**3GPP TSG-RAN WG4 Meeting # 97-e R4-2016618**

**Electronic Meeting, Nov 2nd – 13th, 2020**

**Agenda item:** 7.19.3

**Source:** Moderator (OPPO)

**Title:** Email discussion summary for [97e][116] NR\_R16\_Maintenance

**Document for:** Information

# Introduction

This document summarizes the email discussions for agenda item 7.19.3 which is intended for R16 maintenance.

The discussions of this email thread are divided into the following four areas, i.e. papers for 38.101-1, for 38.101-2, for 38.101-3 and for other specs.

# Topic #1: Papers for 38.101-1

## Companies’ contributions summary

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| **T-doc number** | **Company** | **Proposals / Observations** |
| **R4-2014167**  Type: CR  CAT: F | Qualcomm | ***Title:*** CR CatF n7 NS\_46 AMPR and coexistence  ***WIC: NR\_n7\_BW***  ***Reason for change:***  Missing the additional spurious requirement for NS\_46 large channel BWs > 20MHz.  ***Summary of change:***   1. Add reference to the missing additional requirement sub-clause for channel BWs > 20MHz. 2. Remove AMPR for 15MHz and 20MHz channel BWs for NS\_46. 3. Modify note 21 in coexistence table to refer to coexistence requirements only apply for channel BWs up to 20MHz with RB restriction for 15MHz and 20MHz channel BWs. 4. Add the missing additional requirement sub-clause for all channel BWs for NS\_46. |
| **R4-2014517**  Type: CR  CAT: F | Nokia | ***Title:*** n53 bracket removal  ***WIC: NR\_n53-Core***  ***Reason for change:***  RAN5 is developping test cases for n53 but this band has A-MPR values and OOB table note 6 still in brackets which means that these requriements are untestable. Furthermore some references and numbering is corrected  ***Summary of change:***   1. Brackets removed and errors corrected |
| **R4-2014520**  Type: CR  CAT: B | Nokia, AT&T | ***Title:*** TS 38.101-3: Addition of missing lower order fallbacks  ***WIC: TEI16***  ***Reason for change:***  These configurations have relating higher order configurations already in REL16 specs. It is important to add these as a correction inorder to retain specification intergity.  DC\_2A-30A\_n2A  DC\_2A-66A\_n2A  DC\_29A-30A\_n2A  DC\_29A-30A\_n66A  DC\_30A-66A\_n66A  ***Summary of change:***  Missing lower order configurations are added.  MSD for DC\_2A-66A\_n2A is reused from DC\_2A-66A\_n25A.  MSD for DC\_29A-30A\_n66A is reused from DC\_1A-28A\_n7A |
| R4-2014521 | Nokia, AT&T | ***Title:*** TR 37.716-21-11: Addition of missing lower order fallbacks |
| **R4-2015033**  Type: CR  CAT: F | ZTE | ***Title:*** CR to TS38.101-1: Correction on the general requirement and configured transmitted power requirement for inter-band DC  ***WIC: NR\_newRAT-Core***  ***Reason for change:***  For the general requirement (subclause 4.3)  1. The sentence agreed in R4-2006997 was not implemented in the latest spec.  For Pcmax: (subclause 6.2B.4.1)  1. According to the configured transmitted power single carrier, the total power reduction is (MPR+ ∆MPR) dB.  2. The feature of PC2 inter-band NR-DC combination is not supported in Rel-16, therefore it is no need to consider ΔPPowerClass in the formulas.  3. The explanation for some inter-band DC specfied terms in the formulas are missing..  ***Summary of change:***   1. Add the sentence agreed in R4-2006997 in sub-clause 4.3 2. Add ∆MPR in the term of MAX(MPRc A-MPRc), i.e. MAX(MPRc+∆MPRc, A-MPRc) and delete ΔPPowerClass in the PCMAX\_L,f,c,MCG and PCMAX\_L,f,c,SCG formulas 3. Add the explanations for some inter-band DC specfied terms. |
| **R4-2015299**  Type: CR  CAT: F | Huawei | ***Title:*** Editorial correction on section 5.2C to 38.101-1 R16  ***WIC: TEI16***  ***Reason for change:***  This CR corrects title for 5.2C  ***Summary of change:***  This CR corrects title for 5.2C |
| **R4-2015339**  Type: CR  CAT: F | OPPO | ***Title:*** CR on sum of power for multiple transmit connectors  ***WIC: TEI16***  ***Reason for change:***  In R4-2011768, below agreements have been reached in changing the description of how to sum powers from multiple connectors. The agreement is reproduced below. Even the agreements are made for UL MIMO/TxD, it is also applicable to other cases which require summing of powers from multiple connectors.   |  | | --- | | * RAN4 agree to define requirements for MOP and emission so that power is measured correctly for all implementations, including UE with transparent TxD:   + Use “requirements are defined as the sum of powers from both connectors”.     - This shall be interpreted as: Measure the power and emissions per connector and then sum them up afterwards.     - RAN4 will clean-up all requirements related to summing the powers and emissions, including UL MIMO, UL full power transmission requirement. |   ***Summary of change:***  Change the description from “measured as the sum of maximum output power at each UE antenna connector” to “defined as the sum of maximum output power from both UE antenna connectors”. |
| **R4-2015553**  Type: Discussion paper for approval | Huawei, HiSilicon, CMCC | **Title:** Discussion on spurious emission about UE co-existence between band n40 and n41  Proposal 1: To introduce -50dBm/MHz spurious emission requirements for band n41 frequency range when band n40 transmitting power.  Proposal 2: To introduce -40dBm/MHz spurious emission requirements for band n40 frequency range when band n41 transmitting power. |
| **R4-2015554**  Type: CR  CAT: F | Huawei, HiSilicon, CMCC | ***Title:*** CR on spurious emission about UE co-existence between band n40 and n41  ***WIC: NR\_RF\_FR1-Core***  ***Reason for change:***  1. The operators in China has a plan to use the asynchronized deployment between band n40 and n41. It’s necessary to specify the spurious emission about UE co-existence between band n40 and n41.  ***Summary of change:***   * To add protected band n41 for band n40 spurious emissions for UE co-existence. * To add protected band n40 for band n41 spurious emissions for UE co-existence. |
| **R4-2015699**  Type: CR  CAT: F | Huawei, HiSilicon | ***Title:*** Reference measurement channels for 70 MHz CBW  ***WIC: TEI16***  ***Reason for change:***  70 MHz CBW is introduced in Rel-16 for band n77/n78, but the reference measurement channels for 70 MHz CBW are not defined.  ***Summary of change:***  1. RMC for 70 MHz CBW is added |
| **R4-2015914**  Type: CR  CAT: F | Keysight | ***Title:*** Correction to supported channel bandwidths per SUL\_n41A-n81A  ***WIC: NR\_SUL\_combos\_R16-Core***  ***Reason for change:***  SUL\_n41A-n81A ban combination includes 25 MHz and 30 MHz channel bandwiths for frequency band n81 but they are not supported according to table 5.3.5-1.  ***Summary of change:***  Removing channel bandwidths 25 MHz and 30 MHz |
| **R4-2016341**  Type: CR  CAT: F | Ericsson | ***Title:*** CR for editorial corrections 38.101-1  ***WIC: NR\_CA\_R16\_Intra***  ***Reason for change:***  Editorial corrections 38.101-1.  ***Summary of change:***  Adding space between BW’s in the 2nd channel BW column for CA\_n1B  Removing 35 MHz for CA\_n7B in configuration table since 35 MHz is not yet defined.  Removing empty rows for CA\_n48B and CA\_n48C in Table 5.5A.1-1 (highlighted red)  Remove emply first row of CA\_n48(2A) in Table 5.5A.2-1 (highlighted red)  Adding missing SCS for CA\_n20A-n78A, CA\_n41C-n79A, CA\_n46B-n48A, CA\_n46C-n48A, CA\_n46D-n48A, CA\_n46E-n48A  Correcting references from CA\_7(2A) to CA\_n7(2A) instead  Correcting references from CA\_25(2A) to CA\_n25(2A) instead  For the n41 row for CA\_n41(2A)-n71A, the SCS column and the CA\_n41(2A) BW column is merged (highlighted yellow)  For the n78 row for CA\_n7A-n66A-n78(2A), the SCS column and the CA\_n78(2A) BW column is merged (highlighted yellow)  Format the SCS values to the center for CA\_n25A-n41A-n71A  Delete the emply rows between CA\_n25A-n66A-n78A and CA\_n28A-n40A-n78A (highlighted red) |
| **R4-2016442**  Type: CR  CAT: D | Qualcomm | ***Title:*** Replacement of void sub-clauses  ***WIC: NR\_newRAT-Core***  ***Reason for change:***  Sub-clauses were incorrect marked as “Void” when the intention was to reserve them for future usage.  ***Summary of change:***  Void sub-clauses are replaced with “Reserved”. Reserved sub-clauses are added to maintain clause numbering continuity. 7.3F is moved to 7.3B and 7.3G is moved to 7.3F. |
| **R4-2016451**  Type: CR  CAT: F | T-Mobile USA | ***Title:*** CR to for 38.101-1: CA uplink power clarification  ***WIC: TEI16***  ***Reason for change:***  Some of the wording on UE maximum output power for carrier aggregation is unclear  ***Summary of change:***  Clarify the wording for UE maximum output power for carrier aggregation |
| **R4-2016458**  Type: CR  CAT: F | T-Mobile USA | ***Title:*** CR for 38.101-1: Editorial corrections  ***WIC: TEI16***  ***Reason for change:***  Many editorial errors exist in 38.101-1  ***Summary of change:***  Corrects editorial errors |
| **R4-2016483**  Type: CR  CAT: F | Huawei, HiSilicon | ***Title:*** CR for TS 38.101-1 harmonic MSD for CA\_n41-n79  ***WIC: TEI16***  ***Reason for change:***  For CA\_n41-n79, the frequency range below 2506 MHz for Band n41 is not used, it is assumed before that there is no 2nd order harmonic issue due to the applicable frequency range. However, since n41 supports larger CBW, considering the spectrum regrowth for the harmonics, the interference would still cause REFSENS degradation for n79 especially for the DL channel close to 5000MHz.  ***Summary of change:***  Add harmonic MSD for CA\_n41-n79 |
| **R4-2016592**  Type: CR  CAT: F | Qualcomm | ***Title:*** Editorial CR to change 'Void" section to reserved  ***Note: Paper did not submitted before meeting.*** |
| **R4-2014327**  Type: CR  CAT: F | Reliance Jio | ***Title:*** LTE/NR spectrum sharing in Band 40/n40  ***WIC: DSS\_LTE\_B40\_NR\_Bn40\_Core***  ***Reason for change:***  To enable dynamic spectrum sharing between LTE and NR in B40/n40 band  ***Summary of change:***  Section 5.4.2.1, Introduction of 7.5 KHz UL shift (FREF, shift) for TDD band n40 |
| **R4-2014899**  Type: CR  CAT: F | Apple | ***Title:*** Coexistence cleanup for 38.101-1 Rel16  ***WIC: TEI16***  ***Reason for change:***  Rel-16 features several band protection requirements which are not technical possible or contain contradicting protection requirements.  ***Summary of change:***  Duplicate protections with contradicting requirements are corrected for several single bands and CA. |

## Open issues summary

### Sub-topic 1-1 UE co-existence between n40 and n41

*Moderator notes: UE co-existence requirements between n40 and n41 was removed from spec due to the assumption that the two bands will be synchronized and same UL/DL configuration. Now operator demands on the asynchronized NWs are shown, thus requirements are proposed in R4-2015553. The -50dBm/MHz for n40 Tx is same as removed requirement, and -40dBm/MHz is new for n41 Tx. CR is R4-2015554.*

**Issue 1-1-1: Whether following proposals from R4-2015553 is acceptable to define spurious emission requirements?**

* + **Proposal 1: To introduce -50dBm/MHz spurious emission requirements for band n41 frequency range when band n40 transmitting power.**
  + **Proposal 2: To introduce -40dBm/MHz spurious emission requirements for band n40 frequency range when band n41 transmitting power.**
* Option 1: Yes
* Option 2: No

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| **Company** | **Comments** |
| LGE | For both aggressor cases, we prefer -40dBm/MHz as spurious emission requirement. The filter characteristic is quite aggressive to satisfy the 30dB isolation when we consider normal B40 filter performance.  If RAN4 only consider synchronous operation only, then do not need to discuss for MSD issues. LGE still prefer to keep the previous RAN4 agreements as synchronous operation between n40 and n41. |
| ZTE | We think both synchronize and asynchronize operation should be considered for band n40 and n41. |
| Qualcomm | Prefer synchronous operation. There is a lot of filter variability in UE implementation, and UE may not be able to support non-simultaneous RX/TX at this stage. For NR-CA, the relaxed coexistence requirement is not enough, AMPR or RB restriction and MSD would be required, especially for non-contiguous allocations in NRCA, so these bands require synchronization to prevent interference. The relaxed requirement would only be able to meet the general spurious emission for single carrier operation provided UE implementation met the filtering requirement. Also, original TP for TR was approved under the assumption of synchronous operation.  Coexistence in the same band among operators must also be considered. |
| CMCC | Option 1,  The -50dBm\MHz spurious emission requirements for n41 was defined in the early phase of the coexistence of n40 and n41 or B40 and n41, but since only the synchronization scenario was considered, RAN4 removed the -50dBm\MHz for band n41 when n40 transmitting power. Operators currently have potential asynchronize request for n40 and n41, and we agree with proposal 1 and proposal 2 to fix the spurious emission requirements between n41 and n40. |
| Huawei | To LGE:  Band n40 should protect band 1 to meet -50dBm/MHz spurious emission requirements. Look at the performance of band n40 filter. The performance for band 1 Rx frequency is worse than band 41. I wonder why -50dBm/MHz spurious emission requirements can’t be reached for band n41 frequency range when band n40 transmitting power.  To ZTE: When we draft the spurious emission requirements for UE co-existence, we need to consider the worst scenario.  To QC, this requirements are for single band. I can’t understand why we need to consider the MSD and CA scenarios.  When band n40 is transmitting, there is no UL CA configuration. Thus, the proposal 1 can be approved without any doubt.  When band n41 is transmitting for CA, we can further discuss whether AMPR or RB allocation is needed. Anyway, proposal 2 is for single band. There is no technical reason to approve that.  As a reminder, we can’t restrict network deployment in UE specs. |
| Skyworks | More time is needed to analyse the proposed filter rejection assumptions. |

## Companies views’ collection for 1st round

### CRs/TPs comments collection

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| **CR/TP number** | **Comments collection** |
| R4-2014167 | Title: CR CatF n7 NS\_46 AMPR and coexistence |
| Huawei: the reason of changes are not clearly explained in the cover page, especially for changes of 15MHz and 20MHz channel BWs.  Apple: It is not apparent why A-MPR is removed for 15 MHz and 20 MHz. Please clarify. |
| R4-2014517 | Title: n53 bracket removal |
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| R4-2014520 | Title: TS 38.101-3: Addition of missing lower order fallbacks |
| ZTE: Strange to see the high order configurations have already completed before lower order fallbacks are not included. But we are ok to make up the ‘hole’.  Huawei: Band 2 and n2 can't use the same frequency test point for MSD.  Skyworks: Thank you for bridging the gap in missing fallbacks. Some minor corrections are needed:   * B66 MSD test point due to IMD5(2,n2) for DC\_2A-66A\_n2A can be removed because only SUO is supported for DC\_2\_n2,   Question: should n66 DL carrier to be set to 2177.5MHz for DC\_29A-30A\_n66A ? |
| R4-2014521 | Title: TR 37.716-21-11: Addition of missing lower order fallbacks  *Moderator note: same changes as 4520.* |
| ZTE: The contents are for TP, but the Tdoc type is for CR. This Tdoc cannot be approved. Instead, we can focus on 2014520.  Nokia: TR is under change control v.16.0.0 so CR is required.  Huawei: Band 2 and n2 can't use the same frequency test point for MSD.  AT&T: We agree with Nokia that a CR is required since the TR is under change control. The contents of the CR are consistent with this approach. |
| R4-2015033 | CR to TS38.101-1: Correction on the general requirement and configured transmitted power requirement for inter-band DC |
| Qualcomm: Instead of removing DeltaPPowerClass, would it be better to set it equal to zero? Otherwise, in the future, if we add NR-DC PC2, then we would have to reintroduce it in, and it would bd inconsistent with EN-DC which does have PC2.  Huawei: In LTE, we have this statement (“Terminal that supports Dual Connectivity configuration shall meet the minimum requirements for corresponding CA configuration (suffix A), unless otherwise specified.”). For NR, we have agreed to use method to specify explicitly the DC’s requirements one by one. If the DC and CA’s requirements are conflicted, this statement will bring confusion just like Pcmax. |
| R4-2015299 | Editorial correction on section 5.2C to 38.101-1 R16 |
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| R4-2015339 | CR on sum of power for multiple transmit connectors |
| Qualcomm: The first part is ok “defined as sum” but since this is inter-band CA, the sentence “*If each band has separate antenna connectors, maximum output power is defined ~~measured~~ as the sum of maximum output power ~~at each~~ from both UE antenna connectors*” can be confusing as whole since UE with inter-band CA there can be more than two connectors. Also, we have not agreed the CR for TxD for general single CA case so that should be done first before changing the CA parts since the applicability of the TxD may cause changes. Not ok to agree this CR for now.  To QC:  [OPPO]: the CA sentence can be revised to “from all UE antenna connectors”, is this ok?  About the TxD, not clear which part this comment is about, there is no TxD touched in this CR.  Huawei: prefer not to use “from both antenna connectors”. For UL MIMO, it’s clear that UE only supports 2Tx, but for non-MIMO, UE can transmit from 1Tx or 2Tx depends on UE implementation. Sum from each antenna connector is more appropriate. |
| R4-2015554 | CR on spurious emission about UE co-existence between band n40 and n41  *Moderator note: This CR depends on the conclusion in R4-2015553* |
| ZTE: It should be clarified that this requirements is only for asynchronize operation between band n40 and band n41. i.e. a note is needed.  Qualcomm: Prefer synchronization. See comments in 1.2.1  Huawei:  To ZTE and QC, Synchronize and non-synchronize operation belong to network deployment. UE have to meet the minimum requirements considering the worst scenario. It isn’t UE capability.  As a reminder, we can’t restrict network deployment in UE specs.  Skyworks: We prefer pursuing discussion on filter assumptions before assessing this CR. |
| R4-2015699 | Reference measurement channels for 70 MHz CBW |
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| R4-2015914 | Correction to supported channel bandwidths per SUL\_n41A-n81A |
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| R4-2016341 | Rel-16 CR editorial corrections 38.101-1 |
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| R4-2016442 | Replacement of void sub-clauses |
| Nokia: Some clauses that are changed to reserved should actually stay as void. There is for example CR R4-2014518 that changes some of the headers hence if agreed that CR should over rule this one or revision of it.  ZTE2: Clause 5.2C should not be changed since “5.2C Operating band combination for SUL” actually already exists in clause 5.2B by mistake (see correction in R4-2014956). In addition, agree with Nokia that some clauses should be kept as “void”. Furthermore, for the modification, which one is better to be used, “reserved” or “FFS”?  Huawei: 1. 5.2C has been specified for SUL since Rel-15. It can't be used as reserved. |
| R4-2016451 | CR to for 38.101-1: CA uplink power clarification |
| ZTE: Actually the sentence in current spec is the similar with LTE. Does it need to do the same correction for LTE? In addition, similar corrections should be done for the last sentence.  OPPO: If we understand correctly the 1st change should be “uplink” rather than “downlink” since this section is for UL, and there is scenario that UL CA was configured but only one CC is activated. |
| R4-2016458 | CR for 38.101-1: Editorial corrections |
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| R4-2016483 | CR for TS 38.101-1: harmonic MSD for CA\_n41-n79 |
| ZTE: When RAN4 define the harmonic MSD value, MSD caused by the spectrum regrowth is not considered. We are not sure why n41-n79 needs to consider. ( also no such issue for ENDC 41-n79?) Also if we consider the harmonic spectrum regrow,then it seems there may exist some other completed combination who have the same problem need to be revisited.  Qualcomm: Same question as ZTE. Also, can you submit the discussion analysis or precedence on how the MSD is derived. Is H2 ACLR worse for higher BWs? Also, n41 has 100MHz UL BW, should we not have the UL configuration defined there as well?  Huawei: disagree that the spectrum regrowth is not considered in the spec. Note 1 and Note 3 in the MSD table are all examples for considering the harmonic spectrum regrowth. The issue also exists for DC\_41-n79, which can be updated later. To QC, as clarified in Note 1 for the UL configuration table, only 15kHz SCS is considered for UL, thus the max CBW is 50MHz for the test.  Skyworks: We need further look into this near miss H2 MSD. Detailed analysis should be provided. |
| R4-2016592 | Editorial CR to change 'Void" section to reserved |
| Huawei: Is this CR available? We can’t find it. |
| R4-2014327 | LTE/NR spectrum sharing in Band 40/n40 |
| Qualcomm: There are at least two cover sheet errors in the CR. The source to TSG should be R4 and the work item code should be DSS\_LTE\_B40\_NR\_Bn40-Core |
| R4-2014899 | Coexistence cleanup for 38.101-1 Rel16 |
| Skyworks: clean up is needed, we support this CR. |

## Summary for 1st round

### Open issues

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|  | **Status summary** |
| **Issue 1-1-1: Whether following proposals from R4-2015553 is acceptable to define spurious emission requirements?** | Moderator summary:   1. Regarding the synchronization scenario between n40 and n41, different opinions are shown. Two companies prefer only synchronized NW is considered in RAN4 from UE implementation perspective, while three companies believe the unsynchronized NW is needed from potential deployment perspective. No conclusion can be drawn in 1st round, continue discussion is needed. 2. Regarding spurious emission requirements, more discussion is needed, and filter rejection performance needs to be checked and aligned among companies. |

*Recommendations on WF/LS assignment*

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|  | **WF/LS t-doc Title** | **Assigned Company,**  **WF or LS lead** |
|  | WF on unsynchronized NW between n40 and n41  (Cover Issue 1-1-1) | Huawei |

### CRs/TPs

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| **CR/TP number** | **CRs/TPs Status update recommendation** |
| R4-2014167 | Title: CR CatF n7 NS\_46 AMPR and coexistence |
| More clarification is needed on the reason for change especially for 15MHz and 20MHz CBW, and continue discuss in the 2nd round. |
| R4-2014517 | Title: n53 bracket removal |
| No comments received in 1st round, suggest to be agreed. |
| R4-2014520 | Title: TS 38.101-3: Addition of missing lower order fallbacks |
| Revise according to the questions and comment, continue discussing in 2nd round. |
| R4-2014521 | Title: TR 37.716-21-11: Addition of missing lower order fallbacks  *Moderator note: same changes as 4520 for TR.* |
| Revise according to the questions and comment, continue discuss in 2nd round. |
| R4-2015033 | CR to TS38.101-1: Correction on the general requirement and configured transmitted power requirement for inter-band DC |
| Further discussion is needed in 2nd round regarding whether the general statement is needed in section 4.3, and further consider whether to keep DeltaPpowerclass or remove it. |
| R4-2015299 | Editorial correction on section 5.2C to 38.101-1 R16 |
| No comments received in 1st round, suggest to be agreed. |
| R4-2015339 | CR on sum of power for multiple transmit connectors |
| Revise the description of “from both antenna connectors” and other parts according to the questions and comment, continue discussing in 2nd round. |
| R4-2015554 | CR on spurious emission about UE co-existence between band n40 and n41  *Moderator note: This CR depends on the conclusion in R4-2015553* |
| Continue discuss in 2nd round after the conclusion of Issue 1-1-1. |
| R4-2015699 | Reference measurement channels for 70 MHz CBW |
| No comments received in 1st round, suggest to be agreed. |
| R4-2015914 | Correction to supported channel bandwidths per SUL\_n41A-n81A |
| No comments received in 1st round, suggest to be agreed. |
| R4-2016341 | Rel-16 CR editorial corrections 38.101-1 |
| No comments received in 1st round, suggest to be agreed. |
| R4-2016442 | Replacement of void sub-clauses |
| Revision is needed, further check whether some of the “reserved” clause should be kept as “void” like 5.2C, and keep alignment with CR R4-2014518 where some “void” clauses are used. Continue discuss in 2nd round. |
| R4-2016451 | CR to for 38.101-1: CA uplink power clarification |
| Different views regarding the 1st change and the last sentence, suggest to continue discuss in 2nd round. |
| R4-2016458 | CR for 38.101-1: Editorial corrections |
| No comments received in 1st round, suggest to be agreed. |
| R4-2016483 | CR for TS 38.101-1: harmonic MSD for CA\_n41-n79 |
| Different views on the spectrum regrowth are shown, and the change to DC\_41-n79 is needed, suggest to revise it and continue discuss in the 2nd round |
| R4-2016592 | Editorial CR to change 'Void" section to reserved |
| CR is not uploaded, suggest to not pursue. |
| R4-2014327 | LTE/NR spectrum sharing in Band 40/n40 |
| It was pointed out that there are at least two cover sheet errors in the CR, i.e. the source to TSG should be R4 and the work item code should be DSS\_LTE\_B40\_NR\_Bn40-Core. According to the CR quality control “*If a CR has two or more errors on its coversheet, please indicate so in your moderator summary and the recommendation is “Postponed”. Technical points captured in such CRs can still be discussed*” this CR suggest to be postponed.  No comment regarding the CR content is received in 1st round. |
| R4-2014899 | Coexistence cleanup for 38.101-1 Rel16 |
| No concern raised in 1st round, suggest to be agreed. |

## Discussion on 2nd round

The following WF and revised CR will be discussed in 2nd round to seek for approval and agreement.

### WF/LS

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| **Tdoc number** | **Comments** |
| R4-20xxxxx | Title: |
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### CRs/TPs

## Summary on 2nd round

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

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| CR/TP/WF number | CRs/TPs/WFs Status update recommendation |
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# Topic #2: Papers for 38.101-2

## Companies’ contributions summary

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| **T-doc number** | **Company** | **Proposals / Observations** |
| **R4-2014957**  Type: CR  CAT: F | ZTE | ***Title:*** CR to TS 38.101-2 on fallback group for intra-band contiguous CA (Rel-16)  ***WIC: TEI16***  ***Reason for change:***  The fallback groups for intra-band contiguous CA classes CA\_n259G and CA\_n261D in the configuration table are incorrect groups.  ***Summary of change:***  (1) Move CA\_n259G and CA\_n261D to the corresponding fallback groups.  (2) Remove the empty row for CA\_n261H. |
| **R4-2015980**  Type: CR  CAT: F | ZTE | ***Title:*** Correction to modified MPR behaviour  ***WIC: TEI16***  ***Reason for change:***  Incorrect conditions for the bits in the field modifiedMPRbehavior (all defined in Rel-15).  Modified MPR behaviour introduced in an earlier release is mandatory in a later release.  ***Summary of change:***  Annex H: “may set” is changed to “shall set” for the bits defined for n257, n258, n260 and n261. |
| **R4-2016342**  Type: CR  CAT: F | Ericsson | ***Title:*** Rel-16 CR editorial corrections 38.101-2  ***WIC: NR\_CA\_R16\_Intra***  ***Reason for change:***  Editorial corrections 38.101-2  ***Summary of change:***  Adding CA to n261I in the CA\_n261(A-G-I) row of Table 5.5A.2-2  Removing references to Note 1 and Note 2 in Table 5.5A.2-2  Adding A to 1CC bands in Table 5.5A.2-2 to be consistent with notation in Table 5.5A.2-1  Removing not needed Note 1 in Table 5.5A.1-1 about maximum bandwidth band n261  Removing end comma not needed in the 2nd channel BW column for CA\_n260Q and n261Q |
| **R4-2016593**  Type: CR  CAT: F | Qualcomm | ***Title:*** Editorial CR to change 'Void" section to reserved  ***Note: Paper didn’t submitted before meeting.*** |

## Companies views’ collection for 1st round

### CRs/TPs comments collection

|  |  |
| --- | --- |
| **CR/TP number** | **Comments collection** |
| R4-2014957 | CR to TS 38.101-2 on fallback group for intra-band contiguous CA (Rel-16) |
| Qualcomm: CA NW class D belongs to FB group 2, so the change to FB group 1 is not correct    ZTE2: Thanks for pointed out. The revision of CA\_n261D has been removed in the below link.  https://www.3gpp.org/ftp/tsg\_ran/WG4\_Radio/TSGR4\_97\_e/Inbox/Drafts/%5B97e%5D%5B116%5D%20NR\_R16\_Maintenance/R4-2014957-r1.docx |
| R4-2015980 | Correction to modified MPR behaviour |
| Intel:  ‘shall’ can only be applicable to the Rel-16 UEs. Suggest to add the highlighted for clarity. ‘This bit shall be set to 1 **in the present release** by a UE supporting n257**’**  Ericsson  to Intel: we should have the same note text in all releases, the highlight (even if correct) is not needed, all provisions apply to the present release of the specification  Huawei: when MPR is modified, it is always for UE to support. Not agree. |
| R4-2016342 | Rel-16 CR editorial corrections 38.101-2 |
|  |

## Summary for 1st round

### CRs/TPs

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

|  |  |
| --- | --- |
| **CR/TP number** | **CRs/TPs Status update recommendation** |
| R4-2014957 | CR to TS 38.101-2 on fallback group for intra-band contiguous CA (Rel-16) |
| Revise the CR and continue discuss in 2nd round. |
| R4-2015980 | Correction to modified MPR behaviour |
| No agreement can be drawn on whether this change is needed, continue discuss in 2nd round. |
| R4-2016342 | Rel-16 CR editorial corrections 38.101-2 |
| No comments received in 1st round, suggest to be agreed. |

## Discussion on 2nd round

The following WF and revised CR will be discussed in 2nd round to seek for approval and agreement.

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|  | **Title:** |
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## Summary on 2nd round

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

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| --- | --- |
| **CR/TP/WF number** | **CRs/TPs/WFs Status update recommendation** |
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# Topic #3: Papers for 38.101-3

## Companies’ contributions summary

|  |  |  |
| --- | --- | --- |
| **T-doc number** | **Company** | **Proposals / Observations** |
| **R4-2014170**  Type: Discussion paper for approval | Qualcomm | **Title:** Handling new channel bandwidths for ENDC and NRCA band combinations with MSD  **Proposal 1: Modify the UL configuration table for larger UL channel BWs as shown in section 2.3** |
| **R4-2014169**  Type: CR  CAT: F | Qualcomm | ***Title:*** CR CatF Cross Band Noise DC\_3\_n1\_highBW  ***WIC: TEI16***  ***Reason for change:***  Missing cross band noise MSD for various interband ENDC band combinations with large NR UL BW  ***Summary of change:***   1. Modifed UL configuration by shifting the RB starting position for the 25, 30, 40, 50MHz channel bandwidths with the allocated UL resource blocks starting at RB positions 9, 19, 42, 63 respectively. |
| R4-2015552  Type: Discussion paper for approval | HW | **Title: Consideration on Cross band isolation impact with larger BW**  Observation 1: If the NR band is a DL band or victim band, the corresponding MSD value should be specified for the new channel bandwidth. If the NR band is a UL band or aggressive band, the UL configuration and MSD values need to be further considered.  Observation 2: It’s noted that UL configuration applies regardless of the channel bandwidth of the UL band and the UL resource blocks shall be located as close as possible to the downlink operating band in Table 7.3B.2.3.4-2 from TS 38.101-3.  Observation 3: Even if UL configuration applies regardless of the channel bandwidth of the UL band, UL allocation such as SCS and LCRB may still restrict the channel bandwidth.  Proposal 1: 15kHz SCS can be used for sub-3GHz FDD bands and sub-2.3GHz TDD/SUL bands except for n50 when RAN4 derive the UL configuration of the MSD due to cross band isolation.  Proposal 2: 30kHz SCS can be used for n41, n77, n78 and n79 when RAN4 derive the UL configuration of the MSD due to cross band isolation.  Proposal 3: UL SCS for n40 and n50 can be considered case by case. 15kHz or 30kHz or Both 15kHz and 30kHz can be used for n40 and n50 when RAN4 derive the UL configuration of the MSD due to cross band isolation.  Observation 4: MSD due to aggressive band PA spurious emission depends on RB allocation regardless of the channel bandwidth. The maximum RB allocation is the worst case for aggressive band PA spurious emission. However, the RB allocation can be limited when deriving the UL configuration of the MSD due to cross band isolation.  Observation 5: There is a difference between MSD due to spurious emission and CIM interference. The key factor for MSD due to CIM interference is whether the CIM interference falls into the DL channels. The minimum RB allocation is the worst case for CIM interference.  Proposal 4: It’s proposed that RAN4 create a new MSD exception due to CIM interference. The original MSD due to cross band isolation can focus on the aggressive band PA spurious emission.  Proposal 5: It’s proposed that Reference sensitivity exceptions (MSD) due to counter intermodulation interference for EN-DC in NR FR1 can be specified as table 1. |
| **R4-2015795**  Type: Discussion paper for approval | CHTTL | **Title:** Discussion on handling the cross band isolation requirement for larger channel BW in Rel.16  Proposal 1: for the Rel.16 combinations that face the issue on the cross band isolation with new added larger channel bandwidth, for example, DC\_3\_n1, limited UL BWs of the aggressor band for EN-DC combinations with the existing cross band noise MSD can be considered. |
| R4-2014317  Type: Discussion paper for approval | LGE | **Title: Consideration on additional ILs and MSD levels for DC\_20\_n38 UE and/or V2X\_20\_n38 UE based on RF architecture**  Observation1: For DC\_20\_n38 UE, RAN4 did not consider Harmonic trap filter based on the delta Tib/Rib levels for DC\_20\_n38 band combinations.  Observation2: Even though DC\_20\_n38 UE did not consider HTF, the required MSD levels by 3rd harmonic problems is specified as low MSD values compared in [2]  Proposal 1: RAN4 shall consider option2 or option3 to solve the RF architecture and MSD problems for DC\_20A\_n38A UE and V2X\_20A\_n38A UE.  Proposal 2: Based on RAN4 consensus, the proposed contents in section 3 according to candidate option2 or option3 will be applied for DC\_20A\_n38A and V2X\_20A\_n38A UE in TS38.101-3. |
| R4-2014318  Type: CR  CAT: F | LGE, HW | ***Title:*** Correction on additional ILs and MSD levels for DC\_20\_n38 UE  ***WIC:*** NR\_newRAT-Core  ***Reason for change:***  This CR is to update additional ILs and MSD levels by 3rd harmonic problem for DC\_20\_n38 UE 5G V2X UE in TS38.101-3.  ***Summary of change:***  This CR is to revise MSD level for DC\_20\_n38 UE. The specified delta Tib/Rib for DC\_20\_n38 are derived without Harmonic trap filter even though 3rd harmonic from B20 fall into n38 reception frequency. However, the MSD level is quite lower values compare to the proposed MSD values in V2X\_20\_n38 UE.  So, RAN4 can update the additional ILs and MSD requirements based on RF architecture. |
| R4-2014582  Type: CR  CAT: F | Intel | ***Title:*** CR to 38.101-3 (Rel-16) error correntions to configurations for CA and DC  ***WIC:*** TEI16  ***Reason for change:***  There are errors in CA and DC configurations in Clause 5.5A and 5.5B  ***Summary of change:***  Correct errors |
| **R4-2014883**  Type: Discussion paper for approval | NTT DOCOMO INC. | **Title:** Clarification on RF assumption for B42\_n77 and B42\_n78  Proposal 1: Conform RF assumption in Rel-15 and Rel-16 that DC\_42\_n77 and DC\_B42\_n78 have intra-band architecture.  Proposal 2: Recommend that power imbalance requirements as UE demod requirements shall apply some inter-band EN-DC configuration where intra-band EN-DC requirements apply, e.g., DC\_42\_n77 and DC\_42\_n78.  Proposal 3: To avoid the delay of discussion in UE demod, agree Proposal 1 and Proposal 2 in 1st round discussion in RAN#97 and give feedback to UE demod session before 2nd round. |
| **R4-2015042**  Type: Discussion paper for approval | ZTE | **Title:** Discussion on the MSD of the new channel BW for EN-DC and NR CA band combinations  In this paper, we give some discussions on the MSD of the new channel BW for EN-DC and NR CA band combinations. Comparing with the currently three options included in the WF, option 2 is reasonable from specification aspect. |
| **R4-2015264**  Type: CR  CAT: F | Xiaomi | ***Title:*** CR for 38.101-3 Rel16 corrections on ACS requirements for intra-band contiguous EN-DC  ***WIC: NR\_newRAT-Core***  ***Reason for change:***  In release 16, the transmitter is set to 4 dB below PCMAX\_L,f,c for ACS case 2 which is not aligned with the requirement in release 15. The reason is that the agreed Cat A CR (R4-2000452) was not implemented accordingly when Cat F CR (R4-2000451) was implemented after RAN4 #94-e meeting.  ***Summary of change:***  4dB is replaced by 24dB in the note 1 of table 7.5B.1-2. |
| **R4-2015323**  Type: CR  CAT: F | vivo | ***Title:*** Alignment of descritpion of the power class restriction for inter-band EN-DC  ***WIC: ENDC\_UE\_PC2\_TDD\_TDD***  ***Reason for change:***  The clarification for FDD-TDD ENDC HPUE has been agreed in Note 6 in Table 6.2B.1.3-1 with improved wording which is more clear. This can be also used for Note 5 to improve the consistency and better reflect the result for TDD-TDD ENDC HPUE.  ***Summary of change:***  Change the Note 5 wording from:  ““NOTE 5: The UE is not required to support PC2 within each individual cell group. Power class support within each individual cell group is signaled separately by the UE.”  To:  “NOTE 5: The UE supports PC3 within both E-UTRA cell group and NR cell group. Power class support within each individual cell group is signaled separately by the UE.” |
| **R4-2015324**  Type: CR  CAT: F | vivo | ***Title:*** Correction of delta Powerclass for Inter-band EN-DC  ***WIC: ENDC\_UE\_PC2\_TDD\_TDD***  ***Reason for change:***  This is resubmission of CR R4-2010855 (CRNum: 0344). The original CR which was agreed in RAN4#96-e and also approved in RP-201504 in RAN#89, was mistakenly implemented into clause 6.2B.4.1.3a which is used for NE-DC in 38.101-3 v16.5.0. The correction for 6.2B.4.1.3 for EN-DC has to be done, and current revision to 6.2B.4.1.3a can also be kept.  -------------------  Power class 2 had been introduced for TDD-TDD ENDC and the fallback scheme had been defined in 6.2B.1.3. It has been clarified that under different conditions, the requirements for default or the supported power class would be applied and would “set the configured transmitted power as specified sub-clause 6.2B.4”  However, no revisions had been done for section 6.2B.4.1.3 which is for inter-band EN-DC for FR1. The ∆PPowerClass,EN-DC which is used to adjust this was not updated as for other cases, thus make the specification incomplete..  ***Summary of change:***  The condition for “∆PPowerClass,EN-DC = 3 dB” in the cofigurated transmitted power has been clarified as “for a power class 2 capable EN-DC UE when requirements of default power class had been applied as specified in sub-clause 6.2B.1”, otherwise ∆PPowerClass,EN-DC = 0 dB;  This clarification aviods the duplicate condition description in this part, and effectively reduced the spec complexity.It is also general enough to applied to other inter-band EN-DC cases. |
| **R4-2015331**  Type: CR  CAT: F | OPPO | ***Title:*** CR on NR power class under EN-DC  ***WIC: TEI16***  ***Reason for change:***  The capability signaling for NR part under EN-DC has been defined in RAN2 38.331, thus RAN4 spec shall be aligned.  ***Summary of change:***  Align the NR power class capability with 38.331. |
| **R4-2015555**  Type: Discussion paper for approval | Huawei, HiSilicon | **Title:** Discussion on asynchronous for DC\_42\_n79  ***Proposal 1: To introduce MSD values as below between band 42 and n79 if UE choose to support simultaneous Tx/Rx for DC\_42\_n79.*** |
| **R4-2015729**  Type: CR  CAT: F | Qualcomm | ***Title:*** CR to TS 38.101-3 corrections on inter-band EN-DC configurations including FR1 and FR2  ***WIC: DC\_R16\_xBLTE\_2BNR\_yDL2UL-Core***  ***Reason for change:***  Few configurations in the spec are not aligned with the agreed CR, R4-2006728, “Introducing CR on new EN-DC LTE(xDL/1UL)+ NR(2DL/1UL) DC in Rel-16”.  ***Summary of change:***  Correct the specification to be aligned with the agreed CR, R4-2006728.  1. missing DC\_3A-3A\_n1A-n257A  2. wrong uplink DC configurations for DC\_3A\_n40A-n258A |
| **R4-2015981**  Type: CR  CAT: F | Ericsson | ***Title:*** Verification of the P-MPR method for EN-DC FDD-TDD power class 2  ***WIC: TEI16***  ***Reason for change:***  Introduce a test case for the P-MPR solution. The (UE-based) P-MPR solution is the default for EN-DC FDD-TDD PC2 in the absence of duty-cycle capabilities. Moreover, fallback to a lower EN-DC power class is not defined for the P-MPR solution.  The total EN-DC power P\_Total^(EN-DC) is always 26 dBm for the P-MPR solution, there is not fallback behaviour (unclear if this is the case under all circumstances e.g. when the combined UL duty cycle exceeds 50% or for TDD U/D configurations up to 50% UL duty cycle ).  The P-MPR method is not verified. The solution is proprietary, but it should at least make sure that the maximum power of 26 dBm can be achieved for both non-simultaneos and simultaneous (overlapping) CG transmissions when the combined duty cycle is up to 50% resulting in a 23 dBm average total EN-DC power.  ***Summary of change:***  Clause 6.2B.4.1.3: two test case are specified for EN-DC PC2:  1. For NR PC2, the UE shall meet the SA requirements when LTE and NR transmissions are not overlapping with a 60% UL duty cycle on FDD and 20% UL duty cycle on TDD.  2. For NR PC3, the UE shall meet the SA requirements when LTE and NR transmissions are overlapping with a 80% UL duty cycle on FDD and 20% UL duty cycle on TDD while the PUMAX requirement (simultaneous transmissions) is met.  The UL RMC for FDD with six (60%) and eight (80%) scheduled UL subframes per radio frame and the existing UL RMC for TDD (20%) are used for this purpose.  It is noted that for PC2, the test case for the PUMAX requirement only works when sub-frame p on the MCG and physical-channels q on the SCG are overlapping (this could also be the implication in general). |
| **R4-2016343**  Type: CR  CAT: F | Ericsson | ***Title:*** Rel-16 CR editorial corrections 38.101-3  ***WIC: DC\_R16\_1BLTE\_1BNR\_2DL2UL-Core***  ***Reason for change:***  Editorial corrections 38.101-3  ***Summary of change:***  Adding missing bands in the ΔRIB,c table for DC\_2-48\_(n)5, DC\_2-66\_(n)5  Correcting band 66 DL frequency in MSD table for DC\_66A\_n7A-n78A  Adding DC\_40C\_n78A to Table 6.2B.1.3-1 |
| **R4-2016498**  Type: CR  CAT: F | Huawei, HiSilicon | ***Title:*** Rel-16 CR editorial corrections 38.101-3  ***WIC: NR\_newRAT-Core***  ***Reason for change:***  The delta TIB requirement for DC\_2-7-7-13\_n66 was missing in 38.101-3  ***Summary of change:***  Adding delta TIB requirement for DC\_2-7-7-13\_n66 to 38.101-3 |
| **R4-2016435**  Type: CR  CAT: F | vivo | ***Title:*** Correction to PCMAX for contiguous intra-band EN-DC  ***WIC: NR\_newRAT-Core***  ***Reason for change:***  An error seems to have been introduced into the specification during the implementation of R4-2000454. The configured maximum output power for E-UTRA cell group is not specified for contiguous intra-band EN-DC. Instead, the PCMAX for NR cell group is specified twice.  ***Summary of change:***  Replace specifications for PCMAX,f,c,NR with specifications for PCMAX\_ E-UTRA,c. Other corrections in symbol notation according to R4-2000454 |

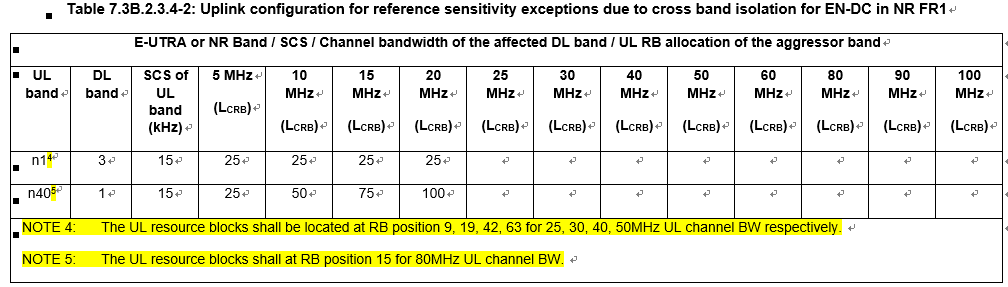
## Open issues summary

### Sub-topic 3-1 Larger channel BW

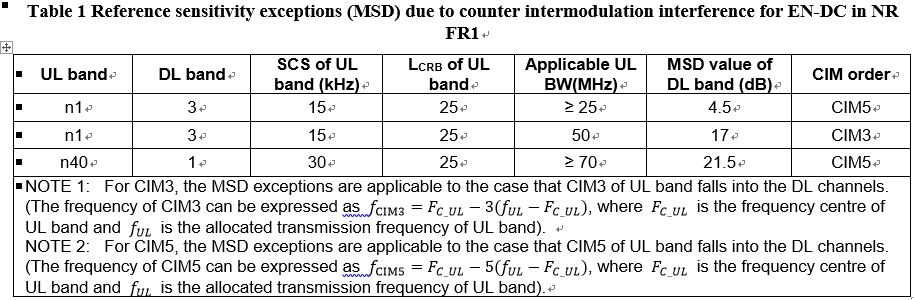
*Moderator notes: Paper R4-2014170, R4-2015042, R4-2015552, R4-2015795 are discussed in this sub topic which all about the handling of impact caused by new and larger CBW.*

**Issue 3-1-1: Regarding how to handle new and larger channel bandwidths introduced into NRCA and ENDC combinations which of the following options is acceptable?**

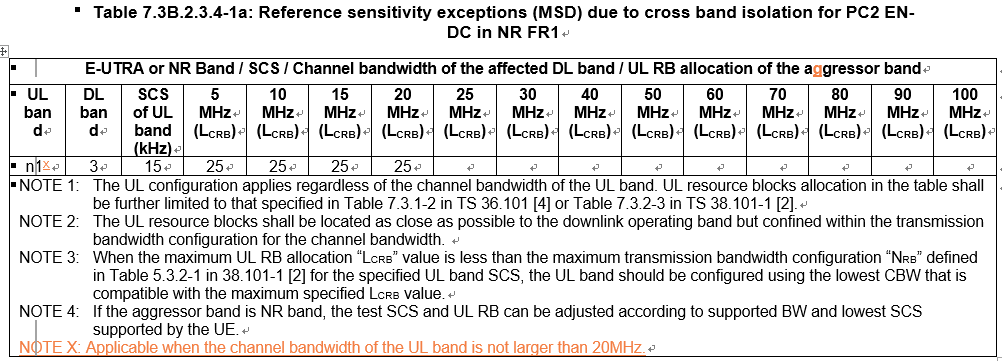
* + **Option 1: Modify the UL configuration table for larger UL channel BWs as shown below.**



* + **Option 2: RAN4 create a new MSD exception due to CIM interference as below. The original MSD due to cross band isolation can focus on the aggressive band PA spurious emission.**



* + **Option 3: For the Rel.16 combinations that face the issue on the cross band isolation with new added larger channel bandwidth, for example, DC\_3\_n1, limited UL BWs of the aggressor band for EN-DC combinations with the existing cross band noise MSD can be considered.**



*Moderator notes: Option1 is from paper R4-2014170, and the CR is R4-2014169. Option2 is from paper R4-2015552 with more proposals in issue 3-1-2. Option3 is from paper R4-2015795 and is open to other choices.*

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| **Company** | **Comments** |
| ZTE | Option 1. Actually option 1 is consistent with our view in R4-2015042, where we use the option order in the WF. We think it is more meaningful to look for some methods to avoid big MSD values than the values themselves. |
| MediaTek | Option 2 is our preference. The MSD due to wider CBW shall be specified. |
| Qualcomm | We prefer option 1 (our proposal along with ZTE).  The only issue seen with option 3 is that is the most simplistic, but it offers no information about how to deploy resource allocation with a band combination having larger BW.  The issue with option 2 is the variability among UE’s on the amount of MSD required. Also, it is better not to have this much detail in spec since the IM3 of CIM3+TX can be in same frequency position as CIM5. |
| CHTTL | We are fine to withdrawn option 3. |
| Huawei | For a certain band combination, we can’t easily skip them if larger MSD is identified. The MSD due to CIM have a deterministic frequency relation which is similar to the harmonic/harmonic mixing. Option 2 is preferred.  Option 1 is not general method by restricting RB position which is related to BW. We need to check the RB position and add the note one by one, if we want to extend to other band combination.  We can’t restrict the BW of UL band for network deployment. Thus, option 3 is not recommended.  To QC, your last comment is quite strange. CIM3 can be tested at the antenna connector. I can’t understand which component can generate the IMD of CIM3 + Tx after antenna connector. |
| Skyworks | Option 1 |

**Issue 3-1-2: Regarding SCS configurations to derive the MSD due to cross band isolation whether the proposals from R4-2015552 is acceptable?**

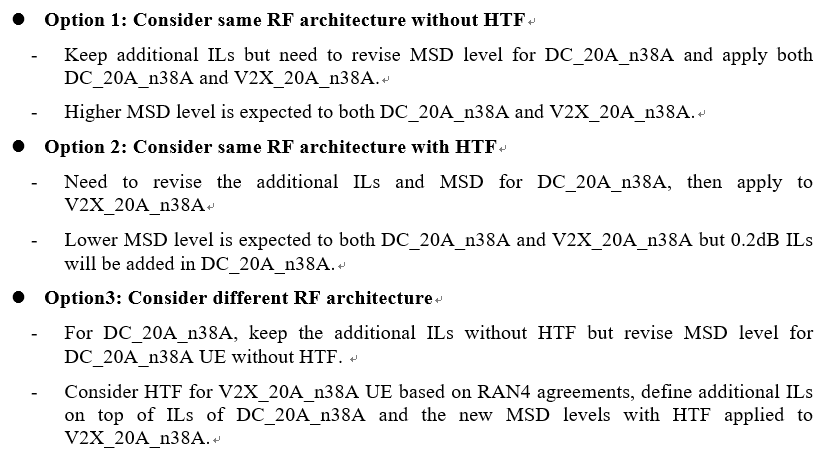
* + **Proposal 1: 15kHz SCS can be used for sub-3GHz FDD bands and sub-2.3GHz TDD/SUL bands except for n50 when RAN4 derive the UL configuration of the MSD due to cross band isolation.**
  + **Proposal 2: 30kHz SCS can be used for n41, n77, n78 and n79 when RAN4 derive the UL configuration of the MSD due to cross band isolation.**
  + **Proposal 3: UL SCS for n40 and n50 can be considered case by case. 15kHz or 30kHz or Both 15kHz and 30kHz can be used for n40 and n50 when RAN4 derive the UL configuration of the MSD due to cross band isolation.**
* Option 1: Yes
* Option 2: No

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| **Company** | **Comments** |
| ZTE | The above three proposals are more like observations, since if we look at the table, it seems we can obverse the above three proposals. |
| Qualcomm | Use the minimum supported SCS of the larger BW to determine the resource position for which there is no additional degradation. |
| Huawei | To ZTE: anyway, if these proposals are common understanding, they can be captured as agreements.  To QC: It looks fine. |
| Apple | Minimum supported SCS. |
| Skyworks | We share Qualcomm’s view. |

### Sub-topic 3-2 UE architecture assumption and requirements

*Moderator notes: Two main issues will be handled under this sub-topic, one is handling of different HTF assumptions in EN-DC requirements, the other is the architecture assumption for overlapping inter-band EN-DC.*

**Issue 3-2-1: Regarding HTF assumption in defining requirements which of the following options from R4-2014317 is acceptable to update the DC\_20A\_n38A delta Tib, delta Rib, and MSD requirements? If no options acceptable, please share the views.**



*Moderator notes: The conclusion will impact CR R4-2014318.*

* Option 1
* Option 2
* Option 3
* Other view

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| **Company** | **Comments** |
| LGE | Prefer option2 or option3. Especially option2 is more reasonable for both DC\_20\_n38 and V2X\_20\_n38 UE. |
| ZTE | either option 2 or option 3. It seems doesn’t make sense to define huge MSD value for a combination, instead methods should be adopt to avoid such MSD value. |
| Qualcomm | Other view: Do not want to modify the DC\_20A\_n38A MSD values that have already been agreed if the MSD values are going to be smaller than what they are in the current 38.101-3, v16.5.0 specifications. Agreeable to aligning architectures as long as MSDs for V2X\_20\_n38 based on an agreed RF architecture is equal to or larger than the current MSDs for V2X\_20\_n38 given in R4-2014325 in table 10.2.2.1a-1. Also, in our opinion the standard should give the required MSD specifications but should not mandate the architecture that should be implemented to achieve this performance. |
| OPPO | Similar discussions are happening in V2X thread [109] (Issue 2-1: MSD for V2X\_20\_n38), it needs to avoid conflict conclusions. |

**Issue 3-2-2: Regarding UE architecture for overlapping inter-band EN-DC whether the following proposals from R4-2014883 is acceptable or not?**

* + **Proposal 1: Conform RF assumption in Rel-15 and Rel-16 that DC\_42\_n77 and DC\_B42\_n78 have intra-band architecture.**
  + **Proposal 2: Recommend that power imbalance requirements as UE demod requirements shall apply some inter-band EN-DC configuration where intra-band EN-DC requirements apply, e.g., DC\_42\_n77 and DC\_42\_n78.**

*Moderator notes: There is special request from this paper, i.e. “To avoid the delay of discussion in UE demod, agree Proposal 1 and Proposal 2 in 1st round discussion in RAN#97 and give feedback to UE demod session before 2nd round”.*

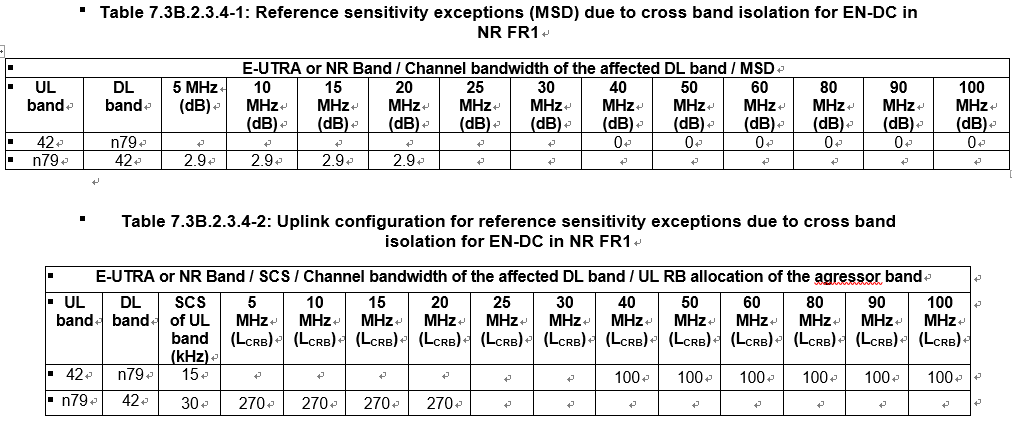
* Option 1: Yes
* Option 2: No

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| **Company** | **Comments** |
| LGE | For reception requirements perspective in DC\_42\_n77 or DC\_42\_n78, it is possible to operate with simultaneous reception as intra-band DC RF architecture.  The power imbalance requirements for DC\_42\_n77 or DC\_42\_n77 is up to demodulation session decision. |
| SoftBank | Support option 1. We have already discussed the UE architecture for DC\_42\_n77/DC\_42\_n78.  I understand the LGE's comment that it is up to the decision of demodulation session. But I think we need to inform the demodulation session that there is no concern for applying the power imbalance requirements to DC\_42\_n77/DC\_42\_n78 from the perspective of RF assumption. |
| Qualcomm | Note 11 is an error in 38.101-3 release 16 and should be removed. We can agree with all proposals. |
| NTT DOCOMO, INC | We support option 1.  For LGE:  Yes, so we use a word “Recommend” in proposal 2. RF session would recommend but the final decision is up to demod session.  We would like to note that the following agreement was made in demod session in last meeting, and that’s why we proposed proposal 2.  *Agreement: Companies are encouraged to further check this scenario in RF agenda in next meeting, with the confirmation in RF part, we can introduce requirements for such case (option 1).*  With this clarification, we hope two proposals would be agreeable. |
| Skyworks | We agree to all proposals. |

### Sub-topic 3-3 Simultaneous Tx/Rx

**Issue 3-3-1: Regarding Simultaneous Tx/Rx DC\_42\_n79 whether the following proposals from R4-2015555 is acceptable or not?**

* + **Proposal 1: To introduce MSD values as below between band 42 and n79 if UE choose to support simultaneous Tx/Rx for DC\_42\_n79.**



* Option 1: Yes
* Option 2: No

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| **Company** | **Comments** |
| LGE | RAN4 agreed B42 will be synchronous operation with n77 and n78. And Also we have agreements for n77 and n79 that n79 will be synchronous operation with n77 due to small frequency gap.  So, we do not want to specify MSD requirements due to synchronous operation between B42 and n79. |
| ZTE | We agree with LGE. |
| MediaTek | If B42 is implemented with n77 filter, then we agree with LGE’s comment.  If B42 is implemented with single B42 filter or n78 filter, we can agree option 1 with adding a note to tell “the simultaneous TX/RX of B42\_n79 requirements is not applied for B42 with n77 implementation.” |
| NTT DOCOMO, INC | Related contribution R4- 2016238 is submitted by Skyworks, which is discussed in [104].  We have same understanding with Media Tek, simultaneous Rx/Tx for B42\_n79 is available when B42 is implemented with n78 filter. This is same assumption with simultaneous Rx/Tx for n78-n79 which has already introduced in TS 38.101-1.  But CR should be revised: UL configuration of B42 is not used in DC\_B42\_n79 as described in NOTE 9 in Table 5.5B.4.1-1 in TS 38.101-3. So, MSD from B42 to n79 is not needed. |
| Huawei | We are open to assume B42 will be synchronous operation with n79. However, R4-2016238 in thread [104] have a different view about synchronous operation between band 42 and n79. Maybe RAN4 need to be aligned with each other. If non-synchronous operation is allowed, the proposed MSD value should be considered. |
| Apple | We have similar view as LGE, and don’t agree on the support of simultaneous RxTx for DC\_42-n79. Therefore, MSD is not needed if synchronous operations is assumed. |
| Skyworks | We have 2 CRs related to this: R4-2016238 for REL-15 and R4-2016241 mirror for REL-16. The filter assumptions in this analysis must be aligned with these change requests. Further discussion is needed. |

## Companies views’ collection for 1st round

### CRs/TPs comments collection

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| **CR/TP number** | **Comments collection** |
| R4-2014169 | Title: CR CatF Cross Band Noise DC\_3\_n1\_highBW  *Moderator Note: This paper reply on whether discussion paper R4-2014170 is approved.* |
| ZTE: ‘RB position ’ is not clear. Does it from the lower edge or form upper edge? also, is note 2 applicable for large CBW MSD cases?  Qualcomm: If preferable, we could state RB\_start instead of RB position.  It is meant to be the absolute position of the resource allocation regardless of whether the DL band is at a higher or lower frequency.  Yes, applying note 2 removes all added effect of the TX distortion in the DL band excluding the adjacent noise of the distortion itself. If UE feels that more margin is required fot adjacent noise, then the RB position can be modified within reason. |
| R4-2014318 | Title: Correction on additional ILs and MSD levels for DC\_20\_n38 UE  *Moderator Note: This paper reply on the conclusion of discussion paper R4-2014317, i.e. which option is chosen. Now the changes are based on UEs with HTF.* |
| Qualcomm: Agreeable to the additional ILs as long as the MSD levels for DC\_20\_n38 do not become smaller than the values given in 38.101-3, v16.5.0 |
| R4-2014582 | Title: CR to TS 38.101-3 (Rel-16) Error corrections to configurations for CA and DC  *Moderator Note: Editorial changes.* |
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| R4-2015264 | CR for 38.101-3 Rel16 corrections on ACS requirements for intra-band contiguous EN-DC |
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| R4-2015323 | Alignment of descritpion of the power class restriction for inter-band EN-DC |
| Qualcomm: Don’t agree with this change. This change means that the cell group power class is restricted to PC3 in EN-DC even if the UE signals PC2 in that cell group for SA.  OPPO: Same view as QC.  Vivo: The original WI (ENDC\_UE\_PC2\_TDD\_TDD) which introduce this feature clearly stated in the WID RP-190315 that only the case that both LTE and NR PC3 is considered which is also copied below: “The objective of the work item is to specify the RF requirements for Power Class 2 EN-DC (1 LTE band (PC3) +1 NR band (PC3) with 1Tx). ” In fact, the original note is also try to reflect this but not that clearly drafted, thus may cause some confusion.  By comparison, more refined wording is used in FDD-TDD EN-DC case, in which the scope of WID clearly include two cases 23&26dBm case for NR part. There is a reason for the difference. |
| R4-2015324 | Correction of delta Powerclass for Inter-band EN-DC  *Moderator note: Content has been agreed before for EN-DC but implemented to a wrong section (NE-DC). This CR is reintroduce content for EN-DC.* |
| OPPO: CR content is ok but question is the mistakenly introduced NE-DC section should be removed since there is no PC2 in NE-DC.  Vivo: Indeed there is no power class 2 definition of NE-DC case in Rel-16. However, the parameter ΔPPowerClass,NE-DC has been introduced for some time. Keeping it currently seems no serious problem, as always there would be 0dB for it since no PC2 UE available. Thus we think it can be discuss further whether and how to remove NE-DC part and currently we can focus on EN-DC part in this CR. |
| R4-2015331 | CR on NR power class under EN-DC  *Moderator note: Align the NR power class capability with 38.331.*  Qualcomm: Ok with the change  Huawei: the IE for Pcmax clause should be updated as well. |
| R4-2015729 | CR to TS 38.101-3 corrections on inter-band EN-DC configurations including FR1 and FR2 |
|  |
| R4-2015981 | Verification of the P-MPR method for EN-DC FDD-TDD power class 2  *Moderator note: Introduce a test case for the P-MPR* |
| Qualcomm: It is not clear that this CR is needed since the Pcmax requirement is already specified for EN-DC and can be used as-is. For example, the CR proposes a supplemental requirement for the case when there is no overlap between subframes p and q on MCG and SCG, but the general Pcmax already provides a requirement when there is no overlap. Similarly, when there is overlap, a requirement already exists.  OPPO: There is no need to verify PMPR. There is no difference in EN-DC HPUE comparing to from the beginning of this PMPR introduced.  Huawei: Not sure it can fulfill the purpose for P-MPR verification. The Pcmax requirements defined in Rel-15 cover both over lapping and non-overlapping scenarios. Noted that triggering P-MPR relies on some conditions in real application which are up to UE implementation. Test cases proposed in the CR are not necessary.  Vivo：Test cases proposed in this CR are not necessary.:  Ericsson:  to OPPO: no need to verify? The P-MPR method for HPUE is proprietary and its behavior and output performance unspecified. The method should be able to produce full power on the TDD band with FDD at 23 dBm for a case in which the average power over a radio frame is 23 dBm.  To Qualcomm: the purpose of the test is to verify that there is no power dropping when the average power is less than or equal to 23 dBm. The requirements on each CG apply as per the respective SA specification (the problem is that the modifications of the configured power of the CG made in 38.101-3, e.g. PNR, is not included in the applicable SA specifications). |
| R4-2016343 | Rel-16 CR editorial corrections 38.101-3 |
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| R4-2016498 | CR for TS 38.101-3: Adding delta TIB requirement for DC\_2-7-7-13\_n66 (R16) |
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| R4-2016435 | Correction to PCMAX for contiguous intra-band EN-DC |
|  | Qualcomm: This CR is sourced by Qualcomm. |

## Summary for 1st round

### Open issues

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|  | **Status summary** |
| Issue 3-1-1: Regarding how to handle new and larger channel bandwidths introduced into NRCA and ENDC combinations which of the following options is acceptable? | Moderator summary:   1. Option 3 (limit UL BWs of the aggressor band for EN-DC) is agreed to be withdrawn; 2. Option 1 (restrict RB location) is supported by three companies, while Option 2 (create a new CIM table) is supported by two companies, no conclusion can be drawn.   Suggest to continue discuss based on a WF in 2nd round. |
| Issue 3-1-2: Regarding SCS configurations to derive the MSD due to cross band isolation whether the proposals from R4-2015552 is acceptable? | Moderator summary:  It is agreed that the minimum supported SCS of the larger BW to determine the resource position for which there is no additional degradation |
| Issue 3-2-1: Regarding HTF assumption in defining requirements which of the following options from R4-2014317 is acceptable to update the DC\_20A\_n38A delta Tib, delta Rib, and MSD requirements? If no options acceptable, please share the views. | Moderator summary:  Different views are shown, suggest to continue discuss in 2nd round based on a WF. |
| Issue 3-2-2: Regarding UE architecture for overlapping inter-band EN-DC whether the following proposals from R4-2014883 is acceptable or not? | Moderator summary:  The proposal 1 and 2 can be agreed. |
| Issue 3-3-1: Regarding Simultaneous Tx/Rx DC\_42\_n79 whether the following proposals from R4-2015555 is acceptable or not? | Moderator summary:  Different views on the assumption of synchronization status for B42 and n79, and also the filters used for B42. Further discussion is needed based on a WF.  Besides, alignment the conclusion on the simultaneous Rx/Tx for B42+n79 with CR R4-2016238 in email [104] is needed. |

*Recommendations on WF/LS assignment*

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|  | **WF/LS t-doc Title** | **Assigned Company,**  **WF or LS lead** |
|  | WF on handling of interference caused by larger CBWs  (Note: cover issue Issue 3-1-1 and Issue 3-1-2) | Qualcomm |
|  | WF on DC\_20A\_n38A RF architecture  (Note: cover issue Issue 3-2-1) | LGE |
|  | WF on simultaneous Rx/Tx for DC\_42\_n79  (Note: cover issue Issue 3-3-1, align the conclusion on the simultaneous Rx/Tx for B42+n79 with CR R4-2016238 in email [104]) | Huawei |

### CRs/TPs

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| **CR/TP number** | **CRs/TPs Status update recommendation** |
| R4-2014169 | Title: CR CatF Cross Band Noise DC\_3\_n1\_highBW  *Moderator Note: This paper reply on whether discussion paper R4-2014170 is approved.* |
| No conclusion is drawn for Issue 3-1-1 in 1st round. The CR can be further discussed in 2nd round once conclusion can be made in Issue 3-1-1. |
| R4-2014318 | Title: Correction on additional ILs and MSD levels for DC\_20\_n38 UE  *Moderator Note: This paper reply on the conclusion of discussion paper R4-2014317, i.e. which option is chosen. Now the changes are based on UEs with HTF.* |
| No conclusion is drawn for Issue 3-2-1 in 1st round. The CR can be further discussed in 2nd round once conclusion can be made in Issue 3-2-1. |
| R4-2014582 | Title: CR to TS 38.101-3 (Rel-16) Error corrections to configurations for CA and DC  *Moderator Note: Editorial changes.* |
| No comments received in 1st round, suggest to be agreed. |
| R4-2015264 | CR for 38.101-3 Rel16 corrections on ACS requirements for intra-band contiguous EN-DC |
| No comments received in 1st round, suggest to be agreed. |
| R4-2015323 | Alignment of descritpion of the power class restriction for inter-band EN-DC |
| Different view on the power class restriction, continue discuss in the 2nd round to get common understanding of EN-DC TDD+TDD HPUE. |
| R4-2015324 | Correction of delta Powerclass for Inter-band EN-DC  *Moderator note: Content has been agreed before for EN-DC but implemented to a wrong section (NE-DC). This CR is reintroduce content for EN-DC.* |
| No concern on the content, CR can be agreed. |
| R4-2015331 | CR on NR power class under EN-DC  *Moderator note: Align the NR power class capability with 38.331.*  No concern on the content of this CR, and it is commented that Pcmax section also need this change which can be done in a CR next meeting. CR suggest to be agreed. |
| R4-2015729 | CR to TS 38.101-3 corrections on inter-band EN-DC configurations including FR1 and FR2 |
| No comments received in 1st round, suggest to be agreed. |
| R4-2015981 | Verification of the P-MPR method for EN-DC FDD-TDD power class 2  *Moderator note: Introduce a test case for the P-MPR* |
| No conclusion can be drawn whether this test case for PMPR is needed or not. More discussion is needed in 2nd round with more clarifications. |
| R4-2016343 | Rel-16 CR editorial corrections 38.101-3 |
| No comments received in 1st round, suggest to be agreed. |
| R4-2016498 | CR for TS 38.101-3: Adding delta TIB requirement for DC\_2-7-7-13\_n66 (R16) |
| No comments received in 1st round, suggest to be agreed. |
| R4-2016435 | Correction to PCMAX for contiguous intra-band EN-DC |
|  | No concern with the content in 1st round, suggest to be agreed. |

## Discussion on 2nd round

The following WF and revised CR will be discussed in 2nd round to seek for approval and agreement.

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|  | **Title:** |
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|  | **Title:** |
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## Summary on 2nd round

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

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| **CR/TP/WF number** | **CRs/TPs/WFs Status update recommendation** |
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# Topic #3: Papers for other Specs

## Companies’ contributions summary

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| **T-doc number** | **Company** | **Proposals / Observations** |
| **R4-2014600**  Type: CR  CAT: F | LGE | ***Title:*** CR for adding NR overlapping bands list in TS38.307  ***WIC:*** NR\_newRAT-Core  ***Reason for change:***  This CR is to update NR overlapping bands list in TS38.307  ***Summary of change:***  This CR is to add NR overlapping bands list in annex A |
| **R4-2014620**  Type: CR  CAT: F | LGE | ***Title:*** CR for adding NR overlapping bands list in TS38.307 v16.4.0  ***WIC:*** NR\_newRAT-Core  ***Reason for change:***  This CR is to update NR overlapping bands list in TS38.307  ***Summary of change:***  This CR is to add NR overlapping bands list in annex A |
| **R4-2015856**  Type: CR  CAT: B | CHTTL, ZTE Corporation, Dish, SGS Wireless | ***Title:*** CR to TS 38.307 on release independent update for the Rel.16 EN-DC and NR CA/DC  ***WIC:*** NR\_CA\_R16\_intra-Core  NR\_CADC\_R16\_2BDL\_xBUL-Core  DC\_R16\_1BLTE\_1BNR\_2DL2UL-Core  DC\_R16\_2BLTE\_1BNR\_3DL2UL-Core  DC\_R16\_3BLTE\_1BNR\_4DL2UL-Core  DC\_R16\_4BLTE\_1BNR\_5DL2UL-Core  DC\_R16\_5BLTE\_1BNR\_6DL2UL-Core  DC\_R16\_xBLTE\_2BNR\_yDL2UL-Core  NR\_SUL\_combos\_R16-Core  NR\_CA\_R16\_3BDL\_1BUL-Core  NR\_CA\_R16\_4BDL\_1BUL-Core  NR\_CADC\_R16\_3BDL\_2BUL-Core  DC\_R16\_LTE\_NR\_3DL3UL-Core  ***Reason for change:***  More Rel.16 EN-DC and NR CA/DC configurations have been introduced in latest TS 38.101-1, 38.101-2, 38.101-3, an update is needed for the release independent specification.  Note that the draft CR with same content was endorsed in RAN#96-e, R4-2011781  ***Summary of change:***  Update release-independent information for Rel.16 EN-DC and NR CA/DC configurations to be release independent from Rel.15.  Note that the NR-NR DC within FR1 is release independent from Rel.16. |
| **R4-2014328**  Type: CR  CAT: F | Reliance Jio | ***Title:*** LTE/NR spectrum sharing in Band 40/n40  ***WIC:*** DSS\_LTE\_B40\_NR\_Bn40\_Core  ***Reason for change:***  To enable dynamic spectrum sharing between LTE and NR in B40/n40 band  ***Summary of change:***  Section 5.4.2.1, Introduction of 7.5 KHz UL shift (FREF, shift) in TDD band n40 |
| **R4-2014329**  Type: CR  CAT: F | Reliance Jio | ***Title:*** LTE/NR spectrum sharing in Band 40/n40  ***WIC:*** DSS\_LTE\_B40\_NR\_Bn40\_Core  ***Reason for change:***  To enable dynamic spectrum sharing between LTE and NR in B40/n40 band  ***Summary of change:***  Section 5.4 and B.4.7 added for UL 7.5KHz shift in n40 band |

## Companies views’ collection for 1st round

### CRs/TPs comments collection

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| **CR/TP number** | **Comments collection** |
| R4-2014600 | Title: CR for adding NR overlapping bands list in TS38.307  *Moderator note: This paper is for Rel-15* |
| LGE: need to specify in TS38.307 to support MFBI  Nokia: RAN2 reference may be wrong. multiBandInfoListNR-SIB --> MultiFrequencyBandListNR-SIB  LGE: To Nokia, you are correct, we can revise CR to update the SIB signaling with MultiFrequencyBandListNR-SIB.  OPPO: Not clear why this table is needed. More clarification is needed. |
| R4-2014620 | Title: CR for adding NR overlapping bands list in TS38.307 v16.4.0  *Moderator note: This paper is same as 4600 for Rel-16.* |
| LGE: need to specify in TS38.307 to support MFBI  Nokia: RAN2 reference may be wrong. multiBandInfoListNR-SIB --> MultiFrequencyBandListNR-SIB  LGE: To Nokia, you are correct, we can revise CR to update the SIB signaling with MultiFrequencyBandListNR-SIB.  OPPO: Not clear why this table is needed. More clarification is needed. |
| R4-2015856 | CR to TS 38.307 on release independent update for the Rel.16 EN-DC and NR CA/DC |
| ZTE: Agree.  Nokia: Yellow highlights should be removed.  Huawei: Thanks for the contributions. The indication for duplex mode is unnecessary for the band combinations with mixing duplex mode, since RAN4 never discuss the requirements or capabilities based mixing duplex mode for the band combination. We may still lost the mixing duplex mode, such as “SDL and FDD” for inter-band CA since Rel-15. The duplex mode for band combinations is confused and meaningless, so we can remove them. |
| R4-2014328 | LTE/NR spectrum sharing in Band 40/n40  *Moderator note: CR to 38.104* |
| Huawei: Band n40 can be added into this sentence “For bands n38 and n48, FREF, shift is only applicable to uplink transmissions using a 15 kHz SCS.” And remove the last one. |
| R4-2014329 | LTE/NR spectrum sharing in Band 40/n40  *Moderator note: CR to 38.307* |
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## Summary for 1st round

### CRs/TPs

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| **CR/TP number** | **CRs/TPs Status update recommendation** |
| R4-2014600 | Title: CR for adding NR overlapping bands list in TS38.307  *Moderator note: This paper is for Rel-15* |
| Revise the CR for the changes of multiBandInfoListNR-SIB --> MultiFrequencyBandListNR-SIB, and further clarify the reason for introducing NR overlapping band list in 38.307. Continue discuss in 2nd round.  Besides, coversheet “Other specs affected” should be marked. |
| R4-2014620 | Title: CR for adding NR overlapping bands list in TS38.307 v16.4.0  *Moderator note: This paper is same as 4600 for Rel-16.* |
| Revise the CR for the changes of multiBandInfoListNR-SIB --> MultiFrequencyBandListNR-SIB, and further clarify the reason for introducing NR overlapping band list in 38.307. Continue discuss in 2nd round.  Besides, coversheet “Other specs affected” should be marked. |
| R4-2015856 | CR to TS 38.307 on release independent update for the Rel.16 EN-DC and NR CA/DC |
| Revise the CR according to the comments, i.e. consider removing yellow highlighted, and the duplex mode. Then further discuss in 2nd round. |
| R4-2014328 | LTE/NR spectrum sharing in Band 40/n40  *Moderator note: CR to 38.104* |
| Same issue as CR R4-2014327, and there are at least two cover sheet errors in the CR, i.e. the source to TSG should be R4 and the work item code should be DSS\_LTE\_B40\_NR\_Bn40-Core.  According to the CR quality control “*If a CR has two or more errors on its coversheet, please indicate so in your moderator summary and the recommendation is “Postponed”. Technical points captured in such CRs can still be discussed*” this CR suggest to be postponed.  Regarding the contents consider revising the CR according to comments. |
| R4-2014329 | LTE/NR spectrum sharing in Band 40/n40  *Moderator note: CR to 38.307* |
| No comments received in 1st round, this CR can be agreed. |

## Discussion on 2nd round (if applicable)

## Summary on 2nd round (if applicable)

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

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| **CR/TP/WF number** | **CRs/TPs/WFs Status update recommendation** |
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