**3GPP TSG-RAN WG4 Meeting # 104-e draft R4-2214079**

**Electronic Meeting, 15 - 26 August, 2022**

**Agenda item:** 4.1; 4.1.1; 4.1.2; 4.1.3; 4.1.4

**Source:** Moderator (OPPO)

**Title:** Email discussion summary for [104-e][101] R15\_R16\_Maintenance

**Document for:** Information

# Introduction

*This summary includes papers for Rel-15 and Rel-16 maintenance changes of 38.101-1, 38.101-2, 38.101-3, 38.817-01 and 36.101. And different topics will be used for each spec.*

# Topic #1: 38.101-1

## Companies’ contributions summary

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| **T-doc number** | **Company** | **Title** | **Proposals / Observations** |
| R4-2211538 | Mediatek | Discussion on additionalSpectrumEmission signalling in NR UL CA for n77 in US or Canada | Proposal 1: Based on observation 1 to 3, options 3, 4, and 5 are possible for n77 UL CA in US. Given that n77 UL CA in Canada is CCA, option 4 seems not be generic solution. From that perspective, option 3 can be used for Network configuring the same value in *additionalSpectrumEmission* for all uplink carrier(s) of n77 UL CA in US or Canada. Additionally, Option 5 can be used as the generic solution. To select solution from Options 3 and 5 is recommended.   * Option 3: Signal “NS\_01” for UL CA carriers (e.g., Allow C-band (NS-01) + DoD band (NS-01) configuration in CONNECTED mode UL CA) * Option 5: Exception (e.g., Allow C-band (NS-01) + DoD band (NS-55) configuration in CONNECTED mode UL CA) and modification below for TS 38.331 |
| R4-2211552 | Nokia | AdditionalSpectrumEmission in NR CA for n77 in the USA |  |
| R4-2212769  R4-2212770 (CAT-A) | Ericsson | Amendments to requirements for n77 operations in the US |  |
| R4-2211574 | Rohde & Schwarz | Correction to n46 channel raster |  |
| R4-2211575  R4-2211576 (CAT-A)  R4-2211577  (CAT-A) | Rohde & Schwarz | Update of UL MIMO transmit quality definitions |  |
| R4-2211621  R4-2214052 (CAT-A) | Huawei | Correction of A-MPR for NS\_50 |  |
| R4-2211791  R4-2211791r1 | KDDI | Draft CR for updating the note of mandatory simultaneous Rx/Tx capability for FR1 NR-CA combinations | Moderator note: No change marks in the CR, and it was revised to R4-2211791r1 before meeting starts. |
| R4-2212018  R4-2212019 (CAT-A) | Samsung | Cat F Rel-16 Draft CR to 38.101-1 to correct the typo of CA carrier leakage |  |
| R4-2212022  R4-2212023 (CAT-A)  R4-2212024 (CAT-A) | Samsung | Cat F Rel-15 Draft CR to 38.101-1 update of simultaneous RxTx capability for band combinations |  |
| R4-2212066 | Nokia | 30 MHz UE in 40MHz network | Proposal 1: The legacy UE behaviour regarding the channel raster alignment and valid CBW configuration shall be clarified in Rel-15 UE specifications.  Proposal 2: A solution regarding 30 MHz UE in 40 MHz system for n28 shall be universal to other bands and channel bandwidths. |
| R4-2212139 | Qualcomm | Operation with Different Channel BWs in n28 | Proposal: Adopt solution 3 to solve the issue of operating 30MHz UEs in a 40MHz BS channel bandwidth in n28. |
| R4-2212319 | CMCC | 30MHz reconfiguration failure when accessing 40MHz network of n28 | Proposal 1: UE dedicated carrier edge is allowed to extend over the duplexer edge for n28, e.g. 788MHz for n28 30MHz CBW. It’s noted that maximum transmission bandwidth configuration doesn’t extend over the duplexer edge in such case.  Proposal 2: to minimize spec impact and make sure legacy UE could also work, solution 1a and solution 3 are more preferred by us to resolve RRC reconfiguration failure issue. |
| R4-2212702  R4-2212703 (CAT-A)  R4-2212704 (CAT-A) | CMCC | Draft CR on 38.101-1 for allowing exception for n28 minimum guard band requirements | Moderator note: Depending on conclusion of R4-2212319 |
| R4-2212771  R4-2212772 (CAT-A) | Ericsson | Guardbands for channel bandwidths confined in sub-ranges of a band |  |
| R4-2213629 | Huawei | Discussion on 30MHz reconfiguration failure when accessing 40MHz network of n28 | Proposal 1: Solution 2 can be further considered as a general solution in future.  Proposal 2: Solution 3 is a network configuration and implementation. There is no impact on legacy UEs, as well as specifications. |
| R4-2212369 | Apple | Discussion on 40MHz gNB for band n28 | **Proposal 1:** Do not agree on tentative agreement. Instead adapt a solution which aligns the RBs of the 40MHz channel with the RB locations of the 30MHz channel (e.g. solution 3). This means that the 40MHz BS carrier frequency is shifted by +40kHz to achieve same guard band as defined for 30MHz channel. Dependent on BS emission performance all RBs can be used for UL/DL or the uppermost DL RB might not be scheduled. Such a solution enables the operators to achieve the necessary improvements on their side and might be the easiest solution to accommodate legacy devices.  **Proposal 2**: Consider a gNB which uses a CA like configuration of 30MHz channel for the lower side and a 10MHz channel for the upper side. The 30MHz and 10MHz channel would align to the specified 100kHz carrier frequency grid. The network would either assign the 30MHz channel or the 10 MHz channel to a UE. On the UE side it would only observe that it is configured to 30MHz channel or to a 10MHz channel. |
| R4-2212222  R4-2212249 (CAT-A) | MediaTek | Draft CR to 38101-1-gc1 for n41 relevant MSD test frequencies |  |
| R4-2212361 | Apple | Draft CR for TS 38.101-1 Rel-15: Corrections on band combinations for UE co-existence | Moderator note: Depends on R4-2212368 conclusion |
| R4-2212362 | Apple | Draft CR for TS 38.101-1 Rel-16: Corrections on band combinations for UE co-existence | Moderator note: Depends on R4-2212368 conclusion |
| R4-2212363 | Apple | CR for TS 38.101-1 Rel-17: Corrections on band combinations for UE co-existence | Moderator note: This is a formal CR. And Depends on R4-2212368 conclusion |
| R4-2212368 | Apple | Discussion on UE coexistence | **Proposal 1**: It is proposed to discuss whether the listed bands could be removed from UE coexistence list and feedback from operators is highly appreciated.  **Proposal 2:** We propose to remove inconsistencies with harmonic exception and harmonize LTE and NR specs. We have drafted several CRs correcting errors and oversights for TS 36.101 [1] [2] [3], TS 38.101-1 [4] [5] [6] and TS 38.101-3 [7] [8] [9].  **Proposal 3:** Correct the UE coexistence requirements by strictly following the UE coexistence requirements as defined for single band b28/n28. |
| R4-2212530 | Anritsu | RMC related aspects for FR1 UL coherent MIMO | Proposal 1: The same SRS resource mapping should be used for non-codebook-based and codebook-based precoding when checking compliance to 6.4D.4 requirements.  Proposal 2: DMRS configuration type 1 and SRS comb2 configuration should be used for checking compliance to 6.4D.4 requirements.  Proposal 3: The SRS and DMRS should occupy identical SCs.  Proposal 4: Use of DMRS mapping type A with 3 DMRS symbols.  Proposal 5: The REs corresponding to the odd subcarriers and DMRS symbols should be non-allocated for data or DMRS.  Proposal 6: Use 4 SRS symbols in the SRS slot.  Proposal 7: UL RMC described in Annex A.2 of 38.101-1 should be used in the context of 6.4D.4 requirements. |
| R4-2212536  R4-2212537 (CAT-A) | Anritsu | Correction to EVM measurement point for DFTs-OFDM DM-RS Type 2 |  |
| R4-2212542 | Anritsu | Draft CR to update Pcmax tolerance for PC1.5 | Moderator note: Similar change but different wording with R4-2212603  Huawei: Thanks Anritsu for the contribution. The changes are valid, but the CR in R4-2212603 simplifies the Table further.  Anritsu: Thanks Huawei for your comments, we agree the DraftCR R4-2212603 from Xiaomi is simpler (other PCMAX,*c* tolerance tables like Table 6.2.4-1 use the x ≤ PCMAX,c ≤ y for the top row i.e. highest PCMAX,*c* values). |
| R4-2212603  R4-2212604 (CAT-A) | Xiaomi | Draft CR to 38.101-1: Corrections on Pcmax for UL MIMO to support PC1.5 29dBm | Moderator note: Similar change but different wording with R4-2212542  Huawei: OK with the CR.  Anritsu: This DraftCR is simpler than ours. |
| R4-2212563  R4-2212564 (CAT-A) | ZTE | Draft CR to TS38.101-1[R15] Corrections on Output power dynamics |  |
| R4-2212708 | ZTE | On 4Rx MSD for inter-band NR CA | Proposal 1: To add a new NOTE in inter-band CA IMD MSD tables in Rel-15/16/17 TS38.101-1 specs:  NOTE x: For operations with 4 Rx antenna ports, the MSD in the applicable bands shall be modified by the absolute value of ΔRIB,4R in Table 7.3.2-2 when MSD > 0, except the band that 4 Rx antenna ports support is set as the baseline in Table 7.3.2-1a and Table 7.3.2-1b. |
| R4-2212709 | ZTE | draft CR to TS38.101-1: 4Rx for inter-band NR CA | Moderator note: Depends on R4-2212708 conclusion |
| R4-2212710 | ZTE | draft CR to TS38.101-1: 4Rx for inter-band NR CA | Moderator note: Depends on R4-2212708 conclusion |
| R4-2212711 | ZTE | draft CR to TS38.101-1: 4Rx for inter-band NR CA | Moderator note: Depends on R4-2212708 conclusion |
| R4-2212733  R4-2212734 (CAT-A) | ZTE | Draft CR to TS38.101-1: Correction on terms for NR DC Pcmax |  |
| R4-2212768 | Ericsson | Draft LS to RAN2 on simultaneous Rx-Tx for band pairs of an advertised BC | Proposal 1: The indication of simultaneous Rx-Tx for an advertised BC should therefore be modified as follows:  -- *simultaneousRxTxInterBandCA* is included also if the UE supports simultaneous RxTx across all band entires of the BC except intra-band TDD and inter-band TDD-TDD band pairs of overlapping or partially overlapping TDD bands  -- *simultaneousRxTxInterBandCAPerBandPair* is not included  - if the UE does not support simultaneous Rx-Rx for any band pair of the combination (then *simultaneousRxTxInterBandCA* is not included either)  - if the UE includes *simultaneousRxTxInterBandCA* unless the BC contains a TDD intra-band CA or an TDD-TDD inter-band CA overlapping or partially overlapping band pair for which the UE supports simultaneous RxTx (the corresponding bit then set to “1”).  This also means that support of simultaneous Rx-Tx for intra-band TDD or inter-band TDD-TDD of overlapping TDD parts would become an explicit capability by the band-pair signaling.  Proposal 2: the same for EN-DC  Proposal 3: send the draft LS below to RAN2 |
| R4-2213134  R4-2213135 (CAT-A)  R4-2213136  (CAT-A) |  | Draft CR for 38.101-1 to improve the wording for simultaneousRxTx clarification(R15) |  |
| R4-2213224 | Nokia | draftCR to 38.101-1 Corrections to tables with wrong unit declarations |  |
| R4-2213319 | OPPO | R16 Draft CR on power class of each band in inter-band UL CA |  |
| R4-2213325 | OPPO | R15 FR1 Draft CR on clarification of DC location with 3300 and 3301 in TSQ requirement |  |
| R4-2213326 | OPPO | R16 FR1 Draft CR on clarification of DC location with 3300 and 3301 in TSQ requirement |  |
| R4-2213362  R4-2213363 (CAT-A) | Huawei | Correction to intra-band CA requirements |  |
| R4-2213732  R4-2213733 (CAT-A) | Huawei | draft CR for TS 38.101-1: correction on intra-band UL CA contiguous CA requirement (Rel-16) |  |
| R4-2213993  R4-2213994 (CAT-A)  R4-2213995 (CAT-A) | Qualcomm | Correction to NS\_05 frequency range |  |
| R4-2214070 | Qualcomm | Editorial clean-up | Moderator note: Formal CR |
| R4-2214071 | Qualcomm | Editorial clean-up | Moderator note: Formal CR |

## Open issues summary

### Sub-topic 1-1: 30MHz reconfiguration failure when accessing 40MHz network of n28

*Sub-topic description: Four solutions were captured in the WF R4-2210540 last meeting as below:*

* *Solution 1: UE should follow network configuration and do not declare RRC reconfiguration failure*
* *Solution 1a: RAN4 allow carrier edge extend over duplex edge but not extend over band edge.*
* *the 30 MHz channel bandwidth can be shifted by 1 PRB to increase the lower internal GB above 758 MHz, or alternatively,*
* *the carrier grid (SIB1) can be shifted by +100 kHz with the PRB 215 blanked if needed (then the internal guard bands for both the 30 MHz and 40 MHz bandwidths are met), but less attractive*
* *Solution 2: specify new minimum guard band for 30MHz CBW to make it narrower than that of 40MHz CBW. i.e. less than 552.5kHz.*
* *Solution 3: shift the guard band of 40MHz CBW by 40kHz (same as minimum guard band of 30MHz) to higher frequency.*
* *Solution 4: Configure less number of PRBs in UE dedicated CBW, i.e. configure offset to carrier by 1PRB and bandwidth with 158 PRB.*

**Issue 1-1-1: Preference on the candidate solutions**

*Moderator note: according to the Tdoc in this meeting, no company propose solution 1 (see the sub-topic description), and solution 4 neither. So the discussion can focus on below solution 1a/3 to solve the issue today, and study solution 2 in future release as proposed in R4-2213629.*

* **Solution 1a:** RAN4 allow carrier edge extend over duplex edge but not extend over band edge.
* **Solution 3**: shift the guard band of 40MHz CBW by 40kHz (same as minimum guard band of 30MHz) to higher frequency.

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| **Company** | **Comments** |
| Qualcomm | Our preference is solution 3, it has no impact to legacy UEs so it is the simplest overall to implement and has the least impact. In our understanding, this proposal means in practice that a new channel raster entry will be added for n28 in the base station specs. if 40MHz will be added in the future in the UE specs, we can introduce the same exception to the n28 channel raster. |
| Ericsson | Solution 1a. This is captured in R4-2212771 (in a band agnostic manner) and R4-2212319 (for the specific case)  Solution 3 is not preferred. If some UE implementations indeed require CHBW alignment with the 100 kHz raster, a SIB1 carrier resource grid off this 100 kHz channel raster as a result could lead to problems for these UEs in IDLE mode. |
| Apple | Solution 3 is preferred as it has no impact on UE and specification. The gNB shifts its carrier frequency and the emission compliance might be easier to guarantee on gNB side compared to legacy UEs which would run in an untested configuration. As stated in our paper we are certain that any 40MHz CBW at UE side could be handled via exception. |
| MTK | We prefer Solution 3. As pointed by QC and Apple, Solution 3 has no impact to legacy UE and the least impact on spec. Regarding Solution 1a, it will lead to performance degradation due to carrier edge extends over duplex edge. |
| Nokia(HO) | As far as a solution is consistent with agreements to be made in thread [129] FS\_NR\_eff\_BW\_util, we are fine with either 1a or 3.  However, we would like to get clarification on Solution 3, as Qualcomm’s paper R4-2212139 does not look consistent with another Qualcomm’s paper R4-2212148.  Our understanding is the same as Ericsson. Solution 3 uses SIB1 bandwidth broadcasted as 40 MHz which is not centered at 100 kHz channel raster. Can all legacy UEs camp on this cell? |
| Huawei, Hisilicon | We support Solution 3 to shift the guard band of 40MHz CBW and the RB configuration at gNB side by 40 kHz to higher frequency. From the perspective of the upper bound of 40MHz, shifting +40kHz would cause the guardband extended by 32.5kHz, but the PRB#215 would not extend over the upper bound. Solution 3 is a network configuration and implementation, and there is no change to UE implementation following existing procedure in the specifications. And legacy UE could also accommodate the solution without any impact. In our opinion, Solution 3 could be the best solution to the problem that 30MHz reconfiguration failure when accessing 40MHz network of n28 for now. |
| ZTE | either 1a or 3 is fine to us. |
| CMCC | both solution 1a and 3 are OK for us.  For solution 1a), our test shows legacy UE which has RRC reconfiguration failure issue could work with solution 1a. the rightmost RB at upper edge will not be scheduled in solution 1a and reserved guard band offset from rightmost configured RB is larger than minimum requirement. so actual configured RB will not lead to any performance gain or performance degradation is acceptable. We just need to add some exception for minimum guard band requirement of n28. The spec change is small.  For solution 3, CBW in SIB1 is not aligned with channel raster. whether solution 3 is compliant with 3GPP spec is based on the conclusion of channel raster alignment issue in [129] FS\_NR\_eff\_BW\_util. Besides, solution 3 may only works for 30MHz CBW, for future 40MHz UE, UE dedicated CBW is still not aligned with channel raster and we may also need to change the spec. |
| OPPO | Solution 3. It seems from NW side the concern is whether UE can access the cell if the cell BW is not on the channel raster. And from some feedback from UE/chipset vendor there is no problem. Then solution 3 probably is ok. |
| vivo | We also prefer solution 3 to minimize the impacts on legacy UE and specification. |
| Moderator summary:  According to feedback from companies, companies are either support solution 3 (QC/Apple/MTK/HW/OPPO/vivo), or ok with either 1a or 3 (Nokia/ZTE/CMCC). And one company not prefer Option 3 (E///). The only question probably is whether legacy UE can access the cell in Idle mode when the SIB1 carrier resource grid off this 100 kHz channel raster.  Therefore, the solution 3 can be used as baseline in the 2nd round, and further clarify the issue below with WF:   * Whether legacy UE can access the cell in Idle mode when the SIB1 carrier resource grid off this 100 kHz channel raster. | |

**Issue 1-1-2: Views on each of the proposals from R4-2212066**

**Proposal 1:** The legacy UE behaviour regarding the channel raster alignment and valid CBW configuration shall be clarified in Rel-15 UE specifications.

**Proposal 2:** A solution regarding 30 MHz UE in 40 MHz system for n28 shall be universal to other bands and channel bandwidths.

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| **Company** | **Comments** |
| Qualcomm | For proposal 1: we do not see the need for any clarification, the specs are very clear, the UE has to be configured with a valid CBW from the set defined for the band and the channel has to be on a valid channel raster position. Some companies are claiming there are ambiguities in order to introduce some NBC changes.  For Proposal 2: there is no need for any universal solution, is there a need for the same solution in any other band? |
| Ericsson | We agree with these proposals. For Proposal 1, we have provided CRs against Rel-15 UE and BS specifications in thread #129 and in R4-2212771.  To Qualcomm: if specifications are very clear how come we have all these different interpretations of the SIB1 grid and the CHBW described in thread 129? Where is it specified that the UE-specific CHBW must be on the channel raster? This is not in accordance with the configuration in ServingCellConfig. |
| Apple | Regarding proposal 1: If we can safely determine legacy behavior a clarification might be ok.  Regarding proposal 2: Is channel bandwidth nesting an issue beyond n28? Typically, UE and BS support same channel bandwidth and lower bandwidth usage is assigned via dedicated BWP. |
| MTK | For proposal 1: If there is any clarification, it should have no impact on legacy UE. We don’t see the need for any clarification.  For proposal 2: We have the same question as QC. Does any other band have the same issue as n28? |
| Nokia(HO) | We support both Proposal 1 and 2. |
| Huawei, Hisilicon | We don’t think Proposal 1 is necessary. However, some specific clarification can be considered for the issue of 30MHz reconfiguration failure of n28. |
| CMCC | During our test, either when UE CBW is not aligned with channel raster or when SIB1 CBW is not alignment with channel raster, R15 UE could work well. If such behavior is clarified into the spec, we are afraid the behavior is against legacy RAN4 spec.  The same RRC reconfiguration issue occurs only when NW’s CBW is larger than UE’s CBW. For all solutions, solution 1a is OK for us and we need to update spec with exception for minimum guard band of n28. We are afraid such solution is not universal to all other bands. |
| OPPO | If Issue 1-1-1 choose solution 3, then there will be no impact to UE and also the spec. So proposal 1 then will be not needed.  For proposal 2, the problem exists when gNB use larger BW while UE use smaller BW. This will happen to other bands also. Therefore, ok with Proposal 2. |
| Moderator summary:  For proposal 1, no consensus on whether the legacy UE behaviour regarding the channel raster alignment and valid CBW configuration should be clarified in Rel-15 UE specifications.  For proposal 2, companies questioned about whether this other bands that have the issue as n28.  From moderator point of view, the potential clarification depends on which solution is chosen in Issue 1-1-1, and can wait for the outcome and also proponent can share what kind of clarification afterward for further discussion. | |

**Issue 1-1-3: Views on the below proposals**

**Proposal 1:** UE dedicated carrier edge is allowed to extend over the duplexer edge for n28, e.g. 788MHz for n28 30MHz CBW. It’s noted that maximum transmission bandwidth configuration doesn’t extend over the duplexer edge in such case. (R4-2212319)

**Proposal 2**: Consider a gNB which uses a CA like configuration of 30MHz channel for the lower side and a 10MHz channel for the upper side. The 30MHz and 10MHz channel would align to the specified 100kHz carrier frequency grid. The network would either assign the 30MHz channel or the 10 MHz channel to a UE. On the UE side it would only observe that it is configured to 30MHz channel or to a 10MHz channel. (R4-2212369)

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| **Company** | **Comments** |
| Qualcomm | For proposal 1: The UE carrier edge could extend over the duplexer edge but this will lead to some possible performance degradation. Also, since this configuration was never used/tested in practice until now, it seems quite risky. Behaviour of existing UEs is not defined for this case.  For Proposal 2: This would be a simple deployment scenario fully supported by the Rel15 specs. |
| Ericsson | Proposal 1: agreed, this enables a +1 PRB shift, which is possible according to 38.331.  Proposal 2; not agreed. The problem of locating of UE channel bandwidths within the carrier resource grid (SIB1) for some UE implementations should be resolved, specifications should be clarified. |
| Apple | Regarding proposal 1: We have concerns which comes from the tight dual duplexer setup. If the UE carrier frequency is shifted by 100kHz or even 180kHz upwards the duplexer ripple might significantly distort phase relation of the upmost subcarrier. |
| MTK | For Proposal 1: We have similar view with QC and apple. Extending over the duplexer edge will lead to performance degradation.  For Proposal 2: Agree with this proposal. |
| Nokia(HO) | Proposal 1: As far as potential UE performance degradation near the duplexer edge is acceptable, this approach is ok. At least this does not cause coexistence issue with other operators or services.  Proposal 2: We understand this is already supported in existing specs. |
| Skyworks | Proposal 1: we share similar concerns than Qualcomm, Apple and Mediatek on performance degradation.  Proposal 2 has several advantages: no impact on UEs, legacy or new, and no impact on specifications. |
| CMCC | Proposal 1 is supported. About the performance degradation proposed by other companies, the rightmost RB at upper edge will not be scheduled in actual network to make sure actual scheduled PRB will not extend duplexer edge. we guess the performance degradation is limited and acceptable.  For proposal 2, we need two sets of cell configuration which will increase signaling overload. Besides, current spec supports the scenario when gNB has larger BW than UE. We try to fix issue that may occurs when NW CBW is larger than UE. The solution in proposal 2 is not preferred for us. |
| OPPO | UE behavior of proposal 1 is unknown for the UE in the field and performance could be degraded. Therefore, not preferred.  Proposal 2 is ok but this is up to NW implementation, and if used as a general solution then it means this is mandatory behavior. Therefore, not sure whether this is practical in the field. |
| Moderator summary:  Both proposals got supports and concerns, no consensus can be reached in 1st round.  For proposal 1, 5 companies have concern, while 3 companies support or ok with the proposal. No more discussion is needed and focus on Issue 1-1-1.  For proposal 2, 2 companies have concern or not preferred. And it is already supported in existing spec and need no more discussion. | |

### Sub-topic 1-2: n77 for US and Canada

**Issue 1-2-1: Views on the below proposal from paper R4-2211538**

**Proposal 1:** Based on observation 1 to 3, options 3, 4, and 5 are possible for n77 UL CA in US. Given that n77 UL CA in Canada is CCA, option 4 seems not be generic solution. From that perspective, option 3 can be used for Network configuring the same value in *additionalSpectrumEmission* for all uplink carrier(s) of n77 UL CA in US or Canada. Additionally, Option 5 can be used as the generic solution. **To select solution from Options 3 and 5 is recommended**.

* Option 3: Signal “NS\_01” for UL CA carriers (e.g., Allow C-band (NS-01) + DoD band (NS-01) configuration in CONNECTED mode UL CA)
* Option 5: Exception (e.g., Allow C-band (NS-01) + DoD band (NS-55) configuration in CONNECTED mode UL CA) and modification below for TS 38.331

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| ***FrequencyInfoUL* field descriptions** |
| ***additionalSpectrumEmission***  The additional spectrum emission requirements to be applied by the UE on this uplink. If the field is absent, the UE uses value 0 for the *additionalSpectrumEmission* (see TS 38.101-1 [15], table 6.2.3.1-1A, and TS 38.101-2 [39], table 6.2.3.1-2). Network configures the same value **or values linked to same spectrum emission requirement** in *additionalSpectrumEmission* for all uplink carrier(s) of the same band with UL configured. The *additionalSpectrumEmission* is applicable for all uplink carriers of the same band with UL configured. |

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| **Company** | **Comments** |
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| Ericsson | The proposed specification text for 38.331 above is good (also submitted to RAN2). The applicable CA\_NS value when the UE is configured with different NS values shall be specified (CA\_NS\_01). |
| Nokia(HU) | *FrequencyInfoUL* is for UL CA. we don’t think Option 3 is one of the Options, but rather the Option 4 shall be included as a candidate. Currently, there are no “1” or “2” as value of *additionalSpectrumEmission* for UL CA. Option 4 basically doesn’t require RAN4 spec changes other than clarification if necessary. We propose the Option 4 in our CR of R4-2211552 |
| MediaTek | Regarding proposed specification text for 38.331 above, it can accommodate NS values (e.g., NS\_01, NS\_55, NS\_57, CA\_NC\_NS\_01, and CA\_NS\_01) that have “N/A” for A-MPR.  On top of that, whether to specify/add specific tables UL NCCA Table 6.2A.3.1.2-1 and UL CCA Table 6.2A.3.1.1-1 into “*additionalSpectrumEmission* (see TS 38.101-1 [15], table 6.2.3.1-1A, and TS 38.101-2 [39], table 6.2.3.1-2)” can be further discussed. |
| Huawei(ZP) | In my understanding, NS\_01/NS\_55/CA\_NS\_01 are just RAN4’s name in NR phase. These terms just represent the general spurious emission / additional spurious emission requirements from RAN4’s perspective. From RAN2 perspective, they can just see PCC signaling *additionalSpectrumEmission (value: 0~7) and SCC additionalSpectrumEmission* *(value: 0~7)* which may be broadcasted by network*.* For US band n77 case, no matter network broadcast (0, 0), (0, 1) or (1, 0) *additionalSpectrumEmission* in PCC and SCC, the general intra-band UL SEM and SE requirements apply. |
| Intel | In our view there is some misalignment between RAN2 and RAN4 specifications that needs to be resolved before we can conclude this issue. The different understanding of the RAN2/4 specifications is likely the root cause for different opinions on this topic.  The additionalSpectrumEmission in the RRC specification is just a value from 0-7, and RAN4 specifications map this value to NS values. RAN4 specifications define different mapping tables for difference cases. We have the following mapping tables: Table 6.2.3.1-1A for NS\_XX values used for the single cell case; Table 6.2A.3.1.1-2 for CA\_NS\_XX values used for intra-band contiguous UL CA; and Table 6.2A.3.1.2-2 for CA\_NC\_NS\_XX used for intra-band non-contiguous UL CA; etc (there are additional tables for unlicensed and V2X which I don’t list here). The aspect that it not clearly specified by either RAN2 or RAN4 specs is how to determine which mapping table should be used. It should be noted that RRC only ever refers to the first table for the NS\_XX values.  My interpretation of the Ericsson and MediaTek contributions is that they assume that only Table 6.2.3.1-1A for NS\_XX values is used, even for the case that the UE is configured for UL CA. This may be a reasonable assumption given RRC only points to this one table. However, in this case the RAN4 mapping tables for the CA\_NS\_XX and CA\_NC\_NS\_XX values **would never be used**, and consequently there is no clear rule for when the requirements of CA\_NS\_XX and CA\_NC\_NS\_XX are applied by the UE. The Ericsson CR attempts to address this for n77 but the issue exists for other bands as well.  My interpretation of the Nokia contribution is that they assume that the appropriate mapping table is used depending on whether the UE is configured with a single cell (per band) or intra-band contiguous UL CA or intra-band non-contiguous UL CA.  The presence of the mapping tables for CA\_NS\_XX values and CA\_NC\_NS\_XX in our specs suggests that there was originally an intention that it would be possible for these values to be explicitly signalled to the UE. Based on this we are more aligned with the Nokia understanding.  Minor note: The spec has a typo in the table number for Table 6.2A.3.1.1-2. |
| Apple | In our view this may not be an issue at all. As for intra-band UL CA, either CA\_NS\_01 or CA\_NC\_NS\_01 is signaled. Since there is no CA\_NS\_55 or CA\_NC\_NS\_55 defined for DoD band, only CA\_NS\_01 or CA\_NC\_NS\_01 can be signaled for both UL carriers when intra-band UL CA is configured. As a result, there would not be violation to the existing RAN2 specifications. In addition, since CA\_NS\_01 and CA\_NC\_NS\_01 are both default NS setting, the field can be left empty when intra-band UL CA is configured. With that being said, is there still a need to make any RAN4 or RAN2 specifications clarification? |
| Qualcomm (GF) | We agree with the comment from Intel. We feel that there is ambiguity in the mapping between NS, CA\_NS, and CA\_NC\_NS to the actual RAN2 signaled IE’s. The idea of CA\_NS was carried over from LTE but not properly executed. It would be clearer if RAN4 could clearly map these CA\_NS and CA\_NC\_NS to the additionalSpectrumEmission IE’s sent in the PCC and the SCC. Somehow, this was never done. |
| AT&T | The proposed specification text for 38.331 above is OK with us. Of course, this is a RAN2 decision but hopefully RAN2 is aligned. Concerning the general issue raised by Intel, perhaps this can be taken for a future meeting in order to conclude on the topic at hand at this meeting per RAN guidance. |
| OPPO | Agree with Intel comment. When in n77 UL contiguous CA, the CA\_NS\_01 will be referred in SCC dedicated configuration signaling though SCC SIB broadcast NS\_55.  Similar for NC CA, when in n77 UL NC CA, the CA\_NC\_NS\_01 will be used for SCC though in SIB NS\_55 used. |
| Moderator summary:  Views are divergent, some companies prefer Option 4, some prefer Option 5, while some companies think this is not an issue at all. But clearly the mapping from RAN2 signaling to RAN4 NS tables including single CC, contiguous CA, NC CA cases need to be clarified for PCC and SCC.  Continue discuss in 2nd round with WF to clarify the NS mapping from RAN2 to RAN4 and potential changes to the specs. | |

### Sub-topic 1-3: UE coexistence requirements

**Issue 1-3-1: Views on the below proposal from paper R4-2212368**

* **Proposal 1**: It is proposed to discuss whether the listed bands could be removed from UE coexistence list and feedback from operators is highly appreciated.
* **Proposal 2:** We propose to remove inconsistencies with harmonic exception and harmonize LTE and NR specs. We have drafted several CRs correcting errors and oversights for TS 36.101 [1] [2] [3], TS 38.101-1 [4] [5] [6] and TS 38.101-3 [7] [8] [9].
* **Proposal 3:** Correct the UE coexistence requirements by strictly following the UE coexistence requirements as defined for single band b28/n28.

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| **Company** | **Comments** |
| Apple | We would like to clarify that Proposals 1 to 3 are all related to UE coexistence list but handle different topics.  Proposal 1 is about protections which might not be needed as bands might be deployed in different regions or bands being “obsolete” today.  Proposal 2 is about certain harmonic exceptions in UE coexistence list (Note 2) which have been specified for several CA/DC combination but missed for others. There exist several cases where the 1MHz extension of the harmonic exception interval overlaps with the protected band. In those cases, harmonic exception is allowed. However, the handling is inconsistent as sometimes harmonic exception is defined and sometimes it is missing. Furthermore, there are misalignments between LTE and NR UE coexistence tables.  Proposal 3 is about protection for band 28 Rx. It is special as the maximum emission limit for lower part of the Rx is set to -32dBm/MHz. Almost all CA/DC combinations re-use this limit e.g. CA\_n1-n28, CA\_n28-n34, CA\_n28-n41, DC\_28\_n2, DC\_28\_n3, DC\_28\_n5 and many more. However, in case of LTE CA\_28-40 and NR CA\_n20-n28, CA\_n28-n40 and DC\_28\_n5 the protection for band 28 Rx is defined as -50dBm/MHz over the full Rx frequency range. This provides issues for UE compliance as the UE is only expected to meet the -50dBm/MHz in the upper Rx range. A UE meeting the emission limits of single band n28 could therefore fail CA/DC requirements. As other CA/DC combinations with band n28 do follow the single band protection requirement it seems to be an oversight. |
| SoftBank-K | On Proposal-1, the first three items are about Japan and we would propose to keep them as they are because:  1) In NR, n5 can be used in Japan in place of B19 due to the change of duplexer perf.(i.e. assuming n26 duplexer) agreed among US operators so we added it to the co-ex.  2) n34 is still listed as “to be protected” in the regulation of Japan so we need to capture. For n34 to others, we simply follow 3GPP’s convention to protect reversely with -50dBm/MHz as far as it is harmless.  These aspects were once discussed with R4-2000959 and succeeding papers. Please check if needed.  Note to the moderator: the relevant draft CRs do not seem to include changes above so the decisions for the CRs could be done regardless of the comment here (and succeeding ones). |
| Nokia(HO) | Regarding n5 in Proposal 1, there was a long discussion to reuse n5 for Japan. It would need to be double checked with Japanese operators.  Regarding b34, Japanese regulations specify b34 as a protected band and b34 shall protects other 3GPP bands deployed in Japan. There are many bands not deployed in some regions in this co-existence table, but the co-existence requirement is specified for future deployment. b34 itself is not deployed in Japan but it is also not deployed in many other regions. It may be hard to simply remove all of the undeployed bands.  This co-existence table is modified too often more than it should be. We are concerned especially about the closed release which should be stable. Rel-15 maintenance should be minimized. However, there are lots of maintenance activity of this table. We should focus only on the open release and leaves closed release unchanged unless there is a critical mistake. |
| NTT DOCOMO | On proposal 1, we have the similar comments with SB and Nokia.  We would like to keep B11/B21 protection from n5 so that n5 can be used in Japan for global harmonization.  Regarding B34, B34 protection from B11/B21/B18/n18 has been specified in both LTE and NR in Japanese regulation, and so far we need to keep it. We would like to also keep B11/B21/B18/n18 protection from B34 as mutual protection between bands, and for the sake of the possible future deployment. |
| ZTE | For proposal 1. It seems similar discussions in [104-e][131] FS\_SimBC. |
| Moderator summary:  Concerns on changing n5 and B34/n34, they are kept as it is.  Proposal 1 regarding b45 can be agreed.  Proposal 2 and 3 can be agreed. | |

### Sub-topic 1-4: RMC for FR1 UL coherent MIMO

**Issue 1-4-1: Views on the below proposal from paper R4-2212530**

* **Proposal 1:** The same SRS resource mapping should be used for non-codebook-based and codebook-based precoding when checking compliance to 6.4D.4 requirements.
* **Proposal 2:** DMRS configuration type 1 and SRS comb2 configuration should be used for checking compliance to 6.4D.4 requirements.
* **Proposal 3:** The SRS and DMRS should occupy identical SCs.
* **Proposal 4:** Use of DMRS mapping type A with 3 DMRS symbols.
* **Proposal 5:** The REs corresponding to the odd subcarriers and DMRS symbols should be non-allocated for data or DMRS.
* **Proposal 6:** Use 4 SRS symbols in the SRS slot.
* **Proposal 7:** UL RMC described in Annex A.2 of 38.101-1 should be used in the context of 6.4D.4 requirements.

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| **Company** | **Comments** |
| Qualcomm | Prop 1:need more time to check  Prop 4: The UL RMC definition already implies type A, not sure if agreement is necessary.  Prop 5: would proponents clarify if this is the proposal ‘The REs corresponding to the odd subcarriers \*IN\* DMRS symbols should be non-allocated for data or DMRS. If so agree |
| Rohde & Schwarz | Thank you Anritsu for the detailed analysis and proposal, we would like to request further time to check. |
| Anritsu | Thanks Qualcomm for your comments. Regarding for Proposal 5, sorry for the "typo": "in" is more appropriate than "and" (intersection), your understanding is corrected.  Thanks to Rohde & Schwarz. Yes please, discussions on the topic can be pursued also in Round2 if the moderator is fine with it. |
| Moderator summary: Continue discuss in 2nd round. | |

### Sub-topic 1-5: 4Rx MSD for inter-band NR CA

**Issue 1-5-1: Views on the below proposal from paper R4-2212708**

**Proposal 1:** To add a new NOTE in inter-band CA IMD MSD tables in Rel-15/16/17 TS38.101-1 specs:

NOTE x: For operations with 4 Rx antenna ports, the MSD in the applicable bands shall be modified by the absolute value of ΔRIB,4R in Table 7.3.2-2 when MSD > 0, except the band that 4 Rx antenna ports support is set as the baseline in Table 7.3.2-1a and Table 7.3.2-1b.

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| **Company** | **Comments** |
| Apple | Adding a note can be beneficial to clarify that ΔRIB,4R applies for 4Rx antenna port operation. In terms of the specific text, can you clarify the exception part “except the band that 4Rx antenna ports support is set as the baseline”? Do you mean that ΔRIB,4R does not apply for this case? |
| Nokia(HU) | It’s OK, but the existing note in LTE spec may not clear on how the spec is modified by the amount of ΔRIB,4R. Perhaps, “shall be increase” is clearer. |
| NTT DOCOMO | We think such clarification is helpful, and we have the same clarification question with Apple. Is it based on the assumption that MSD for 4Rx baseline bands already take into account ΔRIB,4R? |
| CHTTL | Support the changes, since the text mentions to be modified by the absolute value ofΔRIB,4R , we are also fine with the current proposed text. For the band that 4Rx antenna ports support is set as the baseline, theΔRIB,4R  already applies as mentioned in the existing general text, but there is no need to add the same amount back for the 2Rx to 4Rx in the table since the 4Rx support is the baseline. |
| Huawei | The proposal is OK, and we also think it is better to further clarified as “For operations with 4 Rx antenna ports, the MSD in the applicable bands shall be increased by the absolute value of ΔRIB,4R in Table 7.3.2-2 when MSD > 0”. |
| ZTE | To response Apple and DCM’s question:  As stated by CHTTL (Thanks CHTTL), there are some cases for FDD band (like n7) are 4Rx baseline, so there is no needed to modified by the ΔRIB,4R .  For the wordings, we are fine to use “shall be increased” . The original wordings of ‘shall be modified ’ is from LTE. |
| Qualcomm | Regarding the Note text, Huawei/Nokia suggestion to use “be increased” is better than “modified”  Regarding 4RX as baseline, We are not sure if the MSD specified e.g for band n7 in CA\_n3A-n7A was done for 4RX REFSENS or not. If it was done for 4RX REFSENS, then the proposal is OK, but if it was done for 2RX REFSENS (even 4RX is the baseline) then MSD should be increased byΔRIB,4R. |
| Skyworks | This proposal helps remove ambiguities about 4Rx MSD levels. About wording:   * We support Nokia/Huawei’s suggestions, * Is the following rephrasing the intent of your proposal? replace “except the band that 4 Rx antenna ports support is set as the baseline in section 7.3.2” with “except for bands for which the UE is required to be equipped with a minimum of four Rx antenna ports as specified in sub-clause 7.2”? This would mean, except for bands n7, n38, n41, n48, n77, n78, n79.   For MSD due to dual UL interference, only band n7 is impacted by this exception rule. To Qualcomm’s question, it seems n7 MSD in CA\_n3\_n7 was based DC\_3\_n7 MSD, which was proposed in TP R4-1712512 where the [10.25] dB was proposed as the average of LTE DC\_3A-7A 13dB MSD and LG DC\_3A\_n7A 7.5dB MSD (R4-1710724). Both MSD levels apparently assumed 2 Rx antenna. If this is the correct understanding, the n7 MSD needs to be increased by 2.7dB for this combination. Do you have the same understanding?  Questions to ZTE: Is it considered to apply this proposal to all other MSD tables for NR-CA and also to TS 38.101-3? We may have to check the exception rule. |
| OPPO | For clarification of the understanding of the New NOTE:  Assume reference sensitivity for 2Rx is REFSENS2R and the MSD for 2Rx is MSD2R, then the reference sensitivity for 4Rx:   * Before MSD is (REFSENS2R + deltaRib,4R), * After MSD will be (REFSENS2R + deltaRib,4R) + (MSD2R - deltaRib,4R) = REFSENS2R + MSD2R   This means after the MSD, the 4Rx and 2Rx will have same REFSENS which seems not correct. Is there something wrong here?  The baseline REFSENS for 4Rx MSD is REFSENS4R if understand correctly according to the below sentence in 101-1: |
| Moderator summary:  The proposal in general get supports from companies, wording needs to be updated and also clarifications are needed to the questions raised by companies. Continue to discuss based on the CR R4-2212709 in 2nd round. | |

### Sub-topic 1-6: LS to RAN2 on simultaneous Rx-Tx for band pairs of an advertised BC

**Issue 1-6-1: Views on the below proposal from paper R4-2212768**

**Proposal 1:** The indication of simultaneous Rx-Tx for an advertised BC should therefore be modified as follows:

-- *simultaneousRxTxInterBandCA* is included also if the UE supports simultaneous RxTx across all band entires of the BC except intra-band TDD and inter-band TDD-TDD band pairs of overlapping or partially overlapping TDD bands

-- *simultaneousRxTxInterBandCAPerBandPair* is not included

- if the UE does not support simultaneous Rx-Rx for any band pair of the combination (then *simultaneousRxTxInterBandCA* is not included either)

- if the UE includes *simultaneousRxTxInterBandCA* unless the BC contains a TDD intra-band CA or an TDD-TDD inter-band CA overlapping or partially overlapping band pair for which the UE supports simultaneous RxTx (the corresponding bit then set to “1”).

This also means that support of simultaneous Rx-Tx for intra-band TDD or inter-band TDD-TDD of overlapping TDD parts would become an explicit capability by the band-pair signaling.

**Proposal 2:** the same for EN-DC

**Proposal 3:** send the draft LS below to RAN2

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| **Company** | **Comments** |
| Qualcomm | The proposal seems to be just about signaling, why is this proposal brought to RAN4 and not directly to RAN2? It is not clear to us that making more changes to the capability signaling will help because there would likely be many versions in the field. |
| Ericsson | To Qualcomm: no UE supports simultaneous Rx-Tx in overlapping TDD bands, this should be the default for signaling to unnecessary parsing of the per-band capability. |
| Apple | Thank you for the proposal on improving signaling.  There are two questions:   1. It seems like the change is fully compatible with legacy devices but would like to double check. 2. With this change it would be preferable if the update not only clearly specifies for *simultaneousRxTxInterBandCAPerBandPair* but also for *simultaneousRxTxInterBandCA* that the UE is not expected to support intra-band TDD and inter-band TDD-TDD band pairs of overlapping or partially overlapping TDD bands. This would emphasize the intention and prevent future UEs from using old signaling style. |
| Nokia(HO) | The motivation is okay but the change may be NBC.  We are not sure if the issue in capability signalling size is such a big problem especially with the network filtering. Can you elaborate more how big this problem is and whether it should force possibly a NBC change? |
| NTT DOCOMO | We understand the motivation, but, before agreeing it, we would like to understand the compatibility correctly.  As an example, we consider DC\_1-42\_n78 where B42 and n78 is overlapping, and assume a UE support simultaneous RxTx for 1-42 and 1-n78. In that case, currently, the UE is expected to indicate per band combination capability as NS, and additionally indicate per band pair capability accordingly. If we apply Ericsson’s proposal, the UE is expected to indicate per band combination capability as S. So, there would be two different signalling design for the same UE functionality.  But NW may understand correctly if NW check the per band pair capability in former case(the current signalling desing). Is that the same understanding? |
| Huawei | We need further check if the proposal could cause NBC issue. |
| Moderator summary: No conclusion in 1st round, and the NBC issue needs to be further discussed and also the necessity. | |

## Companies views’ collection for 1st round

### CRs/TPs comments collection

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| **T-doc number** | **Company** | **Title** | **Comments collection** |
| R4-2211552 | Nokia | AdditionalSpectrumEmission in NR CA for n77 in the USA | Ericsson: not agreed, the CA\_NC\_NS\_01 also applies when NS\_55 is configured for one of the carriers in dedicated signalling at CA configuration.  T-Mobile USA: A similar discussion is taking place in [102] for n77 in Canada. For consistency, I will make a similar comment here. We think Note 6 should be modified as follows:  NOTE 6: This NS value is applicable for cells in the range 3450 – 3550 MHz ~~for UEs indicating extendedBand-n77-r16~~ for operations in the USA. UEs that support 3450-3550 MHz in the USA shall indicate extendedBand-n77. This NS value does not indicate any additional spurious emission and maximum  Huawei(ZP): merged with R4-2212769  Intel: We need to see the final conclusion between RAN4 and RAN2 before it is possible to finalise CRs.  AT&T: We do not agree with attempting to add the reference to extendedBand-n77 in the table note. This requirement should be covered in the RAN2 specification since it is mandating capability signalling. We also agree that we need to see a final package from RAN2 and RAN4. |
| R4-2212769  R4-2212770 (CAT-A) | Ericsson | Amendments to requirements for n77 operations in the US | Nokia(HU): We cannot agree with this without seeing the conclusion in RAN2.  Huawei(ZP): merged with R4-2211551  Intel: We need to see the final conclusion between RAN4 and RAN2 before it is possible to finalise CRs.  AT&T: We prefer not to remove the text “and maximum output power reduction” from NOTE 6. Even though “N/A” is shown in the A-MPR column, this text was meant to convey that additional RF conformance tests were not required since this NS value is used for barring purposes only. This is necessary to keep this case distinct from the NS\_06 case. Maybe we can modify the table note as follows.  “NOTE 6: This NS value is applicable for cells in the range 3450 – 3550 MHz for operations in the USA. This NS value does not indicate any additional unwanted ~~spurious~~ emission and maximum output power reduction requirements as this NS value is used for barring purposes only.”  We would also like to see similar text added to clause 6.2A.3.1.2.0 to make it very clear that additional RF conformance tests are not required for these cases when NS values have been used for barring purposes only. |
| R4-2211574 | Rohde & Schwarz | Correction to n46 channel raster |  |
| R4-2211575  R4-2211576 (CAT-A)  R4-2211577  (CAT-A) | Rohde & Schwarz | Update of UL MIMO transmit quality definitions | Ericsson: the added sub-clause (general) might suggest per-connector can always be used, add 'when applicable' or similar.  Huawei: The IBE requirement itself includes several aspects, and some of them are relative values. Also since it is in-band emission, there would be no interference to adjacent channel spectrum. The proposed change for IBE is not necessary.  Rohde & Schwarz: @Ericsson We can fix this in a revision in the second round.  @Huawei: Since it is a partially a relative measurement is makes no difference if it per connector or summed over both connectors (of course then not only the emissions would be summed, but also the output power against which the emissions are compared). For sake of progress, we can take out the IBE change, if the rest is agreeable.  Anritsu: We support the DraftCR with IBE change included or not.  We agree with the last comment from R&S. But what about the requirements (in dB/dBc), should they be tighten by 3dBs, so that the equivalent total IBE level in dBm is the same as the IBE for the non-MIMO case (single Tx)?  Huawei: @R&S, We are ok with the rest part without the IBE change. Similar concern for the IBE CR in thread [103] for R4-2211578. |
| R4-2211621  R4-2214052 (CAT-A) | Huawei | Correction of A-MPR for NS\_50 |  |
| R4-2211791  R4-2211791r1 | KDDI | Draft CR for updating the note of mandatory simultaneous Rx/Tx capability for FR1 NR-CA combinations | Moderator note: No change marks in the CR, and it was revised to R4-2211791r1 before meeting starts. KDDI : R4-2211791 has been revised to **[Rev\_R4-2211791\_Rel-16 CR 38.101-1 Simultaneous TxRx FR1 NR-CA.docx](https://www.3gpp.org/ftp/tsg_ran/WG4_Radio/TSGR4_104-e/Inbox/Drafts/%5B104-e%5D%5B101%5D%20R15_R16_Maintenance/revised%20T-docs/Rev_R4-2211791_Rel-16%20CR%2038.101-1%20Simultaneous%20TxRx%20FR1%20NR-CA.docx)** |
| R4-2212018  R4-2212019 (CAT-A) | Samsung | Cat F Rel-16 Draft CR to 38.101-1 to correct the typo of CA carrier leakage |  |
| R4-2212022  R4-2212023 (CAT-A)  R4-2212024 (CAT-A) | Samsung | Cat F Rel-15 Draft CR to 38.101-1 update of simultaneous RxTx capability for band combinations | Ericsson: this would be ideal from a NW perspective. Indeed, if the UE supports a higher order BC simultaneous Rx-Tx must be supported for all constituent band pairs (but with allowed exceptions as proposed in sub-topic 1-6). But is the converse true? If mandated for band pairs part of a supported higher order BC (when these band pairs are indicated as separate BC) -- is simultaneous of Rx-Tx necessarily supported for the indicated higher order BC?  CHTTL: Support, the proposed text is an extended clarification from the existing text in the spec.  ZTE: Fine with the proposed text.  KDDI : Support the proposed text.  Samsung: The proposed test is an extended deduction and clarification from existing text in current spec, in fact we could not think of a counterexample. The benefit is operators could stop fixing the problem for higher order combinations by adding note which is inefficient. With the proposed description, the capability for higher order combination is clear. |
| R4-2212702  R4-2212703 (CAT-A)  R4-2212704 (CAT-A) | CMCC | Draft CR on 38.101-1 for allowing exception for n28 minimum guard band requirements | Moderator note: Depending on conclusion of R4-2212319  Qualcomm: we do not agree to this change, this is NBC and there was no study whether it actually works or not.  Nokia(HO): It is not recommended that the text is restricted to a specific case for n28. R4-2212771 can be a baseline for further discussion. |
| R4-2212771  R4-2212772 (CAT-A) | Ericsson | Guardbands for channel bandwidths confined in sub-ranges of a band | Qualcomm: we do not agree with this change, this is NBC. There is also no study that this actually work, there could be UEs failing regulatory requirements.  Ericsson: related to sub-topic 1-1.  To Qualcomm: the UE-specific CHBW cannot be limited to the 100k raster, then the UE-specific bandwidth and location feature is broken. Now, measurements by CMCC show that there is indeed no restriction to the 100k raster for some UE implementations.  Huawei, Hisilicon: we do not support the change. Legacy UE could not accommodate the change, and it is not helpful to the n28 issue. |
| R4-2212222  R4-2212249 (CAT-A) | MediaTek | Draft CR to 38101-1-gc1 for n41 relevant MSD test frequencies | Skyworks: Thank you for bringing this topic. For Rel-16 the number of changes is small, but for Rel-17 we may need to review more n41 MSD test points (due to harmonic interference, cross band isolation etc..). We are wondering if we could avoid revisiting all test points by adding a new sentence or footnote along the lines of “To avoid UE registration issues, it is up to RAN5 to configure the closest valid band n41 NR-ARFCN”?  MediaTek: Thanks for good comments. We are fine to add the note but MSD due to IMD is the only case that specifies exact frequencies while others don’t. n41 is the only band that may encounter such issue and it may look better that RAN4 specify the frequency that does not have connection issue.  Skyworks: Thanks for the clarification. For Rel-16 it is true that only IMD MSD specifies the exact carrier frequencies. But the new template in REL-17 now also specifies the exact carrier frequencies for n41 in MSD due to harmonics and cross-band interference. |
| R4-2212361 | Apple | Draft CR for TS 38.101-1 Rel-15: Corrections on band combinations for UE co-existence | Moderator note: Depends on R4-2212368 conclusion  Nokia(HO): Although this is technically ok, it is proposed not to maintain Rel-15/16 UE coexistence anymore. |
| R4-2212362 | Apple | Draft CR for TS 38.101-1 Rel-16: Corrections on band combinations for UE co-existence | Moderator note: Depends on R4-2212368 conclusion  Nokia(HO): Although this is technically ok, it is proposed not to maintain Rel-15/16 UE coexistence anymore. |
| R4-2212363 | Apple | CR for TS 38.101-1 Rel-17: Corrections on band combinations for UE co-existence | Moderator note: This is a formal CR. And Depends on R4-2212368 conclusion  Huawei(ZP): For band n101, B34 was removed, but B43 was added again.  Apple: Thank you for the careful checking and spotting this typo. Should have been B34. A revision is provided here: [LINK](https://www.3gpp.org/ftp/tsg_ran/WG4_Radio/TSGR4_104-e/Inbox/Drafts/%5B104-e%5D%5B101%5D%20R15_R16_Maintenance/revised%20T-docs/Rev_1_R4-2212363%20CR%2038101-1%20Rel17%20Corrections%20on%20Coex%20Band%20Combinations%20CAT-F.docx) |
| R4-2212536  R4-2212537 (CAT-A) | Anritsu | Correction to EVM measurement point for DFTs-OFDM DM-RS Type 2 | Huawei: There are red fonts in the new figure. Are they kept red intentionally?  Anritsu: Thanks Huawei for your comments, the red fonts in the new figure will need to be removed in a revised version if the other content and intention of the DraftCR is accepted. |
| R4-2212542 | Anritsu | Draft CR to update Pcmax tolerance for PC1.5 | Moderator note: Similar change but different wording with R4-2212603  Nokia(HU): Xiaomi’s CR of R4-2212603 is better than this one since the former makes spec simpler. |
| R4-2212603  R4-2212604 (CAT-A) | Xiaomi | Draft CR to 38.101-1: Corrections on Pcmax for UL MIMO to support PC1.5 29dBm | Moderator note: Similar change but different wording with R4-2212542 |
| R4-2212563  R4-2212564 (CAT-A) | ZTE | Draft CR to TS38.101-1[R15] Corrections on Output power dynamics | ZTE: Another minor CR (R4-2212565 with cat A) is in agenda 5.2.4.2 which is associated with TS 38.101-1 (v17.6.0). |
| R4-2212709 | ZTE | draft CR to TS38.101-1: 4Rx for inter-band NR CA | Moderator note: Depends on R4-2212708 conclusion |
| R4-2212710 | ZTE | draft CR to TS38.101-1: 4Rx for inter-band NR CA | Moderator note: Depends on R4-2212708 conclusion |
| R4-2212711 | ZTE | draft CR to TS38.101-1: 4Rx for inter-band NR CA | Moderator note: Depends on R4-2212708 conclusion |
| R4-2212733  R4-2212734 (CAT-A) | ZTE | Draft CR to TS38.101-1: Correction on terms for NR DC Pcmax | Ericsson: not agreed, mapping to parameters incorrect, see R4-2204749 for reference (CR submitted against the WI on high-power limit but was not agreed) |
| R4-2213134  R4-2213135 (CAT-A)  R4-2213136  (CAT-A) |  | Draft CR for 38.101-1 to improve the wording for simultaneousRxTx clarification(R15) | SoftBank-M: Our understanding of the approved WF (R4-2202295) is different from this CR. We understand that the WF means that if the simultaneous Rx/Tx capability is mandatory in CA\_A+B, the simultaneous Rx/Tx capability for CA\_A+B is also mandatory in CA\_A+B+C.  NTT DOCOMO: We have the same understanding with SoftBank.  CHTTL: same view as Softbank, that the CR seems not reflecting the same meaning as the original approved WF.  Huawei(ZP): Thanks for Softbank’s comments, I can revise this CR. Anyway, the wording in current spec cause some misunderstanding.  ZTE: We have the same understanding with SoftBank. |
| R4-2213224 | Nokia | draftCR to 38.101-1 Corrections to tables with wrong unit declarations |  |
| R4-2213319 | OPPO | R16 Draft CR on power class of each band in inter-band UL CA | Qualcomm: we do not agree with this CR, the change is confusing and not necessarily correct. why would the lower power class always apply? In our view, the specs are clear, the power class that is in operation applies. If UE is configured with CA, the power class for Ca applies. If UE is in single carrier then the power class for the band applies.  Ericsson: not agreed, the band capability is always according to ue-PowerClass (or the value indicated in the FSC per band as per the latest feature list)  Huawei: The proposed changes could cause ambiguity. Each band could still uses it’s power class, but according to the limitation of Pcmax, ca, the output power could be adjusted if the total power exceeds the Pcmax,ca according to CA power control mechanism.  ZTE: Not agreed. The change is unnecessary, and only introduces ambiguity.  OPPO: Thanks for the comments. And from the comments it seems companies have different view on which power class should be applied to a band under band combination. And QC says the CA power class apply, while Ericsson and HW says the per band power class apply. This should be further discussed and get common understanding then make it clear in the spec even not the changes as we proposed.  Some feedback:  To QC: In some cases the per BC power class is not achievable for UE in each band, for example, n1+n3 = PC2, but n1 and n3 both can only works under PC3, then it is not clear which requirements in clause 6.2.2 apply for each uplink component carrier. In this case can only apply the PC3 rather than PC2 (the smaller power class).  To Ericsson: In another case UE can transmit higher power class in single band but only can transmit lower power class in band combination. For example, n3+n78 = PC3, but UE can work with PC2 at n78. Then the MPR applied for n78 under n3+n78 should be PC3 (the smaller power class)  To Huawei: Do you mean the single band power class apply? If it is, then feedback is similar as to Ericsson. |
| R4-2213325 | OPPO | R15 FR1 Draft CR on clarification of DC location with 3300 and 3301 in TSQ requirement | Nokia(HU): What the applicable requirements looks still not clear. For 3300, it means outside carrier so that it may not be possible to apply IBE requirement to this case as the CR coversheet says. For 3301, the change looks ok. Since 3301 says undetermined, it seems that the DC is inside a carrier or outside a carrier , but we just don’t know where it is, while we just don’t allow exception due to carrier leakage if the UE reports “undetermined”  Qualcomm: The original text says the “measurement requirement is waived” and therefore test burden is indeed relaxed. The text does not say the carrier leakage requirement is waived, or relaxed.  Also the following text should clear the intent:” the RF correction with regard to the carrier leakage and IQ image shall be omitted during the calculation of transmit modulation quality.”  The RF correction is omitted. And if the value would be relaxed, there would need to be that relaxed value written somewhere. We would encourage the proponent of this CR to read and understand the intent of the requirement rather than changing the text based on translator.  OPPO: Thanks for the comments, and some feedback as below.  To Nokia, when UE report 3300/3301 the DC location is unknown to NW, thus no possible to apply carrier leakage exception.  To QC, the word “waived” is very confusing, and even checked with several companies in RAN4 their understandings are different on the meaning of this word. That’s why we try to improve the description to make it clear. With the proposed changes, in our view it is aligned with what you explained above. If there is something need further polish, please help.  vivo: In TS 38.521, the 3300/3301 is further explained as:  “…In case the parameter 3300 or 3301 is reported from the UE via *txDirectCurrentLocation* IE, do not proceed to test procedure and mark the test not applicable with reasoning in the test report…”  So we don’t see the ambiguity present. |
| R4-2213326 | OPPO | R16 FR1 Draft CR on clarification of DC location with 3300 and 3301 in TSQ requirement | Qualcomm: We should discuss the Rel-15 language change first. If the same text is changed in section that are not present in, it can be handled with a cat A CR.. At least 6.4.2 and 6.4D.2 changes should be in Cat A CR based on R4-2213325. Same for the rel-17 CR (R4-2213329) handled in different thread.  OPPO: Thanks QC for the comments, yes if the changes are same then CAT-A is applied, however, this CR is not the same as Rel-15 one. And due to the limitation of CR numbers provided per company in each item, one CR will combine several changes. Then you will find they have to be submitted to different agenda (Rel15/16, and Rel-17) |
| R4-2213362  R4-2213363 (CAT-A) | Huawei | Correction to intra-band CA requirements |  |
| R4-2213732  R4-2213733 (CAT-A) | Huawei | draft CR for TS 38.101-1: correction on intra-band UL CA contiguous CA requirement (Rel-16) | Ericsson: different waveforms/MCS should be clarified but merits further investigation  Huawei: Thanks for the comment. Without the change, UE behaviour is uncertain when different waveform is used across carriers. Fixing the problem earlier would be beneficial to the industry.  The change is following the existing principle to select the larger MPR among CCs. |
| R4-2213993  R4-2213994 (CAT-A)  R4-2213995 (CAT-A) | Qualcomm | Correction to NS\_05 frequency range | NTT DOCOMO: Thank you for the CR. We agree.  Huawei: The corrections look fine. For completeness, maybe add “and 20 MHz BWChannel where the upper channel edge is ≥ 1970 MHz” |
| R4-2214070 | Qualcomm | Editorial clean-up | Moderator note: Formal CR |
| R4-2214071 | Qualcomm | Editorial clean-up | Moderator note: Formal CR |

## Summary for 1st round

### Open issues

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|  | **Status summary** |
| **Issue 1-1-1: Preference on the candidate solutions** | *Tentative agreements: None*  According to feedback from companies, companies are either support solution 3 (QC/Apple/MTK/HW/OPPO/vivo), or ok with either 1a or 3 (Nokia/ZTE/CMCC). And one company not prefer Option 3 (E///). The only question probably is whether legacy UE can access the cell in Idle mode when the SIB1 carrier resource grid off this 100 kHz channel raster.  *Candidate options:*  *Recommendations for 2nd round:*  Solution 3 can be used as baseline in the 2nd round, and further clarify the issue below with WF:  Whether legacy UE can access the cell in Idle mode when the SIB1 carrier resource grid off this 100 kHz channel raster. |
| **Issue 1-1-2: Views on each of the proposals from R4-2212066** | *Tentative agreements: None*  For proposal 1, no consensus on whether the legacy UE behaviour regarding the channel raster alignment and valid CBW configuration should be clarified in Rel-15 UE specifications.  For proposal 2, companies questioned about whether this other bands that have the issue as n28.  *Candidate options:*  *Recommendations for 2nd round:*  The potential clarification depends on which solution is chosen in Issue 1-1-1, and can wait for the outcome and also proponent can share what kind of clarification afterward for further discussion. |
| **Issue 1-1-3: Views on the below proposals** | *Tentative agreements: None*  Both proposals got supports and concerns, no consensus can be reached in 1st round.  For proposal 1, 5 companies have concern, while 3 companies support or ok with the proposal. No more discussion is needed and focus on Issue 1-1-1.  For proposal 2, 2 companies have concern or not preferred. And it is already supported in existing spec and need no more discussion.  *Candidate options:*  *Recommendations for 2nd round:*  No more discussion is needed and focus on Issue 1-1-1. |
| **Issue 1-2-1: Views on the below proposal from paper R4-2211538** | *Tentative agreements: None*  Views are divergent, some companies prefer Option 4, some prefer Option 5, while some companies think this is not an issue at all. But clearly the mapping from RAN2 signaling to RAN4 NS tables including single CC, contiguous CA, NC CA cases need to be clarified for PCC and SCC.  *Candidate options:*  *Recommendations for 2nd round:*  Continue discuss in 2nd round with WF to clarify the NS mapping from RAN2 to RAN4 and potential changes to the specs. |
| **Issue 1-3-1: Views on the below proposal from paper R4-2212368** | *Tentative agreements:*  Concerns on changing n5 and B34/n34, they are kept as it is.  Proposal 1 regarding b45 can be agreed.  Proposal 2 and 3 can be agreed.  *Candidate options:*  *Recommendations for 2nd round:* |
| **Issue 1-4-1: Views on the below proposal from paper R4-2212530** | *Tentative agreements: None*  *Candidate options:*  *Recommendations for 2nd round:*  Continue discuss in 2nd round. |
| **Issue 1-5-1: Views on the below proposal from paper R4-2212708** | *Tentative agreements:*  The proposal in general get supports from companies, wording needs to be updated and also clarifications are needed to the questions raised by companies.  *Candidate options:*  *Recommendations for 2nd round:*  Continue discuss based on the CR R4-2212709 in 2nd round. |
| **Issue 1-6-1: Views on the below proposal from paper R4-2212768** | *Tentative agreements: None*  No conclusion in 1st round, and the NBC issue needs to be further discussed and also the necessity.  *Candidate options:*  *Recommendations for 2nd round:*  Continue discuss in 2nd round. |

### CRs/TPs

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

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

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| **T-doc number** | **Company** | **Title** | **Summary** |
| R4-2211552 | Nokia | AdditionalSpectrumEmission in NR CA for n77 in the USA | Revise and take R4-2212769 and RAN2 discussions into account if possible. |
| R4-2212769  R4-2212770 (CAT-A) | Ericsson | Amendments to requirements for n77 operations in the US | Noted |
| R4-2211574 | Rohde & Schwarz | Correction to n46 channel raster | Agreeable |
| R4-2211575  R4-2211576 (CAT-A)  R4-2211577  (CAT-A) | Rohde & Schwarz | Update of UL MIMO transmit quality definitions | Revise |
| R4-2211621  R4-2214052 (CAT-A) | Huawei | Correction of A-MPR for NS\_50 | Agreeable |
| R4-2211791  R4-2211791r1 | KDDI | Draft CR for updating the note of mandatory simultaneous Rx/Tx capability for FR1 NR-CA combinations | Moderator note: No change marks in the CR, and it was revised to R4-2211791r1 before meeting starts.  R4-2211791r1 is Agreeable |
| R4-2212018  R4-2212019 (CAT-A) | Samsung | Cat F Rel-16 Draft CR to 38.101-1 to correct the typo of CA carrier leakage | Agreeable |
| R4-2212022  R4-2212023 (CAT-A)  R4-2212024 (CAT-A) | Samsung | Cat F Rel-15 Draft CR to 38.101-1 update of simultaneous RxTx capability for band combinations | Return to |
| R4-2212702  R4-2212703 (CAT-A)  R4-2212704 (CAT-A) | CMCC | Draft CR on 38.101-1 for allowing exception for n28 minimum guard band requirements | Moderator note: Depending on conclusion of R4-2212319  Postponed, and focus on issue 1-1-1. |
| R4-2212771  R4-2212772 (CAT-A) | Ericsson | Guardbands for channel bandwidths confined in sub-ranges of a band | Postponed, and focus on issue 1-1-1. |
| R4-2212222  R4-2212249 (CAT-A) | MediaTek | Draft CR to 38101-1-gc1 for n41 relevant MSD test frequencies | Revise |
| R4-2212361 | Apple | Draft CR for TS 38.101-1 Rel-15: Corrections on band combinations for UE co-existence | Moderator note: Depends on R4-2212368 conclusion  Revise |
| R4-2212362 | Apple | Draft CR for TS 38.101-1 Rel-16: Corrections on band combinations for UE co-existence | Moderator note: Depends on R4-2212368 conclusion  Revise |
| R4-2212363 | Apple | CR for TS 38.101-1 Rel-17: Corrections on band combinations for UE co-existence | Moderator note: This is a formal CR. And Depends on R4-2212368 conclusion  Revise |
| R4-2212536  R4-2212537 (CAT-A) | Anritsu | Correction to EVM measurement point for DFTs-OFDM DM-RS Type 2 | Revise |
| R4-2212542 | Anritsu | Draft CR to update Pcmax tolerance for PC1.5 | Moderator note: Similar change but different wording with R4-2212603  Not pursued. |
| R4-2212603  R4-2212604 (CAT-A) | Xiaomi | Draft CR to 38.101-1: Corrections on Pcmax for UL MIMO to support PC1.5 29dBm | Moderator note: Similar change but different wording with R4-2212542  Agreeable |
| R4-2212563  R4-2212564 (CAT-A) | ZTE | Draft CR to TS38.101-1[R15] Corrections on Output power dynamics | Agreeable |
| R4-2212709 | ZTE | draft CR to TS38.101-1: 4Rx for inter-band NR CA | Moderator note: Depends on R4-2212708 conclusion  Revise |
| R4-2212710 | ZTE | draft CR to TS38.101-1: 4Rx for inter-band NR CA | Moderator note: Depends on R4-2212708 conclusion  Revise |
| R4-2212711 | ZTE | draft CR to TS38.101-1: 4Rx for inter-band NR CA | Moderator note: Depends on R4-2212708 conclusion  Revise |
| R4-2212733  R4-2212734 (CAT-A) | ZTE | Draft CR to TS38.101-1: Correction on terms for NR DC Pcmax | Return to |
| R4-2213134  R4-2213135 (CAT-A)  R4-2213136  (CAT-A) |  | Draft CR for 38.101-1 to improve the wording for simultaneousRxTx clarification(R15) | Revise |
| R4-2213224 | Nokia | draftCR to 38.101-1 Corrections to tables with wrong unit declarations | Agreeable |
| R4-2213319 | OPPO | R16 Draft CR on power class of each band in inter-band UL CA | Return to |
| R4-2213325 | OPPO | R15 FR1 Draft CR on clarification of DC location with 3300 and 3301 in TSQ requirement | Not pursued |
| R4-2213326 | OPPO | R16 FR1 Draft CR on clarification of DC location with 3300 and 3301 in TSQ requirement | Not pursued |
| R4-2213362  R4-2213363 (CAT-A) | Huawei | Correction to intra-band CA requirements | Agreeable |
| R4-2213732  R4-2213733 (CAT-A) | Huawei | draft CR for TS 38.101-1: correction on intra-band UL CA contiguous CA requirement (Rel-16) | Return to |
| R4-2213993  R4-2213994 (CAT-A)  R4-2213995 (CAT-A) | Qualcomm | Correction to NS\_05 frequency range | Revise |
| R4-2214070 | Qualcomm | Editorial clean-up | Moderator note: Formal CR  Agreeable |
| R4-2214071 | Qualcomm | Editorial clean-up | Moderator note: Formal CR  Agreeable |

## Discussion on 2nd round (if applicable)

# Topic #2: 38.101-2

## Companies’ contributions summary

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| **T-doc number** | **Company** | **Title** | **Proposals / Observations/Notes** |
| R4-2211922  R4-2211923  (CAT-A)  R4-2211924 (CAT-A) | Apple | Modification on maiximum ouput power related terminology | Moderator notes:   1. Rel-15 formal CR;   R4-2211924 is Rel-16 CAT-A CR but already uploaded before meeting. And the spec number is incorrect |
| R4-2211919  R4-2211919r1  R4-2211920 (CAT-A) | Apple | On Beam correspondence requirement in R15 | Moderator notes: Revision is made before the meeting starts. |
| R4-2211921  R4-2211921r1 | Apple | On Beam correspondence requirement in R17 | *Moderator note: Revision is made before meeting starts.* |
| R4-2212067 | Nokia | On EIRP-based test metric for FR2 SEM | Observation 1: Core requirement on FR2 ACLR and SEM shall be kept as TRP requirement.  Observation 2: Testing with EIRP metric for FR2 SEM shall need further analysis to verify the equivalence of TRP metric to EIRP metric. |
| R4-2212328 | Qualcomm | On changing SEM verification to a directional test | Proposal: The principle that motivates streamlining of compliance with the SEM requirement (see proposal R4-2207674) shall be applied to all requirements: ‘Verification guidelines do not constitute core requirement specification’ |
| R4-2212348 | Apple | EIRP-based test metric for FR2 SEM verifications | Proposal: Modify the text description in TS 38.101-2 clause 6.5.2.1 from “The requirement is verified in beam locked mode with the test metric of TRP (Link=TX beam peak direction, Meas=TRP grid).” to “The requirement is specified as TRP and is verified in beam locked mode with the test metric of EIRP at the beam peak direction subtracted by the power difference between maximum peak EIRP (PUMAX) and maximum TRP (PTMAX)”. |
| R4-2212349  R4-2212350 (CAT-A)  R4-2212351 (CAT-A) | Apple | Draft CR for TS 38.101-2: Change FR2 SEM verification test metric | Moderator note: Depends on R4-2212348 conclusion. |
| R4-2212334 | Qualcomm | Clarification of MPR applicable to a Rel-16 FR2 UE |  |
| R4-2213321  R4-2213322 (CAT-A) | OPPO | R15 Draft CR on modifiedMPRbehavior for FR2 |  |
| R4-2212387  R4-2212388 (CAT-A) | NTT DOCOMO | Draft CR for clarification on Maximum input and ACS and IBB for FR2 DL intra and inter combinations for TS 38.101-2 |  |
| R4-2212538  R4-2212539 (CAT-A) | Anritsu | Correction to EVM measurement point for DFTs-OFDM DM-RS Type 2 |  |
| R4-2212584  R4-2212585 (CAT-A)  R4-2212586 (CAT-A) | Xiaomi | Draft CR for Rel-15 38.101-2 to correct the configured transmitted power |  |
| R4-2212730 | ZTE | draft CR to TS38.101-2[R15] Introduce symbols of delta RIBC and delta RIBNC for intra-band CA |  |
| R4-2212731  R4-2212732 (CAT-A) | ZTE | draft CR to TS38.101-2[R16] Introduce symbols of delta RIBC and delta RIBNC for intra-band CA |  |
| R4-2213226 | Nokia | draftCR to 38.101-2 Corrections to tables with wrong unit declarations |  |
| R4-2213324 | OPPO | R16 Draft CR on clarification of FR2 CA DC location reporting |  |
| R4-2213327 | OPPO | R15 FR2 Draft CR on clarification of DC location with 3300 and 3301 in TSQ requirement |  |
| R4-2213328 | OPPO | R16 FR2 Draft CR on clarification of DC location with 3300 and 3301 in TSQ requirement |  |
| R4-2213734  R4-2213735 (CAT-A)  R4-2213736 (CAT-A) | Huawei | draft CR for 38.101-2 revison on MIMO receiver characteristics (Rel-15) |  |

## Open issues summary

### Sub-topic 2-1: EIRP-based test metric for FR2 SEM

**Issue 2-1-1: Views on the proposals**

**Proposal 1**: Modify the text description in TS 38.101-2 clause 6.5.2.1 from “The requirement is verified in beam locked mode with the test metric of TRP (Link=TX beam peak direction, Meas=TRP grid).” to “The requirement is specified as TRP and is verified in beam locked mode with the test metric of EIRP at the beam peak direction subtracted by the power difference between maximum peak EIRP (PUMAX) and maximum TRP (PTMAX)”. (R4-2212348)

**Proposal 2:** The principle that motivates streamlining of compliance with the SEM requirement (see proposal R4-2207674) shall be applied to all requirements: ‘Verification guidelines do not constitute core requirement specification’ (R4-2212328)

**Observation 1:** Core requirement on FR2 ACLR and SEM shall be kept as TRP requirement. (R4-2212067)

**Observation 2:** Testing with EIRP metric for FR2 SEM shall need further analysis to verify the equivalence of TRP metric to EIRP metric. (R4-2212067)

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| **Company** | **Comments** |
| xxx |  |
| Qualcomm | Prop 1: not ok without agreeing prop 2. Prop 2 is necessary to clearly state and adopt in the standard, both for consistency as well as to explain the disconnect why the standard seems to say the requirement is regulatory requirement applies in the TRP sense, but would now say ‘ok to be verified as a directional requirement’ with prop 1. |
| Rohde & Schwarz | We are not ok to change SEM from SEM to EIRP. As stated in the last meeting this requirement is regulatory and shall remain TRP. If the requirement would be made EIRP this would very likely lead to testability issues in RAN5, since SEM requires a large dynamic range for testing (especially in power classes with high output power). This issue is somewhat lessened by the TRP measurement and being able to average across the sphere. For EIRP measurements, this would not be the case and testing of the requirement may not be possible. |
| Ericsson | We do not agree with these proposals. The TRP metric is a regulatory requirement, the proposed verification has potentially large consequences and can lead to worse 3GPP credibility for a very small test time reduction  A testability problem with TRP and low signal levels is mentioned, but unlike ACLR (for which there is a testability issue) SEM does not have any official testability problem. The BW in SEM is only 1 MHz which makes the noise problem much less severe for SEM compared to ACLR. |
| NTT DOCOMO | Before agreeing it, we need to clarify the impact on existing MU/TT due to the change of the test metric. The existing MU/TT values were derived from the assumption of TRP test metric, and regulatory requirements are specified considering the TT values. So, if TT values are increased by changing test metric, we have concerns. In ACLR case, in our understanding, the change of the test metric was done to address testability issue and decrease TT values. |
| SoftBank-M | We have the similar view of DOCOMO. It is premature to agree the proposal at this timing. |
| Apple | Thanks to companies’ valuable comments.  As stated in our contribution, the EIRP measurement at beam peak direction is only an intermediate step for the SEM verification. The final outcome is still SEM TRP as we need to subtract EIRP at the beam direction with the antenna peak directivity. The proposed verification method is to leverage the availability of the antenna peak directivity through the already required tests of maximum peak EIRP (PUMAX) and maximum TRP (PTMAX) of the wanted signal. So there is still TRP measurement involved. The proposed SEM TRP measurement can save substantial testing time (not as commented by Ericsson only very small test time reduction). In addition, the TRP measured on wanted signal should be more accurate than SEM directly measured by TRP as SEM power level is much lower than wanted signal and after the path loss in test chamber, the SEM power could fall below the tester noise floor at certain spatial angles which would cause measurement inaccuracy. The test equipment vendors should be very familiar with this issue already. On the other hand, we also disagree with Ericsson’s comment that the noise problem is less severe with smaller measurement bandwidth as what we are comparing is the PSD ratio between the signal and the noise (i.e., NF would not become better with smaller measurement BW). |
| KDDI | We have the similar views of DOCOMO and SoftBank. It is premature to agree the proposal at this timing. |
| vivo | We support proposal 1. Single point offset approach was widely used for OTA testing under the condition that antenna pattern is not changed, to reduce measurement time. The requirement metric as TRP is not changed. It is just that RAN5 may need to discuss measurement uncertainty related issues.  For Proposal 2, we understand the intention and agree this can be used for this requirement clarification. But whether adopting this general sentence for all the FR2 requirements, we need further discussion. |
| Samsung | We support proposal 1. With TRP as core requirement not changed, this proposal enables efficient verification and beneficial for industry. The method itself is not problem.  Proposal 2 is also reasonable for the sake of eliminating confusion |
| Huawei | Proposal 1 is acceptable for us, but we disagree with proposal 2 that the principle is applied to all requirements. Alternative way is to use the similar manner to ACLR, the core requirement is not changed, but send LS to RAN5 asking the change of the test procedure. |
| Moderator summary:  Views are divergent, and no consensus can be reached. Continue discuss in 2nd round with WF. | |

## Companies views’ collection for 1st round

### CRs/TPs comments collection

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| **T-doc number** | **Company** | **Title** | **Summary** |
| R4-2211922  R4-2211923  (CAT-A)  R4-2211924 (CAT-A) | Apple | Modification on maiximum ouput power related terminology | *Moderator notes:*   * *Rel-15 formal CR;* * *R4-2211924 is Rel-16 CAT-A CR but already uploaded before meeting. And the spec number is incorrect*   *Apple: Wrong version for R4-2211924 is uploaded. If there I no concern for the changes, revision number is need to upload the right version.* |
| R4-2211919  R4-2211919r1  R4-2211920 (CAT-A) | Apple | On Beam correspondence requirement in R15 | Moderator notes: Revision is made before the meeting starts.  Qualcomm: we were not ok with the original version, but we are ok with the revision  Nokia(HO): The change says “each of the CC”, but BC must be fulfilled across CCs with the same beam direction. It is not independent direction per CC. So the proposed wording is not ok.  Apple: please check the revised version in R4-2214195, where the CA changes has been removed. |
| R4-2211921  R4-2211921r1 | Apple | On Beam correspondence requirement in R17 | *Moderator note: Revision is made before meeting starts.*  Qualcomm: we were not ok with the original version, but we are ok with the revision  Nokia(HO): The change says “each of the CC”, but BC must be fulfilled across CCs with the same beam direction. It is not independent direction per CC. So the proposed wording is not ok.  Apple: please check the revised version in R4-2214196, where the CA changes has been removed. |
| R4-2212349  R4-2212350 (CAT-A)  R4-2212351 (CAT-A) | Apple | Draft CR for TS 38.101-2: Change FR2 SEM verification test metric | *Moderator note: Depends on R4-2212348 conclusion in Issue 2-1.*  Ericsson: not agreed, see comments to sub-topic 2-1  Nokia(HO): Issue 2-1 needs to be agreed first. |
| R4-2212334 | Qualcomm | Clarification of MPR applicable to a Rel-16 FR2 UE | Huawei: The application of modified MPR bits and the applicable version has been clearly defined in the annex table, the proposed changes would cause unnecessary ambiguity. In our view, the UE behaviour according the annex is clear enough. |
| R4-2213321  R4-2213322 (CAT-A) | OPPO | R15 Draft CR on modifiedMPRbehavior for FR2 | Qualcomm: Intent is correct, but not sure it is necessary.  Ericsson: not agreed, each bit only covers a specific change (a UE of an earlier release can optionally support a change made in a later release, UEs of this later release must follow this change and any other subsequent changes specified in this later release)  Nokia(HO): Not agreeable. ModifedMPR should be fixed at one release version. if it is modified later, a new bit should be assigned.  Huawei: We think the proposed changes may not be necessary.  OPPO: The handling of modifiedMPRbehavior across releases should be consistent. In the LS discussion we see comments like apply the latest version in Rel-16, etc. And this is also aligned with our understanding. The spec keeps updating but the *modifiedMPRbehavior* is fixed to an old version of specification. The new changes may not necessarily mean the value changed (new bit needed) but may be like some error correction, then if refer to an old version, these updating will not be reflected. This is the problem. |
| R4-2212387  R4-2212388 (CAT-A) | NTT DOCOMO | Draft CR for clarification on Maximum input and ACS and IBB for FR2 DL intra and inter combinations for TS 38.101-2 |  |
| R4-2212538  R4-2212539 (CAT-A) | Anritsu | Correction to EVM measurement point for DFTs-OFDM DM-RS Type 2 |  |
| R4-2212584  R4-2212585 (CAT-A)  R4-2212586 (CAT-A) | Xiaomi | Draft CR for Rel-15 38.101-2 to correct the configured transmitted power |  |
| R4-2212730 | ZTE | draft CR to TS38.101-2[R15] Introduce symbols of delta RIBC and delta RIBNC for intra-band CA | Huawei: We think the proposed changes with two new symbols are not necessary. The exiting definition of ΔRIB can be extended.  ZTE: For Huawei. In Rel-16/17, inter-band DL CA are introduced, and in Rel17, ΔTIB was also introduced, together with ΔRIB are the parameters for inter-band NR CA. so ΔRIB may need to be kept for forward compability.  Here the approach of ‘delta RIBC and delta RIBNC for intra-band CA’ are the same as TS38.101-1, to keep consistence understanding cross specs. |
| R4-2212731  R4-2212732 (CAT-A) | ZTE | draft CR to TS38.101-2[R16] Introduce symbols of delta RIBC and delta RIBNC for intra-band CA |  |
| R4-2213226 | Nokia | draftCR to 38.101-2 Corrections to tables with wrong unit declarations |  |
| R4-2213324 | OPPO | R16 Draft CR on clarification of FR2 CA DC location reporting | Nokia(HU): need to discuss FR1 and FR2 together.  Huawei: The meaning is identical. We think the previous wording is clear, and will not make ambiguity for misunderstanding of relaxation.  OPPO: To HW comment, the 3300/3301 is for carrier leakage requirement, and previously it was put under EVM this is the wrong place, and this CR move it to general section which is same as FR1.  To Nokia comment, yes, the changes are aligned with FR1 today.  vivo: same comment as FR1 |
| R4-2213327 | OPPO | R15 FR2 Draft CR on clarification of DC location with 3300 and 3301 in TSQ requirement | Nokia(HU): need to discuss FR1 and FR2 together.  Qualcomm: Same comment as for R4-2213325 for 38,101-1. Seems change is not needed for the reasons given. And ran5 has not really made a mistake here. We do not agree with the CR.  OPPO: To Qualcomm, is there something wrong with the proposed changes in this CR? The word “waived” is very confusing and can be understood as relaxed or other meanings which is not intended, and even checked with several companies in RAN4 their understandings are different on the meaning of this word. That’s why this CR try to improve the description to make it clear. Make specification clear to all is necessary.  vivo: same comment as FR1 |
| R4-2213328 | OPPO | R16 FR2 Draft CR on clarification of DC location with 3300 and 3301 in TSQ requirement | Nokia(HU): need to discuss FR1 and FR2 together.  Qualcomm: And same as Fr1, there should be a catA CR for the same changes and the R15 discussion should happen first. We do to agree with this one. |
| R4-2213734  R4-2213735 (CAT-A)  R4-2213736 (CAT-A) | Huawei | draft CR for 38.101-2 revison on MIMO receiver characteristics (Rel-15) | NTT DOCOMO: We understand the intension, but we wonder if it may be better to keep it as core requirements while the tests can be omitted. If we remove whole sections, there are no reference to Rx requirements UE with UL MIMO?  Samsung: we think this CR is reasonable. As comparison, when UE is in DL MIMO mode, there is no corresponding TX requirement section for DL MIMO. so we would like to know the reason why RX requirement section is needed for UL MIMO.  Huawei: It’s not clear why the reference is needed for UL MIMO. There are no RAN5 test for the Rx requirements for the TDD bands. The Rx requirements are already verified for the non-MIMO case. Without dedicated Rx requirements for UL MIMO does not mean there is no DL configuration for UE supporting UL MIMO. Also as mentioned by Samsung, there is no DL MIMO requirements as well, which has no impact for UE supporting this MIMO feature. |

## Summary for 1st round

### Open issues

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

|  |  |
| --- | --- |
|  | **Status summary** |
| **Issue 2-1-1: Views on the proposals** | *Tentative agreements: None*  Views are divergent, and no consensus can be reached.  *Candidate options:*  *Recommendations for 2nd round:* Continue discuss in 2nd round with WF. |

### CRs/TPs

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

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| --- | --- | --- | --- |
| **T-doc number** | **Company** | **Title** | **Comments collection** |
| R4-2211922  R4-2211923  (CAT-A)  R4-2211924 (CAT-A) | Apple | Modification on maiximum ouput power related terminology | *Moderator notes:*   * *Rel-15 formal CR;* * *R4-2211924 is Rel-16 CAT-A CR but already uploaded before meeting. And the spec number is incorrect*   R4-2211922 is agreeable  R4-2211924 is revised |
| R4-2211919  R4-2211919r1  R4-2211920 (CAT-A) | Apple | On Beam correspondence requirement in R15 | Moderator notes: Revision is made before the meeting starts.  Revise |
| R4-2211921  R4-2211921r1 | Apple | On Beam correspondence requirement in R17 | *Moderator note: Revision is made before meeting starts.*  Revise |
| R4-2212349  R4-2212350 (CAT-A)  R4-2212351 (CAT-A) | Apple | Draft CR for TS 38.101-2: Change FR2 SEM verification test metric | *Moderator note: Depends on R4-2212348 conclusion in Issue 2-1.*  Postpone |
| R4-2212334 | Qualcomm | Clarification of MPR applicable to a Rel-16 FR2 UE | Not pursued |
| R4-2213321  R4-2213322 (CAT-A) | OPPO | R15 Draft CR on modifiedMPRbehavior for FR2 | Not pursued |
| R4-2212387  R4-2212388 (CAT-A) | NTT DOCOMO | Draft CR for clarification on Maximum input and ACS and IBB for FR2 DL intra and inter combinations for TS 38.101-2 | agreeable |
| R4-2212538  R4-2212539 (CAT-A) | Anritsu | Correction to EVM measurement point for DFTs-OFDM DM-RS Type 2 | agreeable |
| R4-2212584  R4-2212585 (CAT-A)  R4-2212586 (CAT-A) | Xiaomi | Draft CR for Rel-15 38.101-2 to correct the configured transmitted power | agreeable |
| R4-2212730 | ZTE | draft CR to TS38.101-2[R15] Introduce symbols of delta RIBC and delta RIBNC for intra-band CA | Return to |
| R4-2212731  R4-2212732 (CAT-A) | ZTE | draft CR to TS38.101-2[R16] Introduce symbols of delta RIBC and delta RIBNC for intra-band CA | agreeable |
| R4-2213226 | Nokia | draftCR to 38.101-2 Corrections to tables with wrong unit declarations | agreeable |
| R4-2213324 | OPPO | R16 Draft CR on clarification of FR2 CA DC location reporting | Return to |
| R4-2213327 | OPPO | R15 FR2 Draft CR on clarification of DC location with 3300 and 3301 in TSQ requirement | Not pursued |
| R4-2213328 | OPPO | R16 FR2 Draft CR on clarification of DC location with 3300 and 3301 in TSQ requirement | Not pursued |
| R4-2213734  R4-2213735 (CAT-A)  R4-2213736 (CAT-A) | Huawei | draft CR for 38.101-2 revison on MIMO receiver characteristics (Rel-15) | Return to |

## Discussion on 2nd round (if applicable)

*Moderator can provide summary of 2nd round here. Note that recommended decisions on tdocs should be provided in the section titled ”Recommendations for Tdocs”.*

# Topic #3: 38.101-3

## Companies’ contributions summary

|  |  |  |  |
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| **T-doc number** | **Company** | **Title** | **Proposals / Observations** |
| R4-2211579  R4-2211580 (CAT-A)  R4-2211581 (CAT-A) | Rohde & Schwarz | Addition of missing Additional Spurious Emissions Clause |  |
| R4-2211793  ->  R4-2211793r1 | KDDI | Draft CR for updating the note of mandatory simultaneous Rx/Tx capability for FR1 and FR2 EN-DC combinations | Moderator note: No change marks in the CR, and it was revised to R4-2211793r1 before meeting. |
| R4-2212012  R4-2212013 (CAT-A) | Samsung | Cat F Rel-16 Draft CR to 38.101-3 to correct the requirement of Type2 non-collocated ENDC deployement |  |
| R4-2212026  R4-2212027 (CAT-A)  R4-2212028 (CAT-A) | Samsung | Cat F Rel-15 Draft CR to 38.101-3 update of simultaneous RxTx capability for band combinations |  |
| R4-2212364 | Apple | Draft CR for TS 38.101-3 Rel-15: Corrections on band combinations for UE co-existence |  |
| R4-2212365 | Apple | Draft CR for TS 38.101-3 Rel-16: Corrections on band combinations for UE co-existence |  |
| R4-2212366 | Apple | CR for TS 38.101-3 Rel-17: Corrections on band combinations for UE co-existence | Moderator note: This is formal CR. |
| R4-2212534 | Anritsu | TDD RMC for Intra-band EN-DC | Proposal 1: Choose one of the following options to solve the identified issue:  • Option 1: Use in TS 38.101-3 the compatible E-UTRA TDD uplink-downlink configuration #1 and NR TDD UL/DL patterns (SCS of 15kHz, 30kHz and 60kHz) already used in TS 38.133.  • Option 2: Specify in TS 38.101-3 (please see Annex A of this contribution for possible update of TS) the need to apply a +3ms time offset to the NR “TDD Slot Configuration pattern” relative the E-UTRA “Uplink-downlink configuration” for TDD Intra-band EN-DC. |
| R4-2212540 | Anritsu | Correction to Channel BW for n38 in 7.3 B.2.3 |  |
| R4-2212541 | Anritsu | Correction to Channel BW for n38 in 7.3 B.2.3 |  |
| R4-2212581 | Xiaomi | Discussion on intrabandENDC-Support | Proposal 1: For case 3, 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-DC  configuration | Uplink EN-DC  configuration | | DC\_(n)41AB5  DC\_(n)41CA5  DC\_(n)41DA5 | DC\_41A\_n41A | | DC\_(n)48CA5 | DC\_48A\_n48A6 | | DC\_(n)48DA5 | DC\_48A\_n48A6 |   Proposal 2: For case 4, move DL DC\_48A\_(n)48AA with UL DC\_(n)48AA and UL DC\_48A\_n48A into a new table and indicate them by intraBandENDC-Support= both.  Proposal 3: To get rid of DL DC\_48A-48A\_n48A with UL DC\_48A\_n48A from case 4, one note could be introduce as below:  NOTE 5: The UE supporting these configurations mixed intra-band continuous and non-continuous ENDC with two sub-blocks containing more than two component carriers indicates ‘both’ by IE intraBandENDC-Support. |
| R4-2212582  R4-2212583 (CAT-A) | Xiaomi | Draft CR for 38.101-3 Rel-16 to correct band combination for intra-band ENDC | Moderator note: This depends on R4-2212581 conclusion |
| R4-2212850 | Google | Discussion on Intra-Band EN-DC support | Proposal 1: The *intraBandENDC-Support* definition should follow TS38.101-3 Table 5.3B.1.2-1 and Table 5.3B.1.3-1, and 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 the UE that supports DC\_48A\_(n)48AA should also support DC\_48A-48A\_n48A, and vice versa.  Proposal 3: The *intraBandENDC-Support* definition should follow TS38.101-3 Table 5.3B.1.2-1 and Table 5.3B.1.3-1, and the UE should report *intraBandENDC-Support=non-contiguous* to support the following configurations.   * DL DC\_48A\_(n)48AA with UL DC\_(n)48AA * DL DC\_48A\_(n)48AA with UL DC\_48A\_n48A * DL DC\_48A-48A\_n48A with UL DC\_48A\_n48A |
| R4-2212852 | Google | Draft CR for 38.101-3 Rel-16 intra-band contiguous EN-DC band combination | Moderator note: This depends on R4-2212850 conclusion |
| R4-2212854 | Google | Draft CR for 38.101-3 Rel-17 intra-band contiguous EN-DC band combination | Moderator note: This depends on R4-2212850 conclusion |
| R4-2212855 | Google | Draft CR for 38.101-3 Rel-16 intra-band non-contiguous EN-DC band combination | Moderator note: This depends on R4-2212850 conclusion |
| R4-2212862 | Google | Draft CR for 38.101-3 Rel-17 intra-band non-contiguous EN-DC band combination | Moderator note: This depends on R4-2212850 conclusion |
| R4-2213631 | Huawei | Discussion on intra-band EN-DC combination | Proposal 1: IntraBandENDC-Support IE 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. |
| R4-2212728  R4-2212729 (CAT-A) | ZTE | draft CR to TS38.101-3[R16] Clarification on REFSEN for inter-band CA |  |
| R4-2213137 R4-2213138 (CAT-A)  R4-2213139 (CAT-A) | Huawei | Draft CR for 38.101-3 to improve the wording for simultaneousRxTx clarification(R15) | SoftBank-M: The same comment in R4-2213134. |
| R4-2213140  R4-2213141 (CAT-A) | Huawei | Draft CR for 38.101-3 To remove the frequency restriction for DC\_28\_n5 (R16) |  |

## Open issues summary

### Sub-topic 3-1: intrabandENDC-Support

**Issue 3-1-1: Views on proposals from paper R4-2212581**

**Proposal 1:** For case 3, 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-DC  configuration | Uplink EN-DC  configuration |
| DC\_(n)41AB5  DC\_(n)41CA5  DC\_(n)41DA5 | DC\_41A\_n41A |
| DC\_(n)48CA5 | DC\_48A\_n48A6 |
| DC\_(n)48DA5 | DC\_48A\_n48A6 |

**Proposal 2:** For case 4, move DL DC\_48A\_(n)48AA with UL DC\_(n)48AA and UL DC\_48A\_n48A into a new table and indicate them by intraBandENDC-Support= both.

**Proposal 3:** To get rid of DL DC\_48A-48A\_n48A with UL DC\_48A\_n48A from case 4, one note could be introduce as below:

NOTE 5: The UE supporting these configurations mixed intra-band continuous and non-continuous ENDC with two sub-blocks containing more than two component carriers indicates ‘both’ by IE intraBandENDC-Support.

|  |  |
| --- | --- |
| **Company** | **Comments** |
| CableLabs | We do not support proposal 1 that removes the UL intra-band non-contiguous ENDC DC\_48A\_n48A. The band 48/n48 channels are divided into 10-MHz chunks and the channel allocation is managed by SAS depending on the incumbent usage. The intra-band non-contiguous ENDC will more likely be happen in band 48/n48 than any other bands. Alternative solutions need to be considered such as proposal 1 from Google’s R4-2212850 that uses additional signaling to handle UL DC\_48\_n48A. |
| Ericsson | Proposal 1: agreed (the corresponding non-contiguous DL configurations already specified).  Proposal 2 is a good idea, move the mixed contiguous and non-contiguous BC to a separate table. This works for BC for which the UE supports both UL configurations, not possible if only the contiguous is supported in the UL (neither by the intra-BandENDC-Support or UL associations in the FSC).  Proposal 3: the wording of the note could perhaps be modified to state that the band combinations have at most two sub-blocks |
| Nokia(HO) | As this topic is controversial for quite many meetings, it is recommended to get RAN2 guidance if more flexible signalling can be provided, rather than sorting out ambiguous cases in RAN4. |
| CHTTL | In general we think it will be better to focus on how to support those combinations instead of removing them. |
| Huawei, Hisilicon | We are ok with the proposals. Besides, the capability of should be indicated in UL and DL separately per band combination |
| Xiaomi | support these proposals based on current definition of intra-band configuration and fallback rule. |
| NTT DOCOMO | We support these proposals. |
| Google | Support CableLabs comments. We do not support Proposal 1. For Proposal 2, “both” includes the contiguous and non-contiguous. For contiguous spectrum definition, one more question for clarification. Does it also include the additional case 48A<->n48A<->48A with three carrier are contiguous which is not defined now? |
| Moderator summary:  For proposal 1, get negative view from three companies, is not agreeable.  For proposal 2, seems agreeable except one question for clarification from Google.  For proposal 3, seems agreeable but with wording improvement as Ericsson commented.  Besides, Nokia commented that probably can ask RAN2 whether flexible signaling can be provided. And HW commented the capability should be UL and DL separately indicated. | |

**Issue 3-1-2: Views on proposals from paper R4-2212850**

**Proposal 1:** The *intraBandENDC-Support* definition should follow TS38.101-3 Table 5.3B.1.2-1 and Table 5.3B.1.3-1, and 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 the UE that supports DC\_48A\_(n)48AA should also support DC\_48A-48A\_n48A, and vice versa.

**Proposal 3:** The *intraBandENDC-Support* definition should follow TS38.101-3 Table 5.3B.1.2-1 and Table 5.3B.1.3-1, and the UE should report *intraBandENDC-Support=non-contiguous* to support the following configurations.

* DL DC\_48A\_(n)48AA with UL DC\_(n)48AA
* DL DC\_48A\_(n)48AA with UL DC\_48A\_n48A
* DL DC\_48A-48A\_n48A with UL DC\_48A\_n48A

|  |  |
| --- | --- |
| **Company** | **Comments** |
| Google | Support these proposals. The technical details have been discussed a lot in the previous meetings. These proposals are the solution with the minimum cost to specification change by adding notes in TS38.101-3 to make UE capability signalling more thorough for these intra-band EN-DC band combinations. |
| CableLabs | We support these proposals. We need to keep the UL intra-band non-contiguous ENDC. The band 48/n48 channels are divided into 10-MHz chunks and the channel allocation is managed by SAS depending on the incumbent usage. The intra-band non-contiguous ENDC will more likely be happen in band 48/n48 than any other bands. |
| Ericsson | Proposal 1: agreed.  Proposal 2: this cannot be assumed.  Proposal 3: the first combination cannot be indicated by setting "non-contiguous", the UL and DL intraBandEN-DC-Support must be differentiated (see 3-1-3). |
| Nokia(HO) | As this topic is controversial for quite many meetings, it is recommended to get RAN2 guidance if more flexible signalling can be provided, rather than sorting out ambiguous cases in RAN4. |
| CHTTL | It will be better that more flexible and generalized signaling can be provided, but for the old release probably we can only fix it with the minimum impact. |
| Xiaomi | disagree proposal1, disagree constraint the UE implementation to make the UE support the band combination that is conflict with current fallback rule.  proposal 2 and 3 can’t work |
| NTT DOCOMO | We can live with proposal 1. Regarding proposals 2 and 3, we still prefer Xiaomi’s proposals in issue 3-1-1, but, as an alternative, if the proposals 2 and 3 in issue 3-1-2 applies only to intra-band EN-DC for B48/n48, we can accept while other band combinations follow the proposals in issue 3-1-1. |
| Google | As long as no band combination will be removed, we are fine to send a LS. Since there might be some Rel-16 UE which are under implementation, we would like to propose a compromise solution - our proposals in Rel-16 and new signaling introduction in Rel-17. |
| Moderator summary: All proposals get against, none can be agreed. | |

**Issue 3-1-3: Views on proposals from paper R4-2213631**

**Proposal 1:** IntraBandENDC-Support IE 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.

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| **Company** | **Comments** |
| xxx |  |
|  |  |
| Ericsson | Proposal 1: this could resolve remaining cases in the proposed in R4-2212581. |
| Nokia(HO) | Ok to send a LS but the capability ignaling should be decided by RAN2 without indicating any recommended solution.  The proposed solution is not flexible enough for all complicated combinations. |
| Huawei, Hisilicon | We are ok with the proposals. Besides, the capability of should be indicated in UL and DL separately per band combination |
| Xiaomi | we are OK for introducing newUE capability to indicate the contiguous or non-contiguous in UL and DL separately |
| NTT DOCOMO | We are OK to send a LS. |
| Google | Agree with Nokia. As long as no band combination will be removed, we are fine to send a LS. Since there might be some Rel-16 UE which are under implementation, we would like to propose a compromise solution - our proposals in Rel-16 and new signaling introduction in Rel-17. |
| Moderator summary:  All companies agree to send LS to RAN2 ask for support in potentially introduce new signaling.  LS should cover aspects that is necessary in this topic communicate with RAN2, not only the UL and DL differentiation. LS will be discussed in 2nd round. | |

### Sub-topic 3-2: TDD RMC for Intra-band EN-DC

**Issue 3-2-1: Views on proposals from paper R4-2212534**

**Proposal 1:** Choose one of the following options to solve the identified issue:

* Option 1: Use in TS 38.101-3 the compatible E-UTRA TDD uplink-downlink configuration #1 and NR TDD UL/DL patterns (SCS of 15kHz, 30kHz and 60kHz) already used in TS 38.133.
* Option 2: Specify in TS 38.101-3 (please see Annex A of this contribution for possible update of TS) the need to apply a +3ms time offset to the NR “TDD Slot Configuration pattern” relative the E-UTRA “Uplink-downlink configuration” for TDD Intra-band EN-DC.

|  |  |
| --- | --- |
| **Company** | **Comments** |
| Rohde & Schwarz | Thanks to Anritsu for bringing this issue up. As also stated in the paper this issue has already been solved in RAN5 by Time-shifting the RMC. So we are not in favor of introducing a new RMC, but we can accept to also take the RAN5 information to RAN4 specs.  However, the proposed Note from the Annex, does not match what is already being used in RAN5 conformance testing:  (“*For the case of testing overlapping E-UTRA and NR UL transmission scenario when both bands are TDD, ensure E-UTRA UL transmission overlaps with NR UL transmission in time by giving SCG a delay of 3 E-UTRA subframes, or by giving MCG a delay of 2 subframes*.”)  So we would suggest to align the wording in the Note to what is already being used by RAN5 and also indicate that the shifting is only needed in case when overlapping transmissions are required. |
| Anritsu | Thanks Rohde & Schwarz. You are right using the description used in RAN5 in the TS 38.101-3 may be clearer, the DraftCR should then be changed accordingly. |
| Moderator summary: It is agreed to use the RAN5 description and add to TS 38.101-3. | |

## Companies views’ collection for 1st round

### CRs/TPs comments collection

|  |  |  |  |
| --- | --- | --- | --- |
| **T-doc number** | **Company** | **Title** | **Comments collection** |
| R4-2211579  R4-2211580 (CAT-A)  R4-2211581 (CAT-A) | Rohde & Schwarz | Addition of missing Additional Spurious Emissions Clause | Huawei: In general we agree with this CR. But some issues shall be fixed:  First, the format seems incorrect, all 6.5B.4.xxx share the same indentation.  Second, the following highlighted part is quoting “Spurious emission for UE co-existence” instead of “Additional spurious emissions” in the spec, is this aligned with the intention? If not, it shall be changed to “6.5.3.3, 6.5A.3.3”.    Rohde & Schwarz: @Huawei, thanks for the comments, we can fix the indentations in a revision in the second round. The highlighted part is a copy & paste mistake, we will also fix in a revision in the second round. |
| R4-2211793->  R4-2211793r1 | KDDI | Draft CR for updating the note of mandatory simultaneous Rx/Tx capability for FR1 and FR2 EN-DC combinations | *Moderator note:* No change marks in the CR, and it was revised to R4-2211793r1 before meeting. KDDI : R4-2211793 has been revised to **[Rev\_R4-2211793\_Rel-16 CR 38.101-3 simultaneous TxRx EN-DC.docx](https://www.3gpp.org/ftp/tsg_ran/WG4_Radio/TSGR4_104-e/Inbox/Drafts/%5B104-e%5D%5B101%5D%20R15_R16_Maintenance/revised%20T-docs/Rev_R4-2211793_Rel-16%20CR%2038.101-3%20simultaneous%20TxRx%20EN-DC.docx)**  Qualcomm: This CR is not needed and will create confusion in the spec. We already have a sentence in the spec clearly stating that the simultaneous Rx-Tx capability for each band pair applies for the higher order combinations. This was introduced to avoid the issue created by having to put notes on all possible Ca combos of any order. The changes are redundant. Also, this CR does not introduce the note for all the band combinations which would have mandatory Rx-Tx so someone looking at the spec could interpret that the capability is not mandatory for other combinations.  Ericsson: we support this CR.  CHTTL: in our understanding, there is no need to update the note for “Inter-band EN-DC configurations including FR2”, since it was agreed that sim Tx/Rx is supported between LTE + FR2 EN-DC, so the NOTE 2 in those tables actually mentions it is applied “for all of the above combinations. |
| R4-2212012  R4-2212013 (CAT-A) | Samsung | Cat F Rel-16 Draft CR to 38.101-3 to correct the requirement of Type2 non-collocated ENDC deployement | Ericsson: alternatively, remove the "inter-band EN-DC" from NOTE 11.  Nokia(HO): Is this draft correct? Coversheet and changes do not look aligned.  Huawei(ZP): Ericsson’s suggestion seem more appropriate.  Samsung: Thank you Christian, Henry, very good suggestion, I accept. Hisashi-San, yes this draft is correct. |
| R4-2212026  R4-2212027 (CAT-A)  R4-2212028 (CAT-A) | Samsung | Cat F Rel-15 Draft CR to 38.101-3 update of simultaneous RxTx capability for band combinations | Qualcomm: we do not agree with the CR. The text is redundant and confusing. The current text was extensively discussed, it is clear enough.  CHTTL: Support, the proposed text is an extended clarification from the existing text in the spec.  Huawei, Hisilicon: In general, we are ok with the CR.  KDDI : Support the proposed text.  Samsung: The proposed test is an extended deduction and clarification from existing text in current spec, in fact we could not think of a counterexample. The benefit is operators could stop fixing the problem for higher order combinations by adding note which is inefficient. With the proposed description, the capability for higher order combination is clear. Response to Qualcomm, where confusing? |
| R4-2212364 | Apple | Draft CR for TS 38.101-3 Rel-15: Corrections on band combinations for UE co-existence | Nokia(HO): We should not make maintenance of Rel-15/16 UE co-existence any more.  Apple: Thanks for the feedback. I agree that at some point maintenance should stop for the older versions. Hope this is still fine for this meeting. |
| R4-2212365 | Apple | Draft CR for TS 38.101-3 Rel-16: Corrections on band combinations for UE co-existence | Nokia(HO): We should not make maintenance of Rel-15/16 UE co-existence any more.  Apple: Thanks for the feedback. I agree that at some point maintenance should stop for the older versions. Hope this is still fine for this meeting. |
| R4-2212366 | Apple | CR for TS 38.101-3 Rel-17: Corrections on band combinations for UE co-existence | *Moderator note: This is formal CR.* |
| R4-2212540 | Anritsu | Correction to Channel BW for n38 in 7.3 B.2.3 |  |
| R4-2212541 | Anritsu | Correction to Channel BW for n38 in 7.3 B.2.3 |  |
| R4-2212582  R4-2212583 (CAT-A) | Xiaomi | Draft CR for 38.101-3 Rel-16 to correct band combination for intra-band ENDC | *Moderator note: This depends on R4-2212581 conclusion in issue 3-1-1.*  Ericsson: agreeable, suggested changes in sub-topic 3-1-1. The CR can be agreed notwithstanding the proposal by Huawei for Rel-18. |
| R4-2212852 | Google | Draft CR for 38.101-3 Rel-16 intra-band contiguous EN-DC band combination | *Moderator note: This depends on R4-2212850 conclusion in issue 3-1-2.*  Ericsson: not agreed, the capability indication cannot be BC-combination specific. The problems can be solved by differentiating the intraBandENDC-Support in the UL and DL and maximize the number of sub-blocks for mixed combinations to 2.  Huawei, Hisilicon: we don’t agree with the change. IntraBandENDC-Support IE should be indicated in UL and DL separately per band combination. RAN4 should confirm with RAN2 about introducing new UE capability. |
| R4-2212854 | Google | Draft CR for 38.101-3 Rel-17 intra-band contiguous EN-DC band combination | *Moderator note: This depends on R4-2212850 conclusion in issue 3-1-2.*  Ericsson: not agreed, the UL configuration should be removed, the corresponding non-contiguous DL configurations are already specified. RAN4 does not specify what is reported.  Huawei, Hisilicon: we don’t agree with the change. Comments are same as those to R4-2212852 |
| R4-2212855 | Google | Draft CR for 38.101-3 Rel-16 intra-band non-contiguous EN-DC band combination | *Moderator note: This depends on R4-2212850 conclusion in issue 3-1-2.*  Ericsson: not agreed, see comments to 3-1-2.  Huawei, Hisilicon: we don't agree with the change. We share the similar view with Ericsson. |
| R4-2212862 | Google | Draft CR for 38.101-3 Rel-17 intra-band non-contiguous EN-DC band combination | *Moderator note: This depends on R4-2212850 conclusion in issue 3-1-2.*  Ericsson: not agreed, see comments to 3-1-2.  Huawei, Hisilicon: we don't agree with the change. We share the similar view with Ericsson. |
| R4-2212728  R4-2212729 (CAT-A) | ZTE | draft CR to TS38.101-3[R16] Clarification on REFSEN for inter-band CA | Nokia(HU): OK, but better to place “,” immediately after “For NR CA operation”.  Huawei(ZP): The first change " and CA operation of " can be removed. Otherwise, it will change the original meaning.  ZTE: To Nokia, fine to add ‘,’ .we can revised it.  To huawei: It didn’t change the original meaning. In rel-15, there are no FR2-FR2 inter-band CA, and there is no 3DL FR1-FR1-FR2 inter-band CA band combination, so it is ok to say single carrier OF REFSEN. However, from Rel-16 onwards. FR2-FR2 inter-band CA and 3DL FR1-FR1-FR2 band combination are supported, so it this case, we should add " and CA operation of " to cover these cases. Also it is included in inter-band ENDC including FR2, similar situation. |
| R4-2213137 R4-2213138 (CAT-A)  R4-2213139 (CAT-A) | Huawei | Draft CR for 38.101-3 to improve the wording for simultaneousRxTx clarification(R15) | Qualcomm: we do not agree with the CR, the change is redundant. The current text is already clear enough.  SoftBank-M: The same comment in R4-2213134.  (Note that it seems like the above comment from Softbank is placed at the wrong place, I moved it to here)  CHTTL: same view as Softbank that the CR seems not reflecting the same meaning as the original WF.  Huawei(ZP): I can revise this CR based on what we have agreed. Anyway, the wording in current spec cause some misunderstanding.  ZTE: It seems changing the meanings of the original WF.  NTT DOCOMO: Same comments in R4-2213134. |
| R4-2213140  R4-2213141 (CAT-A) | Huawei | Draft CR for 38.101-3 To remove the frequency restriction for DC\_28\_n5 (R16) | Skyworks: This CR cannot be agreed since the frequency range restriction was the fundamental assumption used to derive the RF requirements for this band combination.  CHTTL: we are wondering whether the legacy device will be impacted by removing the restriction at the later stage? Also the 28 DL will be closer to n5 UL after the note removal, there might have impacts on the existing requirements.  Huawei(ZP): We can introduce some MSD to remove the frequency range restriction since CA\_n5-n28 has no such restriction.  ZTE: Similar question as CHTTL.  Skyworks: The reason for our concern on this CR is that the MSD due to crossband isolation was specified assuming the n28A frequency range, so the CR needs to update the test point. We can indeed re-use the recently agreed test point from CA\_n5-n28.  OPPO: The reasoning in the cover page says “NS\_17 is applied to DC\_28\_n5, so the 703~733 frequency restriction for DC\_28\_n5 is contradictory to the real deployment”, not quite clear what does real deployment here means…  Skyworks: to further clarify: our concern is on updating the MSD test point. As discussed above, the n28 range restriction was lifted in NR-CA for CA\_n5-n28, so the correction could be based on the NRCA agreement. |

## Summary for 1st round

### Open issues

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

|  |  |
| --- | --- |
|  | **Status summary** |
| **Issue 3-1-1: Views on proposals from paper R4-2212581** | *Tentative agreements: Proposal 2 and 3.*  For proposal 1, get negative view from three companies, is not agreeable.  For proposal 2, seems agreeable except one question for clarification from Google.  For proposal 3, seems agreeable but with wording improvement as Ericsson commented.  Besides, Nokia commented that probably can ask RAN2 whether flexible signaling can be provided. And HW commented the capability should be UL and DL separately indicated.  *Candidate options:*  *Recommendations for 2nd round:* Discuss based on Revision of R4-2212582 in 2nd round, and the LS to RAN2. |
| **Issue 3-1-2: Views on proposals from paper R4-2212850** | *Tentative agreements: None*  All proposals get against, none can be agreed.  *Candidate options:*  *Recommendations for 2nd round:* |
| **Issue 3-1-3: Views on proposals from paper R4-2213631** | *Tentative agreements: Send LS to RAN2 on this topic*  All companies agree to send LS to RAN2 ask for support in potentially introduce new signaling.  LS should cover aspects that is necessary in this topic communicate with RAN2, not only the UL and DL differentiation. LS will be discussed in 2nd round.  *Candidate options:*  *Recommendations for 2nd round:* Discuss based on Revision of R4-2212582 in 2nd round, and the LS to RAN2. |
| **Issue 3-2-1: Views on proposals from paper R4-2212534** | *Tentative agreements:* It is agreed to use the RAN5 description and add to TS 38.101-3.  *Candidate options:*  *Recommendations for 2nd round:* |

### CRs/TPs

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

|  |  |  |  |
| --- | --- | --- | --- |
| **T-doc number** | **Company** | **Title** | **Summary** |
| R4-2211579  R4-2211580 (CAT-A)  R4-2211581 (CAT-A) | Rohde & Schwarz | Addition of missing Additional Spurious Emissions Clause | Revise |
| R4-2211793->  R4-2211793r1 | KDDI | Draft CR for updating the note of mandatory simultaneous Rx/Tx capability for FR1 and FR2 EN-DC combinations | *Moderator note:* No change marks in the CR, and it was revised to R4-2211793r1 before meeting.  Not pursued |
| R4-2212012  R4-2212013 (CAT-A) | Samsung | Cat F Rel-16 Draft CR to 38.101-3 to correct the requirement of Type2 non-collocated ENDC deployement | Revise |
| R4-2212026  R4-2212027 (CAT-A)  R4-2212028 (CAT-A) | Samsung | Cat F Rel-15 Draft CR to 38.101-3 update of simultaneous RxTx capability for band combinations | Return to |
| R4-2212364 | Apple | Draft CR for TS 38.101-3 Rel-15: Corrections on band combinations for UE co-existence | Agreeable |
| R4-2212365 | Apple | Draft CR for TS 38.101-3 Rel-16: Corrections on band combinations for UE co-existence | Agreeable |
| R4-2212366 | Apple | CR for TS 38.101-3 Rel-17: Corrections on band combinations for UE co-existence | *Moderator note: This is formal CR.*  Agreeable |
| R4-2212540 | Anritsu | Correction to Channel BW for n38 in 7.3 B.2.3 | Agreeable |
| R4-2212541 | Anritsu | Correction to Channel BW for n38 in 7.3 B.2.3 | Agreeable |
| R4-2212582  R4-2212583 (CAT-A) | Xiaomi | Draft CR for 38.101-3 Rel-16 to correct band combination for intra-band ENDC | *Moderator note: This depends on R4-2212581 conclusion in issue 3-1-1.*  Revise |
| R4-2212852 | Google | Draft CR for 38.101-3 Rel-16 intra-band contiguous EN-DC band combination | *Moderator note: This depends on R4-2212850 conclusion in issue 3-1-2.*  Not pursued |
| R4-2212854 | Google | Draft CR for 38.101-3 Rel-17 intra-band contiguous EN-DC band combination | *Moderator note: This depends on R4-2212850 conclusion in issue 3-1-2.*  Not pursued |
| R4-2212855 | Google | Draft CR for 38.101-3 Rel-16 intra-band non-contiguous EN-DC band combination | *Moderator note: This depends on R4-2212850 conclusion in issue 3-1-2.*  Not pursued |
| R4-2212862 | Google | Draft CR for 38.101-3 Rel-17 intra-band non-contiguous EN-DC band combination | *Moderator note: This depends on R4-2212850 conclusion in issue 3-1-2.*  Not pursued |
| R4-2212728  R4-2212729 (CAT-A) | ZTE | draft CR to TS38.101-3[R16] Clarification on REFSEN for inter-band CA | Revise |
| R4-2213137 R4-2213138 (CAT-A)  R4-2213139 (CAT-A) | Huawei | Draft CR for 38.101-3 to improve the wording for simultaneousRxTx clarification(R15) | Revise |
| R4-2213140  R4-2213141 (CAT-A) | Huawei | Draft CR for 38.101-3 To remove the frequency restriction for DC\_28\_n5 (R16) | Revise |

## Discussion on 2nd round (if applicable)

*Moderator can provide summary of 2nd round here. Note that recommended decisions on tdocs should be provided in the section titled ”Recommendations for Tdocs”.*

# Topic #4: TR38.817-01

## Companies’ contributions summary

|  |  |  |  |
| --- | --- | --- | --- |
| **T-doc number** | **Company** | **Title** | **Proposals / Observations** |
| R4-2211800  R4-2211801 (CAT-A) | Nokia | Draft CR to TR 38.817-01 on calculations of sync raster GSCN per operating band |  |

## Companies views’ collection for 1st round

### CRs/TPs comments collection

|  |  |  |  |
| --- | --- | --- | --- |
| **T-doc number** | **Company** | **Title** | **Comments collection** |
| R4-2211800  R4-2211801 (CAT-A) | Nokia | Draft CR to TR 38.817-01 on calculations of sync raster GSCN per operating band |  |

## Summary for 1st round

### CRs/TPs

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

|  |  |  |  |
| --- | --- | --- | --- |
| **T-doc number** | **Company** | **Title** | **Summary** |
| R4-2211800  R4-2211801 (CAT-A) | Nokia | Draft CR to TR 38.817-01 on calculations of sync raster GSCN per operating band | Agreeable |

# Topic #5: 36.101

## Companies’ contributions summary

|  |  |  |  |
| --- | --- | --- | --- |
| **T-doc number** | **Company** | **Title** | **Proposals / Observations** |
| R4-2212352 | Apple | Clarifications on LTE P-Max definition | Proposal: The concerned LTE network stakeholders to clarify as whether their networks would signal P-Max higher than the default power class or not for supporting HPUE. |
| R4-2212358 | Apple | Draft CR for TS 36.101 Rel-15: Corrections on band combinations for UE co-existence |  |
| R4-2212359 | Apple | Draft CR for TS 36.101 Rel-16: Corrections on band combinations for UE co-existence |  |
| R4-2212360 | Apple | CR for TS 36.101 Rel-17: Corrections on band combinations for UE co-existence |  |
| R4-2213142  R4-2213143 (CAT-A)  R4-2213144 (CAT-A) | Huawei | Draft CR for 36.101 to clarify the logical ambiguity in A-MPR clause (R10) |  |
| R4-2213145  R4-2213146 (CAT-A) | Huawei | Draft CR for 36.101 to clarify the logical ambiguity in A-MPR clause (R13) |  |
| R4-2213147 | Huawei | Draft CR for 36.101 to clarify the logical ambiguity in A-MPR clause (R15) |  |
| R4-2213148  R4-2213149 (CAT-A) | Huawei | Draft CR for 36.101 to clarify the logical ambiguity in A-MPR clause (R16) |  |

## Open issues summary

### Sub-topic 5-1: Clarifications on LTE P-Max definition

**Issue 5-1-1: Views on proposals from paper R4-2212352**

**Proposal:** The concerned LTE network stakeholders to clarify as whether their networks would signal P-Max higher than the default power class or not for supporting HPUE.

|  |  |
| --- | --- |
| **Company** | **Comments** |
| KDDI | In general, we believe that operators who want to introduce HPUE should change their network operation from P-max=absence to P-max=26dBm (PC3). The default power class change is helpful to operators who introduce HPUE, but also it’s non-backward compatible for operators who don’t introduce HPUE, since it requires those operators to change their network operation from P-max=absence to P-max=23dBm (PC3). For some spectrum not used widely, there may be possibilities to change default power class, but we should check its impacts on the current network operations carefully. |
| SoftBank-M | In Japan, currently high power is allowed only in B41(26dBm). In other bands, only 23dBm is allowed. |
| Nokia(HU) | p-Max is set to higher value than default power class according to necessity, bands and/or regulations. On the other hand, current RAN2 spec assumes that setting p-Max to absent means that declared maximum output power is expected so that some modifications in RAN2 spec might be necessary (should be asked from RAN2). |
| CMCC (Xiaoran) | This was discussed before. In LTE stage, China Mobile deployed band 41 network and introduce HPUE without signaling P-max. We discussed this before, if we change the existing spec to let network signal P-max=26dBm in order to allow HPUE, it will has huge impact on our existing commercial network.  For other PC2 bands (e.g. n40), in our view, the same logic should apply, for the already deployed network, if allowing HPUE needs additional signaling, it means that all the existing networks need to be updated, which is difficult in practice. |
| CHTTL | We also have similar situation as Japan regarding the LTE HPUE allowance, also per band maximum output power limit is introduced in our regulatory. |
| NTT DOCOMO | In Japan, high power UE is only allowed in B41, and we are not operating HPUE so far.  Regarding P-max definition for “bands other than Band 41”, our understanding is that bands other than Band 41 needs P-max indication higher than default power class if NW wants to activate HPUE as stead in section 6.2.2 in TS 36.101. RAN2 spec anyway refers to 6.2.2 in TS 36.101, so there are no misalignment between RAN2 and RAN4 specification at least in our understanding (but OK for some clarification if needed). |
| Apple | Our intention for this contribution is to collect the inputs from Operators on whether their LTE networks (other than B41) supporting HPUE would broadcast P-Max at least equal to or higher than 26 dBm in order to enable capable UE for HPUE operation. Unfortunately, no Operator seemed to have provided the needed information yet. As UE’s behavior needs to align with network’s procedure in order to realize the HPUE operation or to avoid the violation of P-Max regulation for certain country/region, it is very crucial to clarify the HPUE network procedure.  Since HPUE has been defined for the following LTE bands, can we give another try to see if the concerned Operators can help provide the needed information in the table below?   |  |  |  |  | | --- | --- | --- | --- | | Band | Power Class | P-Max broadcast? | Operator | | 3 | PC1 |  |  | | 14 | PC1 | No | AT&T | | 20 | PC1 |  |  | | 28 | PC1 |  |  | | 31 | PC1 |  |  | | 38 | PC2 |  |  | | 40 | PC2 |  |  | | 41 | PC2 | No | CMCC | | 42 | PC2 |  |  | | 47 | PC2 |  |  | | 72 | PC1 |  |  | | 87 | PC1 |  |  | | 88 | PC1 |  |  | |
| AT&T | We have added our position in the table above. We need to ensure that Public Safety PC1 Ues transmit at maximum capable output power if p-Max is not signaled as originally defined in RAN4/RAN2 for Band 14 when it was introduced. This would also align with PC1 case for NR band n14 where PC1 UE would transmit at the supported power class if p-Max is not signaled. |
| Moderator summary: Information are collected, and proponent would like to have another round information collection. In 2nd round, no more extended discussion is needed due to time limitation, and can focus on the table provided by Apple. | |

## Companies views’ collection for 1st round

### CRs/TPs comments collection

|  |  |  |  |
| --- | --- | --- | --- |
| **T-doc number** | **Company** | **Title** | **Comments collection** |
| R4-2212358 | Apple | Draft CR for TS 36.101 Rel-15: Corrections on band combinations for UE co-existence |  |
| R4-2212359 | Apple | Draft CR for TS 36.101 Rel-16: Corrections on band combinations for UE co-existence |  |
| R4-2212360 | Apple | CR for TS 36.101 Rel-17: Corrections on band combinations for UE co-existence |  |
| R4-2213142  R4-2213143 (CAT-A)  R4-2213144 (CAT-A) | Huawei | Draft CR for 36.101 to clarify the logical ambiguity in A-MPR clause (R10) |  |
| R4-2213145  R4-2213146 (CAT-A) | Huawei | Draft CR for 36.101 to clarify the logical ambiguity in A-MPR clause (R13) |  |
| R4-2213147 | Huawei | Draft CR for 36.101 to clarify the logical ambiguity in A-MPR clause (R15) |  |
| R4-2213148  R4-2213149 (CAT-A) | Huawei | Draft CR for 36.101 to clarify the logical ambiguity in A-MPR clause (R16) |  |

## Summary for 1st round

### Open issues

|  |  |
| --- | --- |
|  | **Status summary** |
| **Issue 5-1-1: Views on proposals from paper R4-2212352** | *Tentative agreements: None*  Information are collected, and proponent would like to have another round information collection. In 2nd round, no more extended discussion is needed due to time limitation, and can focus on the table provided by Apple.  *Candidate options:*  *Recommendations for 2nd round:* No more extended discussion is needed due to time limitation, and can focus on the table provided by Apple. |

### CRs/TPs

|  |  |  |  |
| --- | --- | --- | --- |
| **T-doc number** | **Company** | **Title** | **Summary** |
| R4-2212358 | Apple | Draft CR for TS 36.101 Rel-15: Corrections on band combinations for UE co-existence | Agreeable |
| R4-2212359 | Apple | Draft CR for TS 36.101 Rel-16: Corrections on band combinations for UE co-existence | Agreeable |
| R4-2212360 | Apple | CR for TS 36.101 Rel-17: Corrections on band combinations for UE co-existence | Agreeable |
| R4-2213142  R4-2213143 (CAT-A)  R4-2213144 (CAT-A) | Huawei | Draft CR for 36.101 to clarify the logical ambiguity in A-MPR clause (R10) | Agreeable |
| R4-2213145  R4-2213146 (CAT-A) | Huawei | Draft CR for 36.101 to clarify the logical ambiguity in A-MPR clause (R13) | Agreeable |
| R4-2213147 | Huawei | Draft CR for 36.101 to clarify the logical ambiguity in A-MPR clause (R15) | Agreeable |
| R4-2213148  R4-2213149 (CAT-A) | Huawei | Draft CR for 36.101 to clarify the logical ambiguity in A-MPR clause (R16) | Agreeable |

## Discussion on 2nd round (if applicable)

*Moderator can provide summary of 2nd round here. Note that recommended decisions on tdocs should be provided in the section titled ”Recommendations for Tdocs”.*

# Recommendations for Tdocs

## 1st round

**New tdocs**

|  |  |  |  |
| --- | --- | --- | --- |
| **New Tdoc number** | **Title** | **Source** | **Comments** |
|  | WF on 30MHz reconfiguration failure when accessing 40MHz network of n28 | CMCC |  |
|  | WF on clarification of the NS mapping from RAN2 to RAN4 | Qualcomm |  |
|  | WF on EIRP-based test metric for FR2 SEM | Apple |  |
|  | LS on intrabandENDC-Support | Huawei | To: RAN2 |

**Existing tdocs**

**38.101-1**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **T-doc number** | **Revised to** | **Title** | **Source** | **Recommendation** | **Comments** |
| R4-2211552 |  | AdditionalSpectrumEmission in NR CA for n77 in the USA | Nokia | Revise |  |
| R4-2212769  R4-2212770 (CAT-A) |  | Amendments to requirements for n77 operations in the US | Ericsson | Noted |  |
| R4-2211574 |  | Correction to n46 channel raster | Rohde & Schwarz | Agreeable |  |
| R4-2211575  R4-2211576 (CAT-A)  R4-2211577  (CAT-A) |  | Update of UL MIMO transmit quality definitions | Rohde & Schwarz | Revise |  |
| R4-2211621  R4-2214052 (CAT-A) |  | Correction of A-MPR for NS\_50 | Huawei | Agreeable |  |
| R4-2211791  R4-2211791r1 |  | Draft CR for updating the note of mandatory simultaneous Rx/Tx capability for FR1 NR-CA combinations | KDDI | R4-2211791r1 is Agreeable | Moderator note: No change marks in the CR, and it was revised to R4-2211791r1 before meeting starts. |
| R4-2212018  R4-2212019 (CAT-A) |  | Cat F Rel-16 Draft CR to 38.101-1 to correct the typo of CA carrier leakage | Samsung | Agreeable |  |
| R4-2212022  R4-2212023 (CAT-A)  R4-2212024 (CAT-A) |  | Cat F Rel-15 Draft CR to 38.101-1 update of simultaneous RxTx capability for band combinations | Samsung | Return to |  |
| R4-2212702  R4-2212703 (CAT-A)  R4-2212704 (CAT-A) |  | Draft CR on 38.101-1 for allowing exception for n28 minimum guard band requirements | CMCC | Postponed |  |
| R4-2212771  R4-2212772 (CAT-A) |  | Guardbands for channel bandwidths confined in sub-ranges of a band | Ericsson | Postponed |  |
| R4-2212222  R4-2212249 (CAT-A) |  | Draft CR to 38101-1-gc1 for n41 relevant MSD test frequencies | MediaTek | Revise |  |
| R4-2212361 |  | Draft CR for TS 38.101-1 Rel-15: Corrections on band combinations for UE co-existence | Apple | Revise |  |
| R4-2212362 |  | Draft CR for TS 38.101-1 Rel-16: Corrections on band combinations for UE co-existence | Apple | Revise |  |
| R4-2212363 |  | CR for TS 38.101-1 Rel-17: Corrections on band combinations for UE co-existence | Apple | Revise | Moderator note: This is a formal CR |
| R4-2212536  R4-2212537 (CAT-A) |  | Correction to EVM measurement point for DFTs-OFDM DM-RS Type 2 | Anritsu | Revise |  |
| R4-2212542 |  | Draft CR to update Pcmax tolerance for PC1.5 | Anritsu | Not pursued. |  |
| R4-2212603  R4-2212604 (CAT-A) |  | Draft CR to 38.101-1: Corrections on Pcmax for UL MIMO to support PC1.5 29dBm | Xiaomi | Agreeable |  |
| R4-2212563  R4-2212564 (CAT-A) |  | Draft CR to TS38.101-1[R15] Corrections on Output power dynamics | ZTE | Agreeable |  |
| R4-2212709 |  | draft CR to TS38.101-1: 4Rx for inter-band NR CA | ZTE | Revise |  |
| R4-2212710 |  | draft CR to TS38.101-1: 4Rx for inter-band NR CA | ZTE | Revise |  |
| R4-2212711 |  | draft CR to TS38.101-1: 4Rx for inter-band NR CA | ZTE | Revise |  |
| R4-2212733  R4-2212734 (CAT-A) |  | Draft CR to TS38.101-1: Correction on terms for NR DC Pcmax | ZTE | Return to |  |
| R4-2213134  R4-2213135 (CAT-A)  R4-2213136  (CAT-A) |  | Draft CR for 38.101-1 to improve the wording for simultaneousRxTx clarification(R15) |  | Revise |  |
| R4-2213224 |  | draftCR to 38.101-1 Corrections to tables with wrong unit declarations | Nokia | Agreeable |  |
| R4-2213319 |  | R16 Draft CR on power class of each band in inter-band UL CA | OPPO | Return to |  |
| R4-2213325 |  | R15 FR1 Draft CR on clarification of DC location with 3300 and 3301 in TSQ requirement | OPPO | Not pursued |  |
| R4-2213326 |  | R16 FR1 Draft CR on clarification of DC location with 3300 and 3301 in TSQ requirement | OPPO | Not pursued |  |
| R4-2213362  R4-2213363 (CAT-A) |  | Correction to intra-band CA requirements | Huawei | Agreeable |  |
| R4-2213732  R4-2213733 (CAT-A) |  | draft CR for TS 38.101-1: correction on intra-band UL CA contiguous CA requirement (Rel-16) | Huawei | Return to |  |
| R4-2213993  R4-2213994 (CAT-A)  R4-2213995 (CAT-A) |  | Correction to NS\_05 frequency range | Qualcomm | Revise |  |
| R4-2214070 |  | Editorial clean-up | Qualcomm | Agreeable | Moderator note: Formal CR |
| R4-2214071 |  | Editorial clean-up | Qualcomm | Agreeable | Moderator note: Formal CR |
| R4-2211538 |  | Discussion on additionalSpectrumEmission signalling in NR UL CA for n77 in US or Canada | Mediatek | Noted |  |
| R4-2212066 |  | 30 MHz UE in 40MHz network | Nokia | Noted |  |
| R4-2212139 |  | Operation with Different Channel BWs in n28 | Qualcomm | Noted |  |
| R4-2212319 |  | 30MHz reconfiguration failure when accessing 40MHz network of n28 | CMCC | Noted |  |
| R4-2213629 |  | Discussion on 30MHz reconfiguration failure when accessing 40MHz network of n28 | Huawei | Noted |  |
| R4-2212369 |  | Discussion on 40MHz gNB for band n28 | Apple | Noted |  |
| R4-2212368 |  | Discussion on UE coexistence | Apple | Noted |  |
| R4-2212530 |  | RMC related aspects for FR1 UL coherent MIMO | Anritsu | Noted |  |
| R4-2212708 |  | On 4Rx MSD for inter-band NR CA | ZTE | Noted |  |
| R4-2212768 |  | Draft LS to RAN2 on simultaneous Rx-Tx for band pairs of an advertised BC | Ericsson | Noted |  |

**38.101-2**

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| **T-doc number** | **Revised to** | **Title** | **Source** | **Recommendation** | **Comments** |
| R4-2211922  R4-2211923  (CAT-A)  R4-2211924 (CAT-A) |  | Modification on maiximum ouput power related terminology | Apple | R4-2211922 is agreeable  R4-2211924 is revised | *Moderator notes:*  *Rel-15 formal CR;*  *R4-2211924 is Rel-16 CAT-A CR but already uploaded before meeting.* |
| R4-2211919  R4-2211919r1  R4-2211920 (CAT-A) |  | On Beam correspondence requirement in R15 | Apple | Revise | Moderator notes: Revision is made before the meeting starts. |
| R4-2211921  R4-2211921r1 |  | On Beam correspondence requirement in R17 | Apple | Revise | Moderator notes: Revision is made before the meeting starts. |
| R4-2212349  R4-2212350 (CAT-A)  R4-2212351 (CAT-A) |  | Draft CR for TS 38.101-2: Change FR2 SEM verification test metric | Apple | Postpone |  |
| R4-2212334 |  | Clarification of MPR applicable to a Rel-16 FR2 UE | Qualcomm | Not pursued |  |
| R4-2213321  R4-2213322 (CAT-A) |  | R15 Draft CR on modifiedMPRbehavior for FR2 | OPPO | Not pursued |  |
| R4-2212387  R4-2212388 (CAT-A) |  | Draft CR for clarification on Maximum input and ACS and IBB for FR2 DL intra and inter combinations for TS 38.101-2 | NTT DOCOMO | agreeable |  |
| R4-2212538  R4-2212539 (CAT-A) |  | Correction to EVM measurement point for DFTs-OFDM DM-RS Type 2 | Anritsu | agreeable |  |
| R4-2212584  R4-2212585 (CAT-A)  R4-2212586 (CAT-A) |  | Draft CR for Rel-15 38.101-2 to correct the configured transmitted power | Xiaomi | agreeable |  |
| R4-2212730 |  | draft CR to TS38.101-2[R15] Introduce symbols of delta RIBC and delta RIBNC for intra-band CA | ZTE | Return to |  |
| R4-2212731  R4-2212732 (CAT-A) |  | draft CR to TS38.101-2[R16] Introduce symbols of delta RIBC and delta RIBNC for intra-band CA | ZTE | agreeable |  |
| R4-2213226 |  | draftCR to 38.101-2 Corrections to tables with wrong unit declarations | Nokia | agreeable |  |
| R4-2213324 |  | R16 Draft CR on clarification of FR2 CA DC location reporting | OPPO | Return to |  |
| R4-2213327 |  | R15 FR2 Draft CR on clarification of DC location with 3300 and 3301 in TSQ requirement | OPPO | Not pursued |  |
| R4-2213328 |  | R16 FR2 Draft CR on clarification of DC location with 3300 and 3301 in TSQ requirement | OPPO | Not pursued |  |
| R4-2213734  R4-2213735 (CAT-A)  R4-2213736 (CAT-A) |  | draft CR for 38.101-2 revison on MIMO receiver characteristics (Rel-15) | Huawei | Return to |  |
| R4-2212067 |  | On EIRP-based test metric for FR2 SEM | Nokia |  |  |
| R4-2212328 |  | On changing SEM verification to a directional test | Qualcomm |  |  |
| R4-2212348 |  | EIRP-based test metric for FR2 SEM verifications | Apple |  |  |

**38.101-3**

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| **T-doc number** | **Revised to** | **Title** | **Source** | **Recommendation** | **Comments** |
| R4-2211579  R4-2211580 (CAT-A)  R4-2211581 (CAT-A) |  | Addition of missing Additional Spurious Emissions Clause | Rohde & Schwarz | Revise |  |
| R4-2211793->  R4-2211793r1 |  | Draft CR for updating the note of mandatory simultaneous Rx/Tx capability for FR1 and FR2 EN-DC combinations | KDDI | Not pursued | *Moderator note:* No change marks in the CR, and it was revised to R4-2211793r1 before meeting. |
| R4-2212012  R4-2212013 (CAT-A) |  | Cat F Rel-16 Draft CR to 38.101-3 to correct the requirement of Type2 non-collocated ENDC deployement | Samsung | Revise |  |
| R4-2212026  R4-2212027 (CAT-A)  R4-2212028 (CAT-A) |  | Cat F Rel-15 Draft CR to 38.101-3 update of simultaneous RxTx capability for band combinations | Samsung | Return to |  |
| R4-2212364 |  | Draft CR for TS 38.101-3 Rel-15: Corrections on band combinations for UE co-existence | Apple | Agreeable |  |
| R4-2212365 |  | Draft CR for TS 38.101-3 Rel-16: Corrections on band combinations for UE co-existence | Apple | Agreeable |  |
| R4-2212366 |  | CR for TS 38.101-3 Rel-17: Corrections on band combinations for UE co-existence | Apple | Agreeable | *Moderator note: This is formal CR.* |
| R4-2212540 |  | Correction to Channel BW for n38 in 7.3 B.2.3 | Anritsu | Agreeable |  |
| R4-2212541 |  | Correction to Channel BW for n38 in 7.3 B.2.3 | Anritsu | Agreeable |  |
| R4-2212582  R4-2212583 (CAT-A) |  | Draft CR for 38.101-3 Rel-16 to correct band combination for intra-band ENDC | Xiaomi | Revise |  |
| R4-2212852 |  | Draft CR for 38.101-3 Rel-16 intra-band contiguous EN-DC band combination | Google | Not pursued |  |
| R4-2212854 |  | Draft CR for 38.101-3 Rel-17 intra-band contiguous EN-DC band combination | Google | Not pursued |  |
| R4-2212855 |  | Draft CR for 38.101-3 Rel-16 intra-band non-contiguous EN-DC band combination | Google | Not pursued |  |
| R4-2212862 |  | Draft CR for 38.101-3 Rel-17 intra-band non-contiguous EN-DC band combination | Google | Not pursued |  |
| R4-2212728  R4-2212729 (CAT-A) |  | draft CR to TS38.101-3[R16] Clarification on REFSEN for inter-band CA | ZTE | Revise |  |
| R4-2213137 R4-2213138 (CAT-A)  R4-2213139 (CAT-A) |  | Draft CR for 38.101-3 to improve the wording for simultaneousRxTx clarification(R15) | Huawei | Revise |  |
| R4-2213140  R4-2213141 (CAT-A) |  | Draft CR for 38.101-3 To remove the frequency restriction for DC\_28\_n5 (R16) | Huawei | Revise |  |
| R4-2212534 |  | TDD RMC for Intra-band EN-DC | Anritsu | Noted |  |
| R4-2212581 |  | Discussion on intrabandENDC-Support | Xiaomi | Noted |  |
| R4-2212850 |  | Discussion on Intra-Band EN-DC support | Google | Noted |  |
| R4-2213631 |  | Discussion on intra-band EN-DC combination | Huawei | Noted |  |

**TR38.817-01**

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| **T-doc number** | **Revise to** | **Title** | **Source** | **Recommendation** | **Comments** |
| R4-2211800  R4-2211801 (CAT-A) |  | Draft CR to TR 38.817-01 on calculations of sync raster GSCN per operating band | Nokia | Agreeable |  |

**36.101**

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| **T-doc number** | **Revised to** | **Title** | **Source** | **Recommendation** | **Comments** |
| R4-2212358 |  | Draft CR for TS 36.101 Rel-15: Corrections on band combinations for UE co-existence | Apple | Agreeable |  |
| R4-2212359 |  | Draft CR for TS 36.101 Rel-16: Corrections on band combinations for UE co-existence | Apple | Agreeable |  |
| R4-2212360 |  | CR for TS 36.101 Rel-17: Corrections on band combinations for UE co-existence | Apple | Agreeable |  |
| R4-2213142  R4-2213143 (CAT-A)  R4-2213144 (CAT-A) |  | Draft CR for 36.101 to clarify the logical ambiguity in A-MPR clause (R10) | Huawei | Agreeable |  |
| R4-2213145  R4-2213146 (CAT-A) |  | Draft CR for 36.101 to clarify the logical ambiguity in A-MPR clause (R13) | Huawei | Agreeable |  |
| R4-2213147 |  | Draft CR for 36.101 to clarify the logical ambiguity in A-MPR clause (R15) | Huawei | Agreeable |  |
| R4-2213148  R4-2213149 (CAT-A) |  | Draft CR for 36.101 to clarify the logical ambiguity in A-MPR clause (R16) | Huawei | Agreeable |  |
| R4-2212352 |  | Clarifications on LTE P-Max definition | Apple | Noted |  |

Notes:

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

## 2nd round

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| R4-22xxxxx |  | CR on … | XXX | Agreeable, Revised, Merged, Postponed, Not Pursued |  |
| R4-22xxxxx |  | WF on … | YYY | Agreeable, Revised, Noted |  |
| R4-22xxxxx |  | LS on … | ZZZ | Agreeable, Revised, Noted |  |
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Notes:

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

# Annex

Contact information

|  |  |  |
| --- | --- | --- |
| **Company** | **Name** | **Email address** |
| Google | Clement Huang | [clementhuang@google.com](mailto:clementhuang@google.com) |

|  |  |  |
| --- | --- | --- |
| KDDI | Yasuki Suzuki | [ui-suzuki@kddi.com](mailto:ui-suzuki@kddi.com) |

|  |  |  |
| --- | --- | --- |
| Rohde & Schwarz | Niels Petrovic | [Niels.petrovic@rohde-schwarz.com](mailto:Niels.petrovic@rohde-schwarz.com) |

|  |  |  |
| --- | --- | --- |
| Qualcomm -2 | Valentin Gheorghiu | [vgheorgh@qti.qualcomm.com](mailto:vgheorgh@qti.qualcomm.com) |

|  |  |  |
| --- | --- | --- |
| Ericsson | Christian Bergljung | [Christian.Bergljung@ericsson.com](mailto:Christian.Bergljung@ericsson.com) |
| SoftBank-K | Kenichi Kihara | [gumai.kihara@g.softbank.co.jp](mailto:gumai.kihara@g.softbank.co.jp) |
| SoftBank-M | Masashi Fushiki | [gumai.fushiki@g.softbank.co.jp](mailto:gumai.fushiki@g.softbank.co.jp) |
| Nokia(HU) | Hiromasa Umeda | [hiromasa.umeda@nokia.com](mailto:hiromasa.umeda@nokia.com) |
| Nokia(HO) | Hisashi Onozawa | [gumai.onozawa@nokia.com](mailto:gumai.onozawa@nokia.com) |
| Skyworks | Laurent Noel | [laurent.noel@skyworksinc.com](mailto:laurent.noel@skyworksinc.com) |
| T-Mobile USA | Bill Shvodian | [bill.shvodian@t-mobile.com](mailto:bill.shvodian@t-mobile.com) |
| Xiaomi | Juan Zhang | [zhangjuan8@xiaomi.com](mailto:zhangjuan8@xiaomi.com) |
| NTT DOCOMO | Yuta Oguma | [Yuuta.oguma.yt@nttdocomo.com](mailto:Yuuta.oguma.yt@nttdocomo.com) |
| Intel | Richard Burbidge | [richard.c.burbidge@intel.com](mailto:richard.c.burbidge@intel.com) |
| Qualcomm (GF) | Gene Fong | [gfong@qti.qualcomm.com](mailto:gfong@qti.qualcomm.com) |
| AT&T | Ron Borsato | ronald.borsato@att.com |
| MediaTek | Huanren | huanren.fu@mediatek.com |
| MediaTek | Ada | ada.wang@mediatek.com |
| MediaTek | Daniel | daniel.hsieh@mediatek.com |
| CMCC(700M reconfiguration) | Chunxia guo | guochunxia@chinamobile.com |
| vivo | Ruixin Wang | ruixin.wang@vivo.com |
| Samsung | Yunayuan(Tina Zhang) | Tina55.zhang@samsung |
| Samsung | Bozhi Li | bozhi.li@samsung |

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