 carriers with UL intra-band non-contiguous ENDC shouldn’t be allowed to request in basket WID according to current fall-back rules in TS 38.101-3 and TS 38.306.** **Proposal 2: Below cases of DL intra-band contiguous ENDC more than 2 carriers with UL intra-band non-contiguous ENDC should be removed from R-16 and R-17 Spec:**

|  |  |
| --- | --- |
| EN-DCconfiguration | Uplink EN-DCconfiguration |
| DC\_(n)41AB5DC\_(n)41CA5DC\_(n)41DA5 | DC\_41A\_n41A |
| DC\_(n)48CA5 | DC\_48A\_n48A6 |
| DC\_(n)48DA5 | DC\_48A\_n48A6 |

**Proposal 3: It should request both of UL intra-band contiguous and non-contiguous ENDC for intra-band non-contiguous ENDC in which the spectrum between LTE part and NR part is contiguous but with intra-band non-contiguous CA in NR or/and LTE part in related basket WID.****Proposal 4: Introduce a new table for DC\_48A-(n)48AA, and the UE could indicate supporting DC\_48A-(n)48AA by reporting ‘both’ via IE intraBandENDC-Support.**Table 5.5B.3-2: Intra-band EN-DC configurations for mixed intra-band contiguous and non-contiguous EN-DC

|  |  |  |
| --- | --- | --- |
| EN-DCconfiguration | Uplink EN-DCconfiguration(NOTE 1) | Single UL allowed |
| DC\_48A-(n)48AA3 | DC\_(n)48AA5DC\_48A\_n48A5 | Yes5 |

 |
| R4-2205879 | Google | **Proposal 1: To follow TS38.101-3 Table 5.3B.1.2-1 and Table 5.3B.1.3-1 as** ***intraBandENDC-Support* definition, the UE should report the additional band combination DC\_48A\_n48A to support the following configurations.*** **DL DC\_(n)48CA with UL DC\_48A\_n48A**
* **DL DC\_(n)48DA with UL DC\_48A\_n48A**

**Proposal 2: If proposal 1 is not agreed, it is proposed to introduce a new UE capability signaling to indicate UL configuration based on the definition in proposal 1.** |
| R4-2205113R4-2205114 (CAT-A) | Xiaomi | Draft CR for 38.101-3 Rel-16 to correct band combination for intra-band ENDC |

## Open issues summary

### Sub-topic 4-1 IntrabandENDC-Support

**Issue 4-1-1: Whether it is acceptable for below two proposals from R4-2205112**

* Proposal 1: The DL intra-band contiguous ENDC more than 2 carriers with UL intra-band non-contiguous ENDC shouldn’t be allowed to request in basket WID according to current fall-back rules in TS 38.101-3 and TS 38.306.
* Proposal 2: Below cases of DL intra-band contiguous ENDC more than 2 carriers with UL intra-band non-contiguous ENDC should be removed from R-16 and R-17 Spec:

|  |  |
| --- | --- |
| EN-DCconfiguration | Uplink EN-DCconfiguration |
| DC\_(n)41AB5DC\_(n)41CA5DC\_(n)41DA5 | DC\_41A\_n41A |
| DC\_(n)48CA5 | DC\_48A\_n48A6 |
| DC\_(n)48DA5 | DC\_48A\_n48A6 |

* + Option 1: Yes
	+ Option 2: No, and reason

|  |  |
| --- | --- |
| **Company** | **Comments** |
| Qualcomm | We are fine to remove |
| Ericsson | Yes, these UL configurations are not consistent with the fallback rules in 38.306 and general conditions specified in 38.101-3. |
| Xiaomi | Option 1According to the fall-back rules for ENDC or band combinations in TS 38.101-3 excerpt here:*“A terminal which supports an inter-band EN-DC or NE-DC configuration with a certain UL configuration shall support the all lower order DL configurations of the lower order EN-DC or NE-DC combinations, which have this certain UL configuration and the fallbacks of this UL configuration.”*and the fall-back rule in TS 38.306 excerpt here:*“An intra-band non-contiguous band combination is not considered to be a fallback band combination of an intra-band contiguous band combination.”*It is not allowed for DL DC\_(n)48CA and DL DC\_(n)48DA configured with UL DC\_48A\_n48A, since if DL CA\_(n)48CA was configured with UL DC\_48A\_n48A, it means DL DC\_48A\_n48A must be a fallback band combination of DL DC\_(n)48CA. |
| Google | Option 2. We prefer to keep this configuration for b48 and n48 which can make the spectrum to have more flexible configurations. Fall back rule is for the UE signaling report and the UE still can support these configurations by reporting an additional band combination to inform the NW. Therefore, we think Issue 4-1-4 proposal can solve this configuration issue from implementation point of view. |
| CHTTL | We think it’s better to discuss and check with the proponents of the combos before removing them. |

**Issue 4-1-2: Whether it is acceptable for below two proposals from R4-2205112**

* Proposal: It should request both of UL intra-band contiguous and non-contiguous ENDC for intra-band non-contiguous ENDC in which the spectrum between LTE part and NR part is contiguous but with intra-band non-contiguous CA in NR or/and LTE part in related basket WID.
	+ Option 1: Yes
	+ Option 2: No, and reason

|  |  |
| --- | --- |
| **Company** | **Comments** |
| Ericsson | New intra-band EN-DC configurations that are release independent to Rel-16 or earlier should follow existing Rel-16 BC signaling.  |
| Xiaomi | Option 1 |

**Issue 4-1-3: Whether it is acceptable for below two proposals from R4-2205112**

* Proposal: Introduce a new table for DC\_48A-(n)48AA, and the UE could indicate supporting DC\_48A-(n)48AA by reporting ‘both’ via IE intraBandENDC-Support.

Table 5.5B.3-2: Intra-band EN-DC configurations for mixed intra-band contiguous and non-contiguous EN-DC

|  |  |  |
| --- | --- | --- |
| EN-DCconfiguration | Uplink EN-DCconfiguration(NOTE 1) | Single UL allowed |
| DC\_48A-(n)48AA3 | DC\_(n)48AA5DC\_48A\_n48A5 | Yes5 |

* + Option 1: Yes
	+ Option 2: No, and reason

|  |  |
| --- | --- |
| **Company** | **Comments** |
| Ericsson | This appears possible with legacy signaling (further checking of the FS needed). |
| DOCOMO | Option 1.We support this proposal. The proposed method is well aligned with our preference and understanding. UE supporting the EN-DC band combination with mixed contiguous and non-contiguous intra-band EN-DC carriers such as DC\_48A-(n)48AA should report “both” via intraBandENDC-Support. |
| Xiaomi | Option 1 |
| Google | We are fine to add the mixed intra-band contiguous and non-contiguous EN-DC table. The DC\_48A-(n)48AA in this table needs to be reported as LTE 48A-48A and NR n48A with IE intraBandENDC-Support=non-contiguous. The contiguous UL configuration can be supported by fallback rule and one additional combination DC\_48A-48A\_n48A should be also supported with the IE intraBandENDC-Support=non-contiguous. |

**Issue 4-1-4: Whether it is acceptable for below proposal from R4-2205879**

* Proposal 1: To follow TS38.101-3 Table 5.3B.1.2-1 and Table 5.3B.1.3-1 as intraBandENDC-Support definition, the UE should report the additional band combination DC\_48A\_n48A to support the following configurations.
	+ DL DC\_(n)48CA with UL DC\_48A\_n48A
	+ DL DC\_(n)48DA with UL DC\_48A\_n48A
	+ Option 1: Yes
	+ Option 2: No, and reason

|  |  |
| --- | --- |
| **Company** | **Comments** |
| Ericsson | Option 1: yes, this is possible with legacy signaling, the UE includes an additional BC.  |
| Xiaomi | Option 2According to the fall-back rules for ENDC or band combinations in TS 38.101-3 excerpt here:*“**A terminal which supports an inter-band EN-DC or NE-DC configuration with a certain UL configuration shall support the all lower order DL configurations of the lower order EN-DC or NE-DC combinations, which have this certain UL configuration and the fallbacks of this UL configuration.”*and the fall-back rule in TS 38.306 excerpt here:*“An intra-band non-contiguous band combination is not considered to be a fallback band combination of an intra-band contiguous band combination.”*It is not allowed for DL DC\_(n)48CA and DL DC\_(n)48DA configured with UL DC\_48A\_n48A, since if DL CA\_(n)48CA was configured with UL DC\_48A\_n48A, it means DL DC\_48A\_n48A must be a fallback band combination of DL DC\_(n)48CA. |
| Google | Option 1. Fall back rule is for the UE signaling report and the UE still can support these configurations by reporting an additional band combination to inform the NW. This option may have the minimum change to impact the specification. |

**Issue 4-1-5: If answer to Issue 4-1-4 is no, then whether it is acceptable for below proposal from R4-2205879**

* Proposal: it is proposed to introduce a new UE capability signaling to indicate UL configuration based on the definition in proposal 1.DL DC\_(n)48CA with UL DC\_48A\_n48A
	+ Option 1: Yes
	+ Option 2: No, and reason

|  |  |
| --- | --- |
| **Company** | **Comments** |
| Xiaomi | Option 2According to the fall-back rules for ENDC or band combinations in TS 38.101-3 excerpt here:*“A terminal which supports an inter-band EN-DC or NE-DC configuration with a certain UL configuration shall support the all lower order DL configurations of the lower order EN-DC or NE-DC combinations, which have this certain UL configuration and the fallbacks of this UL configuration.”*and the fall-back rule in TS 38.306 excerpt here:*“An intra-band non-contiguous band combination is not considered to be a fallback band combination of an intra-band contiguous band combination.”*It is not allowed for DL DC\_(n)48CA and DL DC\_(n)48DA configured with UL DC\_48A\_n48A, since if DL CA\_(n)48CA was configured with UL DC\_48A\_n48A, it means DL DC\_48A\_n48A must be a fallback band combination of DL DC\_(n)48CA. |
| Google | We support Option 1 if Issue 4-1-4 is not acceptable. |

## CRs/TPs comments collection

### CRs/TPs

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

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

|  |  |
| --- | --- |
| **CR/TP number** | **CRs/TPs Status update recommendation**  |
| XXX | *Based on 1st round of comments collection, moderator can recommend the next steps such as “agreeable”, “to be revised”* |
| R4-2203673R4-2203674 (CAT-A) | draftCR for TS 38.101-3 Rel-16: Corrections on UE co-existence |
|  |
| R4-2203995R4-2203996 (CAT-A) | Draft CR to TS 38.101-3 on corrections to inter-band EN-DC configurations including FR1 and FR2 |
|  |
| R4-2205115 | Draft CR for 38.101-3 Rel-16 to modify the notes and correct the configurations for inter-band EN-DC configurations |
| Qualcomm: There are some concerns of other companies in thread [101] of removing note 11. It maybe implied that for the UE to meet intra-band requirements means less than 6dB imbalance and MRTD < 3usec, but this is not explicitly written anywhere. Also note 10 applies for contiguous or non-contiguous spectrum. It is not clear why this note should be modified to remove contiguous.CHTTL: some of the changes are not aligned? Ex: note 11 is kept for DC\_1A-42A\_n77A and DC\_3A-42A\_n77AHuawei: We should avoid discussing the same issue in three threads.Skyworks: in our view whether the band overlap is partial or total the CCs in each band may be contiguous or non-contiguous the key is that the UE is doing co-banding and thus, unless the UE optionally supports 25dB imbalance, the <6dB imbalance is needed and should be clearly stated together with the intra-band mode constraint for MRTD timing. At this point we are not convinced any change is needed other than clarify the optional mode to support 25dB imbalance.Ericsson: we propose to postpone this. The capability interBandContiguousENDC relates to requirements in 38.101-3 while interBandMRDC-WithOverlapDL-Bands-r16 relates to 38.133. Moreover, these notes must (unfortunately) be repeated in all tables, footnotes in a table self-contained. Make necessary changes in joint CR with the introduction of Type 2 requirements (unless changes are needed for the legacy requirements for Type 1)?DOCOMO:For all tables, we are not sure if 6dB power imbalance applicability can be removed from EN-DC including 42\_n77 and 42\_n78. The note is related to type 2 UE requirements.For three bands table, modification on NOTE 10, the second sentence seems to be not completed.*For UEs not indicating interBandMRDC-WithOverlapDL-Bands-r16, when UE capability interBandContiguousMRDC is indicated.*This should be:*For UEs not indicating interBandMRDC-WithOverlapDL-Bands-r16, when UE capability interBandContiguousMRDC is indicated, the minimum requirements for intra-band-contiguous EN-DC also should be met in addtion to intra-band non-contiguous EN-DC.*For four and five bands table, removing "contiguous or" seems OK since it is the same description of note 4 in two bands table.Xiaomi: Response to QC and DOCOMO, sorry the note 10 was missing some information, the complete note should beNOTE 10: For UEs not indicating *interBandMRDC-WithOverlapDL-Bands-r16*, the minimum requirements for intra-band non-contiguous EN-DC apply for inter-band EN-DC operation with completely overlapping bands.. For UEs not indicating *interBandMRDC-WithOverlapDL-Bands-r16*, when UE capability *interBandContiguousMRDC* is indicated, the minimum requirements for intra-band-contiguous EN-DC also should be met in addtion to intra-band non-contiguous EN-DC*.*Since intra-band non-contiguous EN-DC requirements for these inter-band EN-DC configurations applies as mandatory but if UE supports contiguous spectrum for this inter-band EN-DC combination, then the UE needs meet both requirements of intra-band contiguous and non-contiguous ENDC. (Refer LS R4-1913130).Note 10 is to make inter-band ENDC with overlapping DL bands to meet the requirements of intra-band ENDC, it can guarantees the PSD imbalance is within 6dB and MRTD<3us naturally, i.e., DC\_42\_n77/n78. Note 11 and note 12 is to make inter-band ENDC with partially overlapping DL bands to meet the requirements of intra-band ENDC, i.e., DC\_2\_n25; Please refer the original draft CR R4-1904988 involved by big CR R4-1904925. These notes were mixed up in the process of introducing new band combinations.Response to CHTTL: you are right.I will revise the CR. |
| R4-2205182R4-2205183 (CAT-A) | Draft CR for 38.101-3 updating note in MSD tables (Rel-16) |
| Qualcomm: The note is confusing the way it is written. Maybe the following is better:NOTE 1: E-UTRA carrier shall be set min(+23 dBm, PCMAX\_L\_E-UTRA,c) as defined in sub-clause [xxxxx] and NR carrier shall be set to min(+20 dBm, PCMAX\_L,f,c,NR) as defined in clause 6.2.B.4.1.3. |
| Huawei 2: Thanks for the rewording. The Pcmax for E-UTRA and NR all both specified in 6.2B.4.1.3, so following changes could be considered in revision.For PC3 tables:NOTE 1: E-UTRA carrier shall be set to min(+20 dBm, PCMAX\_L\_E-UTRA,c) and NR carrier shall be set to min(+20 dBm, PCMAX\_L,f,c,NR) as defined in clause 6.2.B.4.1.3.For PC2 tables:NOTE 1: E-UTRA carrier shall be set to min(+23 dBm, PCMAX\_L\_E-UTRA,c) and NR carrier shall be set to min(+23 dBm, PCMAX\_L,f,c,NR) as defined in clause 6.2.B.4.1.3. |
| R4-2205273R4-2205274 (CAT-A) | Draft CR for 38.101-3 to specify type 2 UE requirements(Rel-16) |
| We understand the motivation. However, RRM requirements for UE indicating *interBandMRDC-WithOverlapDL-Bands-r16* shall be clarified.The RRM requirement is *a*n (NG)EN-DC/NE-DC MRTD according to clause 7.6.2/7.6.5 in 38.133 [5]. Is it a common understanding? If so, we don’t need to discuss this in Rel-18 anymore, though intra band CA and 4Rx handling are needed to be discussed. |
| Qualcomm: There is no mention as per the last WF that 4RX requirements be waived. Also, I have a concern on which sub-clause Type 2 requirement should be placed. Is it not the intention that other RF requirements be met with the specified imbalance?SoftBank: It seems that there is no change in Table 5.5B.4.1-1. Huawei: To Nokia, I’m not sure whether we can clarify that RRM requirements are applicable in RF spec. It should be up to RRM experts. 4Rx issue can be discussed separately, since it is only related to specific band combinations. Maybe note can be used.To Qualcomm, since 4Rx is only mandatory to some bands. For band combination DC\_42\_n77, we can have a note to clarify 4RX requirements can be waived. One alternative is to create a new clause.We have no intention to specify the other RF requirements with the specified imbalance.To SoftBank, the intention is to change R17 spec to align R16 spec. “To correct note 11 and note 13 in table 5.5B.4.1-1 in Rel-17 due to the misalignment between Rel-16 and Rel-17”. You can further check the mirror CR in the 2nd round.DOCOMO:Thank you for the CR. We are generally supportive. The content is based on the approved WF, so the content itself should be OK.To Qualcomm’s question, our understanding is that this power imbalance requirements is an additional requirement for UE indicating interBandMRDC-WithOverlapDL-Bands-r16, and other Rx requirements still exist without any changes. For no changes in table 5.5B.4.1.1, we understand Huawei’s intention. It is OK, and we will check the Rel-17 CR. On top of that, we think it would be better to update note 11 (and note 13) to clarify the applicability of type 2 UE requirements to DC\_42\_n77 and DC\_42\_n78 such as “For UEs indicating interBandMRDC-WithOverlapDL-Bands-r16, power imbalance defined in clause 7.5B.6 should apply.” |
| R4-2205299R4-2205300 (CAT-A) | Draft CR for 38.101-3 to add MOP for band combination related to band 3C(R16) |
|  |
| R4-2205311R4-2205312 (CAT-A) | Draft CR for 38.101-3 to delete the MSD frequency test points for DC\_1A\_n5A(R16) |
| CHTTL: Indeed it should be removed, the analysis in the TR 37.716-11-11 also mentions no MSD required. |
| R4-2205706 | draft Rel-16 CR 38101-3-ga0 to align spurious emission between R15 and R16 |
|  |
| R4-2205113R4-2205114 (CAT-A) | Draft CR for 38.101-3 Rel-16 to correct band combination for intra-band ENDC*Note: depends on sub topic 4-1.* |
|  |
| R4-2206009R4-2206010 (CAT-A) | draft CR for Type II UE Cat-F rel 16*Note: No submission paper before meeting.* |
|  |

## Summary for 1st round

### Open issues

**Sub-topic 4-1 IntrabandENDC-Support**

|  |  |
| --- | --- |
|  | **Status summary**  |
| * Issue 4-1-1: Whether it is acceptable for below two proposals from R4-2205112
 | *Tentative agreements:* None*Recommendations for 2nd round:* Discuss with WF try to converge with this topic |
| * Issue 4-1-2: Whether it is acceptable for below two proposals from R4-2205112
 | *Tentative agreements:* None*Recommendations for 2nd round:* Discuss with WF try to converge with this topic |
| * Issue 4-1-3: Whether it is acceptable for below two proposals from R4-2205112
 | *Tentative agreements:* Introduce a new table for DC\_48A-(n)48AA, and the UE could indicate supporting DC\_48A-(n)48AA by reporting ‘both’ via IE intraBandENDC-Support.*Recommendations for 2nd round:* Focusing on WF in 2nd round |
| * Issue 4-1-4: Whether it is acceptable for below proposal from R4-2205879
 | *Tentative agreements:* None*Recommendations for 2nd round:* Discuss with WF try to converge with this topic |
| * Issue 4-1-5: If answer to Issue 4-1-4 is no, then whether it is acceptable for below proposal from R4-2205879
 | *Tentative agreements:* None*Recommendations for 2nd round:* Discuss with WF try to converge with this topic |

### CRs/TPs

|  |  |
| --- | --- |
| **CR/TP number** | **CRs/TPs Status update recommendation**  |
| R4-2203673R4-2203674 (CAT-A) | draftCR for TS 38.101-3 Rel-16: Corrections on UE co-existence |
| Agreeable |
| R4-2203995R4-2203996 (CAT-A) | Draft CR to TS 38.101-3 on corrections to inter-band EN-DC configurations including FR1 and FR2 |
| Agreeable |
| R4-2205115 | Draft CR for 38.101-3 Rel-16 to modify the notes and correct the configurations for inter-band EN-DC configurations |
| Revise and continue discuss in 2nd round. |
| R4-2205182R4-2205183 (CAT-A) | Draft CR for 38.101-3 updating note in MSD tables (Rel-16) |
| Revise and continue discuss in 2nd round |
| R4-2205273R4-2205274 (CAT-A) | Draft CR for 38.101-3 to specify type 2 UE requirements(Rel-16) |
| Revise and continue discuss in 2nd round |
| R4-2205299R4-2205300 (CAT-A) | Draft CR for 38.101-3 to add MOP for band combination related to band 3C(R16) |
| Agreeable |
| R4-2205311R4-2205312 (CAT-A) | Draft CR for 38.101-3 to delete the MSD frequency test points for DC\_1A\_n5A(R16) |
| Agreeable |
| R4-2205706 | draft Rel-16 CR 38101-3-ga0 to align spurious emission between R15 and R16 |
| Agreeable |
| R4-2205113R4-2205114 (CAT-A) | Draft CR for 38.101-3 Rel-16 to correct band combination for intra-band ENDC*Note: depends on sub topic 4-1.* |
| Not pursued in this meeting. |
| R4-2206009R4-2206010 (CAT-A) | draft CR for Type II UE Cat-F rel 16*Note: No submission paper before meeting.* |
| Withdrawn |

## Discussion on 2nd round

### WFs/Open issues

|  |  |
| --- | --- |
|  | **Comments** |
| **WF on IntrabandENDC-Support** |  |

### CRs/TPs

|  |  |
| --- | --- |
| **CR/TP number** | **Comments** |
| Rev of R4-2205115 | Draft CR for 38.101-3 Rel-16 to modify the notes and correct the configurations for inter-band EN-DC configurations |
|  |
| Rev of R4-2205182R4-2205183 (CAT-A) | Draft CR for 38.101-3 updating note in MSD tables (Rel-16) |
|  |
| Rev of R4-2205273R4-2205274 (CAT-A) | Draft CR for 38.101-3 to specify type 2 UE requirements (Rel-16) |
|  |
| R4-2205612R4-2205613 (CAT-A) | Draft CR to correct DC\_3A\_n38A test frequencies*Note: They were missed in 1st round.* |
|  |

# Topic #5: 38.104

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

## Companies’ contributions summary

|  |  |  |
| --- | --- | --- |
| **T-doc number** | **Company** | **Proposals / Observations** |
| R4-2203615R4-2203616 (CAT-A) | Rohde & Schwarz | Correction to n46 channel raster |

## CRs/TPs comments collection

|  |  |
| --- | --- |
| **CR/TP number** | **Comments collection** |
| R4-2203615R4-2203616 (CAT-A) | Correction to n46 channel raster |
|  |

## Summary for 1st round

### CRs/TPs

|  |  |
| --- | --- |
| **CR/TP number** | **Summary** |
| R4-2203615R4-2203616 (CAT-A) | Correction to n46 channel raster |
| Agreeable |

# Topic #6: 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** |
| R4-2206012R4-2206013 (CAT-A) | AT&T | DraftCR 36.101 Missing UL CA Configurations |

## CRs/TPs comments collection

|  |  |
| --- | --- |
| **CR/TP number** | **Comments collection** |
| R4-2206012R4-2206013 (CAT-A) | DraftCR 36.101 Missing UL CA Configurations |
| CHTTL: though we don’t have concern on the changes, but it seems that the combinations itself, CA\_2A-2A-14A and CA\_2A-2A-14A-30A are not in the TR 36.716-02-02 and TR 36.716-03-02 ? |
| AT&T: In response to CHTTL comment, it is very common that the TR covers the minimal CA combination and higher-order combinations with intra-band components are later added with CRs. We think that this approach still applies here. |

## Summary for 1st round

### CRs/TPs

|  |  |
| --- | --- |
| **CR/TP number** | **Summary** |
| R4-2206012R4-2206013 (CAT-A) | DraftCR 36.101 Missing UL CA Configurations |
| Agreeable |

# Recommendations for Tdocs

## 1st round

1. **New tdocs**

|  |  |  |
| --- | --- | --- |
| **Title** | **Source** | **Comments** |
| **WF on Transient period capability** | Huawei |  |
| **WF on IntrabandENDC-Support** | Xiaomi |  |

1. **Existing tdocs for 38.307**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Tdoc number** | **Title** | **Source** | **Recommendation**  | **Comments** |
| R4-2204065R4-2204066 (CAT-A) | draft CR to TS 38.307 on Release independence of FDD-TDD EN-DC High Power UE | CHTTL, China Unicom, ZTE | Agreeable |  |
| R4-2204975R4-2204976 (CAT-A) | Resubmission of CR to TS 38.307 on Release independence of FDD-TDD EN-DC High Power UE | vivo | Not pursued |  |
| R4-2203988R4-2203989 (CAT-A) | Draft CR to TS 38.307 on NR UE power class | ZTE | Return to in 2nd round |  |
| R4-2203992 | Draft CR to TS 38.307 on NR intra-band CA BW class within FR1 (Rel-16) | ZTE | Return to in 2nd round |  |

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

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Tdoc number** | **Title** | **Source** | **Recommendation**  | **Comments** |
| R4-2203613R4-2203614 (CAT-A) | Correction to n46 channel raster | Rohde & Schwarz | Agreeable |  |
| R4-2204602R4-2204603 (CAT-A) | Correction to the note on the use of operating bands for shared spectrum access | Ericsson | Return to. |  |
| R4-2203676R4-2203677 (CAT-A) | draftCR to 38.101-1 on new NS for Canadian WCS regulation R16 | Apple | Return to. |  |
| R4-2204199R4-2204200 (CAT-A) | n1 and n65 coexistence fix CR Cat-F rel 16 | Qualcomm | Agreeable |  |
| R4-2204512 | Draft CR to 38.101-1 Correction on UE maximum output power for intra-band CA (R16) | China Telecom | Agreeable |  |
| R4-2204737R4-2204738 (CAT-A) | Draft CR to TS38.101-1: Corrections on REFSEN for CA | ZTE | Revised |  |
| R4-2205184R4-2205185 (CAT-A) | Draft CR for 38.101-1 updating note in MSD tables (Rel-16) | Huawei, HiSilicon | revised |  |
| R4-2205186R4-2205187 (CAT-A) | Draft CR for 38.101-1 updating references in V2X test cases (Rel-16) | Huawei, HiSilicon | Revise |  |
| R4-2205297R4-2205298 (CAT-A) | Draft CR for 38.101-1 to correct configured transmit power for V2X(R16) | Huawei, HiSilicon | Agreeable |  |
| R4-2205881R4-2206093 (CAT-A) | Corrections on carrier leakage requirement | Qualcomm | Revise |  |
| R4-2204208R4-2204209 (CAT-A) | n65 AMPR discrepancies rel 16 CR Cat-F rel 16 | Qualcomm | Revise |  |
| R4-2206125 | CR to R16 TS38.101-1 on transient period capability | Skyworks | Revise |  |
| R4-2204210 | n65 AMPR discrepancies | Qualcomm | Noted |  |
| R4-2206011 | n30 NS for Canada Regulation | Qualcomm | Noted |  |
| R4-2203686 | On Transient period capability | Apple | Noted |  |
| R4-2204823 | On transient period capability | Huawei, HiSilicon | Noted |  |
| R4-2204518 | Short Transient Period | Qualcomm | Noted |  |
| R4-2203687 | Discussion on Rel-16 guard period for SRS antenna switching | Apple | Noted |  |
| R4-2204621 | SRS time masks for SRS usage set to antenna switching for FeMIMO | Ericsson | Noted |  |

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

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Tdoc number** | **Title** | **Source** | **Recommendation**  | **Comments** |
| R4-2203611R4-2203612 (CAT-A) | Correction to Rel-16 FR2 RMCs | Rohde & Schwarz | Agreeable |  |
| R4-2204739R4-2204740 (CAT-A) | Draft CR to TS38.101-2: Add default power class for NR inter-band CA combination | ZTE | Revise |  |

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

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Tdoc number** | **Title** | **Source** | **Recommendation**  | **Comments** |
| R4-2203673R4-2203674 (CAT-A) | draftCR for TS 38.101-3 Rel-16: Corrections on UE co-existence | Apple | Agreeable |  |
| R4-2203995R4-2203996 (CAT-A) | Draft CR to TS 38.101-3 on corrections to inter-band EN-DC configurations including FR1 and FR2 | ZTE | Agreeable |  |
| R4-2205115 | Draft CR for 38.101-3 Rel-16 to modify the notes and correct the configurations for inter-band EN-DC configurations | Xiaomi | Revise |  |
| R4-2205182R4-2205183 (CAT-A) | Draft CR for 38.101-3 updating note in MSD tables (Rel-16) | Huawei | Revise |  |
| R4-2205273R4-2205274 (CAT-A) | Draft CR for 38.101-3 to specify type 2 UE requirements(Rel-16) | Huawei | Revise |  |
| R4-2205299R4-2205300 (CAT-A) | Draft CR for 38.101-3 to add MOP for band combination related to band 3C(R16) | Huawei | Agreeable |  |
| R4-2205311R4-2205312 (CAT-A) | Draft CR for 38.101-3 to delete the MSD frequency test points for DC\_1A\_n5A(R16) | Huawei | Agreeable |  |
| R4-2205706 | draft Rel-16 CR 38101-3-ga0 to align spurious emission between R15 and R16 | Ericsson | Agreeable |  |
| R4-2205113R4-2205114 (CAT-A) | Draft CR for 38.101-3 Rel-16 to correct band combination for intra-band ENDC | Xiaomi | Not pursued |  |
| R4-2206009R4-2206010 (CAT-A) | draft CR for Type II UE Cat-F rel 16 | Qualcomm | Withdrawn |  |
| R4-2205612R4-2205613 (CAT-A) | Draft CR to correct DC\_3A\_n38A test frequencies | Anritsu | Return to |  |
| R4-2205112 | Discussion on intrabandENDC-Support | Xiaomi | Noted |  |
| R4-2205879 | Discussion on Intra-Band EN-DC support | Google | Noted |  |

1. **Existing tdocs for 38.104**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Tdoc number** | **Title** | **Source** | **Recommendation**  | **Comments** |
| R4-2203615R4-2203616 (CAT-A) | Correction to n46 channel raster |  | Agreeable |  |

1. **Existing tdocs for 36.101**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Tdoc number** | **Title** | **Source** | **Recommendation**  | **Comments** |
| R4-2206012R4-2206013 (CAT-A) | DraftCR 36.101 Missing UL CA Configurations |  | Agreeable |  |

## 2nd round

# Annex

Contact information

|  |  |  |
| --- | --- | --- |
| **Company** | **Name** | **Email address** |
| Qualcomm – transient period capability | Valentin Gheorghiu | vgheorgh@qti.qualcomm.com |
| Nokia(HU) | Hiromasa Umeda | hiromasa.umeda@nokia.com |
| Huawei | Xiang Gao | gaoxiang74@huawei.com |
| Qualcomm QC(3) | Pushp Trikha | ptrikha@qti.qualcomm.com |
| Skyworks | Laurent Noel | laurent.noel@skyworksinc.com |
| Huawei 2 | Chunying Gu | guchunying@huawei.com |
| Huawei 3 | Peng (Henry) Zhang | Zhangpeng169@huawei.com |
| Skyworks | Dominique Brunel | dominique.brunel@skyworksinc.com |
| Ericsson | Christian Bergljung | Christian.Bergljung@ericsson.com |
| Qualcomm Incorporated | Gene Fong | gfong@qti.qualcomm.com |
| DOCOMO | Yuta Oguma | Yuuta.oguma.yt@nttdocomo.com |
| ZTE | Zhifeng Ma | ma.zhifeng@zte.com.cn |
| AT&T | Ron Borsato | ronald.borsato@att.com |

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)