**3GPP TSG-RAN WG4 Meeting #98-e R4-2xxxx**

**Electronic Meeting, 25 Jan. - 5 Feb., 2021**

**Agenda item:** 7.19.3

**Source:** Moderator (OPPO)

**Title:** Email discussion summary for [98e][113] 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 three areas, i.e. papers for 38.101-1, for 38.101-2, for 38.101-3.

# Topic #1: Papers for 38.101-1

## Companies’ contributions summary

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| **T-doc number** | **Company** | **Proposals / Observations** |
| **R4-2100112**CAT F CR(R4-2100119CAT A CR) | AT&T | ***Title:*** PC1 and PC3 Updates for Band n14***WIC: NR\_n14-Core******Reason for change:*** 1) NR Band n14 specifies PC1 operation and the associated maximum output power requirements. However, some of the PC1 requirements associated with NR Band n14 have not been included in other affected clauses; 6.2.2 UE maximum output power reduction and 6.5.2.4.1 NR ACLR.2) The PC3 maximum output power requirement for NR Band n14 should not include the deltaTC relaxation. From R4-091742, the feedback from duplex filter vendors indicated that the relative duplex gap should be used as a figure of merit when defining deltaTC. All bands that have a relative duplex gap < 1.75% should have deltaTC relaxation. However, NR Band n14 has a relative duplex gap of 2.5%. Therefore, the PC3 maximum output power requirement for NR Band n14 should not include the deltaTC relaxation.3) The indication of when UTRAACLR is not applicable for certain NR operating bands is not included in the specification. Similar statements exist in the E-UTRA specification and should be leveraged.***Summary of change:***1) Updated the associated PC1 requirements based on leveraging the principles used for E-UTRA PC1 for Band 14.2) Updated the PC3 maximum output power requirement for NR Band n14 to remove the deltaTC relaxation note.3) Added statements concerning when UTRAACLR is not applicable for certain NR operating bands based on deployment scenarios and leveraging the approach utilized in the E-UTRA specification. |
| R4-2100136CAT F CR(R4-2100137 CAT A CR) | Nokia, Nokia Shanghai Bell | ***Title:*** 38.101 Void clean up R16***WIC: NR\_newRAT-Core******Reason for change:*** There exists still three clause headers with Void which may have content if future. Void needs to changed to reserved.***Summary of change:***Void is changed to reserved |
| R4-2100163CAT F CR(R4-2102557 CAT A CR) | Nokia, Nokia Shanghai Bell | ***Title:*** CR for n47 AMPR***WIC: TEI16******Reason for change:*** Region for AMPR does not include relevant RB allocations***Summary of change:***Change region threshold from > 24.48MHz to ≥23.04MHz to account for counter IM3 emission for all sub-carrier spacings up to 60KHz |
| R4-2100846CAT F CR(R4-2100847 CAT A CR) | SoftBank Corp., ZTE Corporation | ***Title:*** CR for 38.101-1: Update of missing fallback NR-DC combinations Rel-16***WIC:*** TEI16***Reason for change:*** DC\_n3-n28-n257, DC\_n3-n77-n257, DC\_n3-n78-n257, DC\_n28-n77-n257 and DC\_n28-n78-n257 have been specified in Rel-16 but the fallback DC combos, DC\_n3-n28, DC\_n3-n77, DC\_n3-n78, DC\_n28-n78 were missing***Summary of change:***Update DC\_n3-n28, DC\_n3-n77, DC\_n3-n78, DC\_n28-n78 to Rel-16 spec |
| R4-2100876CAT F CR(R4-2100877 CAT A CR) | SoftBank Corp. | ***Title:*** CR for 38.101-1: Update of simultaneous Rx/Tx capability for some NR CA band combinations Rel-16***WIC:*** TEI16***Reason for change:*** In some inter-band CA combinations, the note for the mandatory support of simultaneous Rx/Tx capability was missing.***Summary of change:***Update the note in some inter-band CA combinations |
| R4-2101106CAT F CR(R4-2101107 CAT A CR) | Xiaomi | ***Title:*** CR for 38.101-1 Rel16 corrections on exception requirements on out-of-band blocking for inter-band CA***WIC:*** NR\_newRAT-Core***Reason for change:*** The combinations of CA\_n5-n77, CA\_n5-n78 and CA\_n28-n78 also meet the exception condition for out-of-band blocking, which should be included in the corresponding table 7.6A.3.3-1.***Summary of change:***Adding the combinations of CA\_n5-n77, CA\_n5-n78 and CA\_n28-n78 into the exception table 7.6A.3.3-1 |
| R4-2101723CAT F CR | Ericsson | ***Title:*** Modification of Pcmax for UL CA with uplink Tx switching capability***WIC:*** TEI16***Reason for change:*** For an inter-band UL CA configuration with UL TX switching (switching between carrier 1 and carrier 2), the maximum power on carrier 2 is boosted by 3 dB if the *uplinkTxSwitchingPowerBoosting-r16* is enabled and the capability *uplinkTxSwitching-PowerBoosting-r16* is supported by the UE. This is currently specified in clause 6.3A.3.3 on the transmit ON/OFF time mask for inter-band CA, but should be specified in the clause on configured power (Pcmax) for CA. However, the Pcmax for UL CA does not allow 3 dB power boosting for the BC, the total power is capped by the default CA power class (PC3); a modification is needed. The UE would apply prioritization of the transmissions according to clause 7.5 of 38.213 already at Pcmax = 23 dBm.The 38.331 specifies the conditions that apply when the *uplinkTxSwitchingPowerBoosting-r16* is enabled (*CellGroupConfig*)***uplinkTxSwitchingPowerBoosting***Indicates whether the UE is allowed to enable 3dB boosting on the maximum output power for transmission on carrier2 under the operation state in which 2-port transmission can be supported on carrier2 for inter-band UL CA case with dynamic UL Tx switching as defined in TS 38.101-1 [15]. Network can only configure this field for dynamic UL Tx switching in inter-band UL CA case with power Class 3 as defined in TS 38.101-1 [15].The UE behavior with uplinkTxSwitchingPowerBoosting enabled is governed by the 38.331, the 38.101-1 only specifies the associated maximum output power requirement that applies under the conditions cited above***Summary of change:***Clause 6.2A.1.3: for CA configuration of PC3, the requirements for PC2 for uplink operation in n41, n77, n78 and n79 apply when the *uplinkTxSwitchingPowerBoosting-r16* is enabled and *uplinkTxSwitching-PowerBoosting-r16* is supported.Clause 6.2A.2.3: it is clarified that the MPR for power class 2 applies when boosting is enabled.Clause 6.2A.3.1.3: it is clarified that the A-MPR for power class 2 applies when boosting is enabled.Clause 6.2A.4.1.3: the PCmax for UL CA is modified with boosting for the default CA power class (PC3). This change does not modify the CA power class indicated for the band combination (the default), but the PCMAX for CA is increased (and the threshold at which the UE should start scaling according to clause 7.5 of 38.213) by Ppowerclass,CA = 3 dB (i.e. 26 dBm total for CA). The UE might support either PC3 or PC2 for the consituent bands but the CA power class is the default. The PEMAX,CA must be set to 26 dBm to enable boosting, configured by the gNB.Clause 6.3A.3.3: a reference to the specification of the power boosting is added and the IE names corrected in accordance with the latest version of 38.331. |
| R4-2101809CAT F CR(R4-2101810 CAT A CR) | Huawei, HiSilicon, Reliance Jio | ***Title:*** CR for 38.101-1 to introduce PC2 for n40 UL MIMO(Rel-16)***WIC:*** TEI16***Reason for change:*** Referring to the agreed CR R4-2009718, PC2 UE has been introduced into spec for NR band n40. However, the PC2 UL MIMO for n40 is missing***Summary of change:***To introduce PC2 UL MIMO for n40 |
| R4-2101852CAT F CR | ZTE Wistron Telecom AB | ***Title:*** CR to TS 38.101-1 Operating bands for DC***WIC:*** TEI16***Reason for change:*** The information on operating bands for DC is not located in a right place, and the citation to the CA configuration is incorrect.***Summary of change:***(1) Create Table 5.2B.1-1 (2) Correct the citation 5.5A.3 as 5.5A.3.1 |
| R4-2101939CAT F CR(R4-2101940 CAT A CR) | Huawei, HiSilicon, DT | ***Title:*** CR for 38.101-1 to add missing spurious emissions for band n38 UE co-existence (Rel-16)***WIC:*** TEI16***Reason for change:*** Based on the agreed CR R4-2016803, the n77 and n78 to the protected band lists for NR bands n38 are added. However, the n79 to protected band lists for band n38 is missing withour any reasons.Currently, it has a strong demand to deploy band n38/38 and n79 in the same geographical area. Thus, it’s necessary to add n79 spurious emissions for band n38 UEco-existence***Summary of change:***To add n79 spurious emissions for band n38 UEco-existence |
| R4-2102152CAT F CR(R4-2102153 CAT A CR) | T-Mobile USA | ***Title:*** CR for 38.101-1: Add CA\_n25A-n41(2A)-n71A which was missing in the CR implementation***WIC:*** NR\_CA\_R16\_3BDL\_1BUL-Core***Reason for change:*** CA\_n25A-n41(2A)-n71A was included in the big CR 0234 in RP-200380, but was never included in the spec. The RAN4 big CR was R4-2002921***Summary of change:***Adds CA\_n25A-n41(2A)-n71A |
| R4-2102203CAT F CR(R4-2102204 CAT A CR) | ZTE Corporation | ***Title:*** CR to TS38.101-1: Correction on configured transmitted power requirement***WIC:*** NR\_newRAT-Core***Reason for change:*** According to the configured transmitted power single carrier, the total power reduction is (MPR+ ∆MPR) dB. Also the feature of PC2 inter-band NR-DC combination is not supported in Rel-16. In addition, the explanation for some inter-band DC specified terms in the formulas are missing***Summary of change:***1. 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
2. Add the explanations for some inter-band DC specified terms
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| R4-2102602CAT F CR(R4-2102603 CAT A CR) | Apple | ***Title:*** CR for TS 38.101-1: Cleanup for spurious emissions for UE co-existence table***WIC:*** TEI16***Reason for change:*** 1. Band 10 does not need to be included in n5/n89 and n25 protection band list.2. n5 protection to Band 53 should be under harmonic spurious emission requirement. (3rd harmonic)3. n8, n81 was mistakenly written as 5 in Table 6.5.3.2-1.4. n12 protection to Band 51 should be under harmonic spurious emission requirement. (2nd harmonic)5. n28/n83 protection to Band 52 should not be under harmonic spurious emission requirement.6. Band 39 does not need to be protected from n28, n83.7. Some protected bands in CA combinations are missing harmonic exception.***Summary of change:***In Table 6.5.3.2-1,1. Remove Band 10 from n5/n89 and n25 protection band list.
2. For n5, move protected Band 53 to the row with NOTE 2.
3. Change “5” in NR band column to “n8, n81”
4. For n12, move protected Band 51 to the row with NOTE 2.
5. For n28/n83, move protected Band 52 to the row without NOTE.
6. Remove Band 39 from n28, n83 protection band list.

In Table 6.5A.3.2.3-1,1. For CA\_n1-n28, bands 11 and 21 require exception for 2nd harmonic but have NOTE 15 granting exception for 3rd harmonic. Similar bands 1 and 65 require exception for 3nd harmonic but have NOTE 12 granting exception for 2rd harmonic. This is true in single band n28 and therefore corrected.
2. For CA\_n3-n28, bands 32, 50, 51 and 74 are missing harmonic exceptions as found in single band n28.
3. For CA\_n5-n78, band 41 is missing harmonic exception as found in single band n5
4. For CA\_n7-n25, band n78 is missing harmonic exception
5. For CA\_n20-n28, harmonic exceptions, found in single band, were missing
6. CA\_n25-n66, band n78 require harmonic exception
7. CA\_n28-n50, bands 48 and n79 are missing harmonic exception as found in single band n28
8. CA\_n28-n77, band 65 and 74 are missing harmonic exception as found in single band n28
9. CA\_n28-n78, band 65 is missing harmonic exception as found in single band n28
10. CA\_n39-n79, band n78 is missing harmonic exception as found in single band n39
11. CA\_n50-n78, band n78 is missing harmonic exception
12. CA\_n66-n71, band 7 and 77 are missing harmonic exception

CA\_n70-n71, band 7 is missing harmonic exception |
| R4-2102685CAT F CR(R4-2102816 CAT A CR) | Huawei, HiSilicon | ***Title:*** CR on TS 38.101-1 NS\_49***WIC:*** TEI16***Reason for change:*** There is some missing parameters on AMPR NS\_49***Summary of change:***Add region definiton in the blanket part, the number follows agreed CR R4-2002843 |
| R4-2102386CAT F CR | Huawei, HiSilicon | ***Title:*** CR for TS 38.101-1: correction of Pi/2 BPSK***WIC:*** NR\_eMIMO-Core***Reason for change:*** There was no evaluation of Pi/2 BPSK with new DMRS for intra-band CA in Rel-16. And there is no A-MPR table in clause 6.2A.2.1.***Summary of change:***Remove the description of Pi/2 BPSK in clause 6.2A.2.1 for intra-band CA |
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| **R4-2101175**Type: Discussion for Approval | Qualcomm | **Title:** n40-n41 Coexistence**Observation 1:** Removing the synchronous condition and relaxing the coexistence limit can degrade the victim RX performance by 4-6dB, so UL RB restriction should be considered as an alternative if this degradation is not acceptable.**Proposal 1:*** For n41->n40, use coexistence requirement at -50dBm/MHz limiting the n41 UL configuration to 40MHz.
* Use n40->n41, use coexistence requirement at -50dBm/MHz limiting the n40 UL configuration to 40MHz.
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| **R4-2101806**Type: Discussion 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.** |
| R4-2101807CAT F CR(R4-2101808 CAT A CR) | Huawei, HiSilicon | ***Title:*** CR on spurious emission about UE co-existence between band n40 and n41(Rel-16)***WIC:*** NR\_newRAT-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:***1. To add protected band n41 for band n40 spurious emissions for UE co-existence.2. To add protected band n40 for band n41 spurious emissions for UE co-existence |
| **R4-2102929**Type: Discussion for Approval | Skyworks | ***Title:*** UE-UE Coexistence for Asynchronous n40 n41 NetworksProposal: Do not introduce UE to UE coexistence requirements for asynchronous n40/n41 network operation considering the following restrictions:For the case of n40 spurious emissions falling in n41 range:- assume 20dB filter rejection, restrict n40 operation to 80MHz CBW, and assume an extra 19MHz gap for n41 operation in China.For the case of n41 spurious emissions falling in n40 range:- assume 20dB filter rejection, and extra 19MHz gap for n41 operation in China. |
| **R4-2102904**Type: Discussion for Approval | Qualcomm Incorporated | **Title:** Non-default RX-TX Frequency Separation Values and split band duplexers**Observation 1:** There are some frequency bands that use a split duplexer implementation due to narrow duplex gap. In that case UE may not support other than the default TX-RX channel frequency separation with the possible small deviation needed for asymmetric channel BW case.**Proposal 1:** Add a note to table 5.4.4-1: For bands n28 and n74 UE that may support only the default TX-RX frequency separation value with the deviation of ΔFTX-RX = | (BWDL – BWUL)/2 | for asymmetric BW case. |
| R4-2102903CAT F CR | Qualcomm Incorporated | ***Title:*** CR on split band duplexer exceptions to non-default TX-RX separation***WIC:*** NR\_FDD\_bands\_varduplex-Core***Reason for change:*** Some frequency bands use split duplexer implementations. In these cases UE may not be able support a large range of TX-RX frequency separations***Summary of change:***Add note in table 5.4.4-1 for bands n28 and n74 to state that only the default TX-RX frequency separation value with the deviation of ΔFTX-RX = | (BWDL – BWUL)/2 | for asymmetric BW case is permitted |

## 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 paper R4-2101175, R4-2101806 and* *R4-2102929 but with different approaches.*

**Issue 1-1: Which option is preferred?**

**Option 1 (from R4-2101175):**

* + For n41->n40, use coexistence requirement at -50dBm/MHz limiting the n41 UL configuration to 40MHz.
	+ Use n40->n41, use coexistence requirement at -50dBm/MHz limiting the n40 UL configuration to 40MHz.

**Option 2 (from R4-2101806):**

* + To introduce -50dBm/MHz spurious emission requirements for band n41 frequency range when band n40 transmitting power.
	+ To introduce -40dBm/MHz spurious emission requirements for band n40 frequency range when band n41 transmitting power.

**Option 3 (from R4-2102929):**

* + Do not introduce UE to UE coexistence requirements for asynchronous n40/n41 network operation considering the following restrictions:
		- For the case of n40 spurious emissions falling in n41 range:
			* Assume 20dB filter rejection, restrict n40 operation to 80MHz CBW, and assume an extra 19MHz gap for n41 operation in China.
		- For the case of n41 spurious emissions falling in n40 range:
			* Assume 20dB filter rejection, and extra 19MHz gap for n41 operation in China.

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| **Company** | **Comments** |
| CMCC | From the operator's perspective, there are many asynchronous scenarios in the n40 and n41 bands. For example, n40 and 41 between different operators in china, and n40 and n41 are operated by the same operator. In the 5G phase, we are committed to promoting the application scenarios of 5G for non-synchronous deployment to meet various deployment needs. RAN4 need to complete the SE requirements between the n40 and n41 for non-synchronous UEs, which is also to protect other operators and users. RAN4 should introduce UE to UE coexistence requirements for asynchronous n40/n41.In addition, we need to ensure that the application of the n41 and n40 bands in the existing network will not be affected because large bandwidth and high power are already important features of the existing 5G network. We cannot accept limiting bandwidth or reducing transmission output power to meet some coexistence requirements for asynchronous.CMCC support option 2. This topic is about the UE to UE coexistence requirements, rather than CA or EN-DC, which is a probability problem. Whether the distance between UEs also needs to be considered? We do not agree that the n40 band is unable to meet the -50dBm/MHz to the n41 band. It seems that the assumption of filter rejection is too conservative. Companies are encouraged to provide data on the filter rejection. |
| Huawei | Support option 2.For R4-2101175, we have some comments as below.1) -40dBm/MHz spurious emission requirements for band n40 frequency range can be met when band n41 transmitting power based on the results.2) The assumptions about band n40 and n41 filter performance are different, but why did proponent provide same requirements for both band n40 and n41?For R4-2102929, we have some comments as below.Observation 1: “Synchronous network operation between n40 and n41 is the RAN 4 baseline assumption” in R4-2102931 might be not correct. Band n40 and n41 may be deployed by different operators, such as Saudi Arabia. In such case we need to consider the UE to UE coexistence issue. That’s why we specify such requirements in LTE spec. And n40 and n41 will be deployed in China and operator request to consider unsynchronized deployment scenario. Hence we think coexistence is required. In both R4-2101175 and R4-2102929, 20 dB filter rejection for the case n40 to n41 is assumed. And in the agreed WF RAN4-2016831,‒ For band n40 post PA Filter, [20-30]dB attenuation is assumed at band n41 Rx frequency range.We have checked several commercial band 40 filters, the minimal rejection is actually better than 40 dB. Hence even we take 30 dB as a conservative assumption, the -50 dBm co-existence requirements can be met. |
| ZTE | Option 2.We share same view with CMCC. Considering n41 filter attenuate @ n40 ≥30dB, we think that -50dBm/MHz SE requirements can be achieved for n40->n41For n41->n40, we prefer to use -40dBm/MHz SE requirements. |
| Qualcomm | Our concern is that relaxing specification to -40dBm/MHz harms the other UE RX performance. Have studies been done to indicate to other operator that it is ok to relax this specification? To HW, our concern is the uncertainty of emissions in power class 2. Our table of measurement shows that some UL restriction of BW is required for n40 to meet -50dBm/MHz. There is some loading interaction of PA with the filter raising emission levels. Our data shows this effect.So from n41->n40, we could have -40dBm/M requirement at full UL configuration but form n40->n41, we need to limit the UL configuration to have the -50dBm/M requirement. We can further study increasing this from the LTE limit of [40MHz]. |
| Huawei | To QC, 1) In RAN5 we can use the TT and Mu to cover all the kinds of uncertainty. We don’t need to consider the uncertainty of emissions in core requirements. 2) Your argument “loading interaction of PA with the filter” is so ambiguous, which was not captured in our agreed assumption WF. 3) Your data is based on the 20dB filter assumption. However, as we commented above, the minimal rejection is actually better than 40 dB. Hence even if we take 30 dB as a conservative assumption, the -50 dBm co-existence requirements can be met based on your data when n40 transmitting power. |

### Sub-topic 1-2 Non-default RX-TX Frequency Separation

**Issue 1-2: Whether the following proposal from R4-2102904 is acceptable to introduce deviation of frequency separation for asymmetric BW case?**

* **Proposal 1:** Add a note to table 5.4.4-1: For bands n28 and n74 UE that may support only the default TX-RX frequency separation value with the deviation of ΔFTX-RX = | (BWDL – BWUL)/2 | for asymmetric BW case.

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| **Company** | **Comments** |
| SoftBank | If our interpretation is correct, the same constraint has been captured in the first 2 paragraghs of sec 5.3.6 as a general form, not limited to twin-duplexer. So it does not seem necessary to mantate the same thing twice as far as asymmetric BW is concerned.  |
| Huawei | The asymmetric BW hasn’t been specified for band n28 and n74 yet, so there is no need to add this note under the general clause. |
| Qualcomm | Agree with proposal. The main purpose of this paper is to state that for bands n28 and n74 due to the implementation of the duplex filters with narrower filters the TX-RX frequency separation is limited to **only the default spacing**. Also, this spacing may have minor adjustments for UL to DL BW asymmetry that may be introduced for these bands in the futur**e** |
| SoftBank | Then my question goes to the following sentence, from 5.3.6:In FDD, the confinement is defined as a deviation to the Tx-Rx carrier center frequency separation (defined in table 5.4.4-1) as followingIt seems to me that table 5.4.4-1 only defines DEFAULT spacing and nothing other than that. Would you clarify how we interpret the sentence, to indicate any possible separations? |
| Ericsson | The n28 and n74 only support a fixed Tx-RX spacing and only symmetric BW (requirements are not specified for anything else)? |
| Qualcomm | Our understanding is that the title of the table 5.4.4-1 is “UE TX-RX frequency separation” though the wording above the table says “default TX channel to RX channel …”. This is a little ambiguous. We wanted to insert the note to clearly state that for n28 and n74 that only the default spacing is possible for the reasons mentioned in our contribution. |
| NTT DOCOMO, INC. | If our understanding is correct, proposed restriction is already captured in section 5.3.6.Section 5.3.6 says “the narrower carrier shall be confined within the frequency range of the wider channel bandwidth”, and also defines the confinement.So, now we have the same question as SoftBank.**From Section 5.3.6***In asymmetric channel bandwidth operation, the narrower carrier shall be confined within the frequency range of the wider channel bandwidth.**In FDD, the confinement is defined as a deviation to the Tx-Rx carrier center frequency separation (defined in table5.4.4-1) as following:**ΔFTX-RX = | (BWDL – BWUL)/2 |* |

## Companies views’ collection for 1st round

### CRs/TPs comments collection

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| **CR/TP number** | **Comments collection** |
| R4-2101807(R4-2101808 CAT A CR) | Title: Discussion on spurious emission about UE co-existence between band n40 and n41*Moderator note: This CR depends on the conclusion in issue 1-1, i.e. Option 2.* |
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| R4-2102903 | Title: CR on split band duplexer exceptions to non-default TX-RX separation*Moderator note: This CR depends on the conclusion in issue 1-2. If agreed, whether CAT-A CR is needed?* |
| [SoftBank] As mentioned above, it does not seem necessary. Clarification is needed for necessity, taking 5.3.6 into consideration Huawei: The asymmetric BW hasn’t been specified for band n28 and n74 yet, so there is no need to add this note under the general clause.Qualcomm: support this CR. The main purpose of the note inserted into table 5.4.4-1 is to state that the TX-RX frequency separation is limited to **only the default spacing** for bands n28 and n74 and that this spacing may have adjustments for UL to DL bandwidth asymmetry that may be introduced for these bands in the future.To provide further input on statements from other companies we would like to state that section 5.3.6 only states how to calculate the deviation to the TX-RX separation. What this CR states is that for bands n28 and n74 the TX-RX separation is limited to the default spacing with an adjustment for UL/DL BW asymmetry. Also, the potential for BW asymmetry is stated in the note as it may be defined for these bands in the future.[NTT DOCOMO, INC]If our understanding is correct, proposed restriction is already captured in section 5.3.6.Section 5.3.6 says “the narrower carrier shall be confined within the frequency range of the wider channel bandwidth”, and also defines the confinement.So, now we have the same question as SoftBank. **From Section 5.3.6***In asymmetric channel bandwidth operation, the narrower carrier shall be confined within the frequency range of the wider channel bandwidth.**In FDD, the confinement is defined as a deviation to the Tx-Rx carrier center frequency separation (defined in table5.4.4-1) as following:**ΔFTX-RX = | (BWDL – BWUL)/2 |* |
| R4-2100112 (R4-2100119CAT A CR) | Title: PC1 and PC3 Updates for Band n14 |
| Huawei: No technical analysis to reuse the PC3 MPR for PC1 UE and it’s clear what the assumed UE architecture is for PC1 UE. More study is needed.Nokia: This issue was already discussed for LTE long time ago and based on LTE precedence and that PC1 components should be much better as price is not as critical as for handset PC3 MPR is ok.AT&T: We agree with Nokia that the PC1 Tx/Rx requirements and architecture aspects were addressed for LTE and should be leveraged for PC1 in NR. The PC1 PAs and duplexers (ceramic vs. SAW) are of much higher quality to support the higher power operation and linearity requirements. In addition, the PC1 devices will not have many of the physical/power constraints of PC3 UEs. We used these assumptions for the CR to address the missing PC1 requirements in the Rel-16 specification since PC1 is already defined. |
| R4-2100136 (R4-2100137 CAT A CR) | Title*: 38.101 Void clean up R16* |
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| R4-2100163 (R4-2102557 CAT A CR) | Title: CR for n47 AMPR |
| Huawei: Why do we need this change? Simulation and more study may be needed. |
| R4-2100846 (R4-2100847 CAT A CR) | ***Title:*** CR for 38.101-1: Update of missing fallback NR-DC combinations Rel-16 |
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| R4-2100876 (R4-2100877 CAT A CR) | ***Title:*** CR for 38.101-1: Update of simultaneous Rx/Tx capability for some NR CA band combinations Rel-16 |
| Huawei: The CR can be revised based on the agreement in thread [104]/[102]ZTE: The simultaneous Rx/Tx capability issues are also discussed in thread #102. We wonder if mandatory simultaneous Rx/Tx for FDD-TDD CA combinations can be applied for all FDD-TDD CA combinations?Qualcomm: This topic is also discussed in threads [102] and it is unclear whether to have the note at this time. |
| R4-2101106 (R4-2101107 CAT A CR) | ***Title:*** CR for 38.101-1 Rel16 corrections on exception requirements on out-of-band blocking for inter-band CA |
| ZTE: Agree with 1106. But for Cat A CR, seems it is no needed since current v17.0.0 have already covered this combination in OOB blocking exception table. |
| R4-2101723 | ***Title:*** Modification of Pcmax for UL CA with uplink Tx switching capability*Moderator note: If agreed, whether CAT-A CR is needed?* |
| Huawei: The agreements in the June plenary meeting say that there is not new spec change needed for the power boosting except RAN2 signalling introduction. Without having this CR, the spec is not broken in any aspect and the UE is required to meet first normal UL CA requirements to support Tx switching. It is clear that in case 2 for UL CA Tx switching, the maximum output power is 26dBm. Besides, we have concern on the CR contents: 1) MPR and A-MPR subject to requirements related to 2Tx, it is not proper to enhance in the way the CR proposed; 2) P\_EMAX configuration needs to follow RAN4 spec and in Rel-16 there is no 26dBm BC power class defined thus if the CR was implemented, the MOP on C-band is capped with 23dBm.We suggest to consider the issue together with Tx switching topic in Rel-17.Qualcomm: We support this modification since it is essential for the agreed functionality. However, we recognize that the powder boosting may become obsolete once PC2 inter band CA is agreed. Maybe we can agree this CR and have WF top say this boost functionality is removed when PC2 i-b CA is agreed? Agree on the PEMAX, CA comment, atleast the description above should updated to cover p-NR-FR1. Not sure why it needs to be defined twice. China Telecom: We have no comment on the CR itself. To us, similar to QC view, with n1+n78 CA PC2 requirement already implemented in Rel-17 TS and release independent from Rel-15, anyway UE can already transmit max 26dBm with a complete set of requirements.In addition, with different switching scenarios targeted for Rel-16 and Rel-17, to not delay the progress for Rel-17 switching discussion, we don’t want to link the discussion for Rel-16 and Rel-17.Ericsson: the argument is that the specification is not broken, and that maintenance is not needed. Now, it is recognized that for carrier2 the TX power is 26 dBm. We would like to understand how this can be achieved if the total output power is limited to PCMAX = 23 dBm? Our current understanding is that with PCMAX = 23 dBm (UL CA PC3), it is clearly impossible to transmit at 26 dBm for carrier2 and implies that the UE will apply the power prioritization according to 38.213 to keep the total power below PCMAX. This is corrected in the CR by allowing an offset of +3 dB from the CA power class and PCMAX = 26 dBm during boosting. Hence if this CR is not agreed, this Rel-16 feature is not working.We remark that the changes only apply under the conditions specified in 38.331 when *uplinkTxSwitchingPowerBoosting* is configured. There is no new functionality implied by this Cat-F CR.1. The PEMAX configuration is not changed. If PEMAX is absent, then “the UE applies the maximum power according to TS 38.101-1” (38.331), i.e. as specified by the change in the CR. Clearly, the network should not configure the UE with the UE-specific limitations p-UE-FR1 or p-NR-FR1 less than 26 dBm for the boosting to be fully utilized.2. To Qualcomm: we agree that P\_EMAX should be consistent and there is no need to repeat definitions already made for the general UL CA case. The p-NR-FR1 should also be added to the PEMAX\_CA. There is a CR in R4-2102410 correcting the PCMAX CA notions, this can perhaps be revised to include this change?3. The MPR and A-MPR changes are made to make it possible to use the PC2 power back-off for the boosted carrier2 (only allowed when the network configures the UE with TX switching).We see no reason why this maintenance CR for a Rel-16 feature should delay Rel-17 work. |
| R4-2101809 (R4-2101810 CAT A CR) | ***Title:*** CR for 38.101-1 to introduce PC2 for n40 UL MIMO(Rel-16) |
| ZTE: There was a basket WID to add addition NR band for UL-MIMO, why not using basket WID to introduce UL-MIMO band?Qualcomm: Where is the corresponding work item for this? I don’t believe it is correct to add PC2 by Cat F CR under TEI agenda (R4-2009718) nor is it appropriate to now add UL MIMO as a correction. Adding these are regarded as new features for which a work item should be sought.Reliance Jio: Given agreement on R4-2009718 enabling UE PC2 for NR band n40 under TEI16, it makes perfect sense to extend power class 2 for missed out UL MIMO case in Rel16 n40 band as well. The only way to do this correction in corresponding release is via TEI. We support the CR.Huawei: To ZTE/QC, it is based on the agreed CR R4-2009718 in Rel-16. Operators have a strong demand to deploy PC2 and UL MIMO for n40 in Rel-16. That’s why we introduce it using Rel-16 maintenance CR. It’s better to enable it as soon as possible for the IMT industry. |
| R4-2101852 | ***Title:*** CR to TS 38.101-1 Operating bands for DC*Moderator note: If agreed, whether CAT-A CR is needed?* |
| Qualcomm: This is not wrong but may be not needed since the section 5.2B refers to the 5.5B so nothing is really broken. The intent was to simplify the spec and keep the bands only in one section 5.5B. Having bands in two places creates a lot of maintenance work that does not add much value. Nokia: Text still refers to clause 5.5B. |
| R4-2101939 (R4-2101940 CAT A CR) | ***Title:*** CR for 38.101-1 to add missing spurious emissions for band n38 UE co-existence (Rel-16) |
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| R4-2102152 (R4-2102153 CAT A CR) | ***Title:*** CR for 38.101-1: Add CA\_n25A-n41(2A)-n71A which was missing in the CR implementation |
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| R4-2102203 (R4-2102204 CAT A CR) | ***Title:*** CR to TS38.101-1: Correction on configured transmitted power requirement |
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| R4-2102602 (R4-2102603 CAT A CR) | ***Title:*** CR for TS 38.101-1: Cleanup for spurious emissions for UE co-existence table |
| Huawei: Band 39 should not be removed for band n28 since band n28 has been deployed in China.Qualcomm: Why is B10 omitted from n5 or n25. Please provide technical explanation or clarification. Also, n7+n25 -> n78 and n50+n78->n79 have possible IM3 or coexistence issue and would require some analysis to prove that MPR and filtering is enough to meet -50dBm/MHz in the victim NR bands.Apple: Thanks for the comments. Band 39 was removed as it is not found in Rel-15. If protection is required, it might be considered to add it in Rel-15, too. B10 was omitted to match the current changes in Rel-15, where it was removed from n5 and n25.For n7+n25 -> n78 and n50+n78->n79 the protected bands were not introduced by us, only harmonic exception was added. If their existence in the CAs are erroneous then we are open to discuss whether to remove them.In case of n7+n25, n78 is subject to 2nd harmonic of band 25. n78 is protected in single band n7 but not in n25. That might be the reason why it does not have harmonic exception in the CA.In case of n50+n78, n79 is subject to 3rd harmonic of band 50. n79 is not protected in any single band (n50 and n78) and harmonic exception might have been missed while defining CA and the introduction of n79 protection. |
| R4-2102685 (R4-2102816 CAT A CR) | ***Title:*** CR on TS 38.101-1 NS\_49 |
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| R4-2102386 | ***Title:*** CR for TS 38.101-1: correction of Pi/2 BPSK*Moderator note: If agreed, whether CAT-A CR is needed?* |
| Huawei: As RAN4 has not discussed the requirement for DMRS enhancement for CA in Rel-16, the content related to CA should be removed. And meanwhile, the content itself is not correct since the requirements in the clause is not for A-MPR. Cat-A CR is needed if the CR for Rel-16 is agreed.Qualcomm: Do not agree with CR.PAPR’s of PBD waveforms are either lower or similar to ZC DMRS/pi/2 BPSK data waveforms for equivalent filtering profiles. Therefore, if we use a conservative assumption then the same MPRs should apply for Pi/2 BPSK as ZC BPSK. Obviously, the reference to ‘A-MPR’ is a typo and it should have been ‘MPR’. We can bring a CR to the next meeting to correct it |

## Summary for 1st round

### Open issues

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|  | **Status summary**  |
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*Recommendations on WF/LS assignment*

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|  | **WF/LS t-doc Title**  | **Assigned Company,****WF or LS lead** |
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### CRs/TPs

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## Discussion on 2nd round

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

### WF

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### CRs/TPs

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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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# Topic #2: Papers for 38.101-2

## Companies’ contributions summary

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| **T-doc number** | **Company** | **Proposals / Observations** |
| **R4-2100127**CAT F CR(R4-2100128 CAT A CR) | ZTE | ***Title:*** CR to TS 38.101-2 on correction to intra-band non-contiguous CA configurations (Rel-16)***WIC: TEI16******Reason for change:*** An example of CA configuration CA\_n260(3O-2P) is taken for the notation of sub-block for intra-band non-contiguous CA, which does not actually exist in Table 5.5A.2-2. A correct example for notation should be used. Furthermore, the title of Table 5.5A.2-2 should be marked as “multiple CA bandwidth classes” so as to distinguish from the cases of “single CA bandwidth class” defined in Table 5.5A.2-1.***Summary of change:***1. A correct example of CA\_n260(2G-3O) is chosen for the notation of sub-block in intra-band non-contiguous CA configuration.
2. Correct the title of Table 5.5A.2-2 to distinguish from Table 5.5A.2-1.
3. Typo correction of CA\_260 to CA\_n260 in the note part of clause 5.5A.2.
 |
| **R4-2101724**CAT F CR | Ericsson | ***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. |
| **R4-2102562**CAT F CR(R4-2102582 CAT A CR) | Google Inc. | ***Title:*** CR to 38.101-2: correction on UL MIMO***WIC:*** NR\_newRAT-Core***Reason for change:*** The Table 6.2D.1.3-3 in the UL MIMO requirements is pointed to void. Correct the Table 6.2D.1.3-3 to the Table 6.2D.1.0-1 for UL MIMO configuration in Clause 6.3D.3, 6.4D.0, 6.5D.1, 6.5D.2, 6.5D.3, 7.3D, 7.4D, 7.5D, 7.6D.***Summary of change:***Correct the Table 6.2D.1.3-3 to the Table 6.2D.1.0-1 for UL MIMO configuration in Clause 6.3D.3, 6.4D.0, 6.5D.1, 6.5D.2, 6.5D.3, 7.3D, 7.4D, 7.5D, 7.6D |

## Companies views’ collection for 1st round

### CRs/TPs comments collection

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| **CR/TP number** | **Comments collection** |
| R4-2100127 (R4-2100128 CAT A CR) | ***Title:*** CR to TS 38.101-2 on correction to intra-band non-contiguous CA configurations (Rel-16) |
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| R4-2101724CAT F CR | ***Title:*** Correction to modified MPR behaviour*Moderator note: If agreed, whether CAT-A CR is needed?* |
| *Qualcomm: The modified MPR bits were introduced for Rel-16. The modified MPR rules referred to by the bits would only become mandatory for Rel-17. The CR aims to make compliance mandatory for Rel-16 UEs also. Can Ericsson please clarify?*Ericsson: these bits were introduced in the Rel-15 specification, so shall be set to 1 by a Rel-16 UE. However, the bit NS\_201 should be removed (put N/A) since NS\_201 is obsolete. A revision is needed (this should also be changed in the Rel-15 version).(We forgot to request a Rel-17 Cat-A.)Nokia: MPR was changed in REL16 specs hence “may” is correct for REL16 and REL17 and beyond uses “shall”. Reason why also REL15 table mentions modified MPR is to allow REL15 UEs to use new MPR. |
| R4-2102562 (R4-2102582 CAT A CR) | ***Title:*** CR to 38.101-2: correction on UL MIMO |
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## Summary for 1st round

### CRs/TPs

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

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| **CR/TP number** | **CRs/TPs Status update recommendation**  |
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## Discussion on 2nd round

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| **CR/TP number** | **Comments**  |
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## Summary on 2nd round

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# Topic #3: Papers for 38.101-3

## Companies’ contributions summary

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| **T-doc number** | **Company** | **Proposals / Observations** |
| **R4-2100129**CAT F CR(R4-2100130 CAT A CR) | ZTE | ***Title:*** CR to TS 38.101-3 on correction to hanging paragraph in the spec (Rel-16)***WIC: TEI16******Reason for change:*** Some texts in the spec are in hanging paragraphs, which are not allowed according to the 3GPP drafting rules. The protocol may fail to reference the text in the hanging paragraphs. A new “General” clause should be added and the hanging text should be put under it.***Summary of change:***(1) Set new “General” clauses for the hanging paragraphs.(2) Typo correction in clause 5.4B.1. |
| **R4-2100148**CAT F CR(R4-2100149 CAT A CR) | Nokia, AT&T | ***Title:*** TS 38.101-3: Addition of missing lower order fallbacks R16***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\_n2ADC\_2A-66A\_n2ADC\_29A-30A\_n2ADC\_29A-30A\_n66ADC\_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. |
| **R4-2100150**CAT B CR | Nokia, AT&T | ***Title:*** TR 37.716-21-11: Addition of missing lower order fallbacks***WIC: TEI16******Reason for change:*** These configurations have relating higher order configurations already in REL16 specs. This CR captures necessary analysis into the TR.DC\_2A-66A\_n2ADC\_30A-66A\_n66ADC\_2A-30A\_n2ADC\_29A-30A\_n2ADC\_30A-66A\_n66A***Summary of change:***Missing lower order fallbacks are added. |
| **R4-2100878**CAT F CR(R4-2100879 CAT A CR) | SoftBank Corp. | ***Title:*** CR for 38.101-3: Update of simultaneous Rx/Tx capability for some EN-DC band combinations Rel-16***WIC: TEI16******Reason for change:*** In some inter-band EN-DC combinations, the note for the mandatory support of simultaneous Rx/Tx capability was missing***Summary of change:***Update the note in some inter-band EN-DC combinations. |
| **R4-2101176**CAT F CR(R4-2101179 CAT A CR) | CHTTL | ***Title:*** CR to TS 38.101-3 clarification on the single uplink allowance for DC\_3A\_n3A***WIC: DC\_R16\_1BLTE\_1BNR\_2DL2UL******Reason for change:*** Clarify the single uplink allowance of DC\_3A\_n3A due to potential emission issues and self-interference from Rel.16.***Summary of change:***Add a note to Table 5.5B.3-1 to clarify the single uplink allowance of DC\_3A\_n3A due to potential emission issues and self-interference from Rel.16. |
| **R4-2101725**CAT F CR | Ericsson | ***Title:*** Requirements Type 2 UEs supporting inter-band MRDC with overlapping DL***WIC: TEI16******Reason for change:*** Differentiate requirements for band combinations configured for FDD-FDD or TDD-TDD inter-band EN-DC/NE-DC operation with overlapping or partially overlapping DL bands with regard to the capability *interBandMRDC-WithOverlapDL-Bands-r16* (Type 1 or Type 2 UE)Facilitate implementation of UE Type 2 (e.g. for DC\_42-n77).Add missing notes in band-combination tables. A note in a band combination table only apply for the band combinations in the said table. If there are provisions for two-band combiantions e.g. DC\_20-n28 that apply also for higher-combinations containing this two-band-combinations, then the provisions must also be added in the tables for the said higher-order combinations.***Summary of change:***Clause 5.5B.4.1: for two-band combinations, add the prequisite that the current restrictions (when applicable) apply for UEs not indicating *interBandMRDC-WithOverlapDL-Bands-r16* (no change of requirements, the intra-band eN-DC/NE-DC requirements apply)Clauses 5.5B.4.2-5.5B.4.4: add the corresponding notes for up to five bands.Clause 7.1: For UEs indicating *interBandMRDC-WithOverlapDL-Bands-r16*: the requirements for each cell group shall be according to the SA requirements defined for two RX antennas for all DL bands above 2490 MHz (i.e. the requirements for four Rx ports do not apply). Add a provision that the minimum requirements apply for an input power of the anchor signal up to [30 dB] greater than the input power of the wanted NR except for the minimum requirement on the maximum input power. This is consistent with ACS requirements. |
| **R4-2101804**CAT F CR(R4-2101805 CAT A CR) | Huawei, HiSilicon | ***Title:*** CR for 38.101-3 to add the missing Tib Rib for DC\_2-7-7-66\_n78/ DC\_2-7-66-66\_n78/ DC\_2-7-7-66-66\_n78 (Rel-16)***WIC: DC\_R16\_3BLTE\_1BNR\_4DL2UL-Core******Reason for change:*** 1. The Tib and Rib for DC\_2-7-7-66\_n78/ DC\_2-7-66-66\_n78/ DC\_2-7-7-66-66\_n78 is missing.***Summary of change:***To add Tib and Rib for DC\_2-7-7-66\_n78/ DC\_2-7-66-66\_n78/ DC\_2-7-7-66-66\_n78. |
| **R4-2102146**CAT F CR(R4-2102147 CAT A CR) | T-Mobile USA | ***Title:*** CR for 38.101-3: Correction for CA\_n66A-n260***WIC: NR\_CADC\_R16\_2BDL\_xBUL-Core******Reason for change:*** The configuration for n260 in CA\_n66A-n260A is incorrectly listed as CA\_n260A BCS1***Summary of change:***Update the table to show the correct configuration for n260 in CA\_n66A-n260A. |
| **R4-2102205**CAT F CR(R4-2102206 CAT A CR) | ZTE Corporation | ***Title:*** CR to TS38.101-3: Correction on duty cycle signalling terminology for PC2 inter-band ENDC***WIC: ENDC\_UE\_PC2\_FDD\_TDD-Core******Reason for change:*** The current signalling terminology in 38.101-3 for PC2 inter-band FDD-TDD ENDC are not consistent with the signalling defined in TS38.306, show below:***Summary of change:***Correct the duty cycle signalling terminology for PC2 inter-band FDD-TDD ENDC |
| **R4-2102395**CAT F CR(R4-2102396 CAT A CR) | Huawei, HiSilicon | ***Title:*** CR for TS 38.101-3 correction of intra-band contiguous EN-DC for DC\_(n)66\_R16***WIC: TEI16******Reason for change:*** RAN2 signalling intraBandENDC-Support Indicates whether the UE supports intra-band (NG)EN-DC with only non-contiguous spectrum, or with both contiguous and non-contiguous spectrum for the (NG)EN-DC combination. If the UE does not include this field for an intra-band (NG)EN-DC combination the UE only supports the contiguous spectrum for the intra-band (NG)EN-DC combination. However, for DC\_66A\_n66A, there is no corresponding contiguous EN-DC, which may cause problem in the field deployment.***Summary of change:***Add intra-band contiguous EN-DC DC\_(n)66AA in the specification |
| **R4-2102402**CAT F CR(R4-2102403 CAT A CR) | Huawei, HiSilicon | ***Title:*** CR for TS 38.101-3: Adding delta TIB and RIB requirement for DC\_2-7-7-66\_n78 (R16)***WIC: DC\_R16\_3BLTE\_1BNR\_4DL2UL-Core******Reason for change:*** The delta TIB and RIB requirement for DC\_2-7-7-66\_n78 was missing in 38.101-3***Summary of change:***Adding delta TIB and RIB requirement for DC\_2-7-7-66\_n78 to 38.101-3 |
| **R4-2102412**CAT F CR(R4-2102413 CAT A CR) | Qualcomm Incorporated | ***Title:*** Notational amendment and correction to PCMAX for EN-DC***WIC: NR\_newRAT-Core******Reason for change:*** The UE capability maxUplinkDutyCycle is ambiguous since multiple IE’s have been defined by RAN2 corresponding to duty cycles. Notational errors in PCMAX equations and missing definitions***Summary of change:***Replace maxUplinkDutyCycle with maxUplinkDutyCycle-PC2-FR1, correct Ppowerclass,ENDC to PPowerClass,EN-DC (capital P and C in PowerClass and dash in EN-DC), add NR or E-UTRA suffix to PPowerClass to resolve ambiguity, and supply missing definitions. |
| **R4-2102826**CAT F CR | Verizon | ***Title:*** CR for correction of Rel-16 Dual Connectivity of 1LTE band (1DL/1UL) and 1NR band (1DL/1UL) with FR1***WIC: DC\_R16\_1BLTE\_1BNR\_2DL2UL******Reason for change:*** Three approved DC combos were not reflected in the corresponding (ΔTIB,c and ΔRIB,c) Table 6.2B.4.2.3.1-1 and Table 7.3B.3.3.1-1***Summary of change:***Add the following missing combos in Table 6.2B.4.2.3.1-1 and Table 7.3B.3.3.1-1* DC\_2-2\_n5
* DC\_2-2\_n66
* DC\_66-66\_n2
 |
| **R4-2100797**Type: Discussion | China Telecom | **Title:** Discussion on requirement for LTE/NR spectrum sharing and dual connectivity (DSS EN-DC) in band 1/n1***Observation 1:*** *In LTE/NR spectrum sharing and dual connectivity (DSS EN-DC) scenario, LTE and NR BSs are co-located, and NR carrier has the same or larger CBW than LTE carrier.****Observation 2:*** *For the downlink sharing, both FDM and TDM between LTE/NR should be supported from UE perspective, and the potential impact on UE receiver requirements is the maximal power difference from LTE and NR that UE can handle.****Observation 3:*** *For the uplink sharing, different capabilities have been introduced for TDM only, FDM only, or both TDM and FDM between LTE/NR from UE perspective. From UE requirement perspective, the switching time mask for TDM between LTE/NR from UE perspective has been specified in Rel-15, and no requirement has been specified for FDM between LTE/NR from UE perspective.****Proposal:*** *RAN4 to discuss the UE transmitter and receiver requirements to support LTE/NR spectrum sharing and dual connectivity (DSS EN-DC) in band 1/n1, and discuss whether this band combination can be added in Rel-17 WID on Dual Connectivity (DC) of 1 band LTE (1DL/1UL) and 1 NR band (1DL/1UL).* |

## Open issues summary

### Sub-topic 3-1 LTE/NR spectrum sharing for B1/n1

*Moderator notes: This topic is from paper R4-2100797 which is for discussion only.*

**Issue 3-1-1: For downlink sharing, which Rx requirements will be impacted if both FDM and TDM between LTE and NR are supported from UE perspective?**

*Moderator note: In paper R4-2100797, the maximal power difference from LTE and NR that UE can handle is proposed.*

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| **Company** | **Comments** |
| Huawei | According to RAN decisions, RAN1 was not tasked to consider DL sharing from the UE perspective in Rel-15 and there was no corresponding discussion in Rel-16. Thus in our view, the scenario is not supported in current release. |
| China Telecom | Thanks Huawei for the information. Based on this information, not only RAN4 requirements, but also RAN1 spec update is needed to support DSS EN-DC. Is this correct understanding? We would also appreciate if any information on the potential whole spec impact to support DSS EN-DC. |

**Issue 3-1-2: For uplink sharing, which Tx requirements will be impacted if both FDM and TDM between LTE and NR are supported from UE perspective?**

*Moderator note: In paper R4-2100797, it is pointed out that the switching time mask for TDM between LTE/NR from UE perspective has been specified in Rel-15, and no requirement has been specified for FDM between LTE/NR from UE perspective.*

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| **Company** | **Comments** |
| Huawei | TDM is supported for SUL from UE perspective. But RAN4 has not defined the FDM requirements for this scenario. |
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**Issue 3-1-3: Whether band combination B1+n1 can be added in Rel-17 WID of 1 band LTE (1DL/1UL) and 1 NR band (1DL/1UL)?**

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| **Company** | **Comments** |
| Huawei | As clarified above, this scenario from UE perspective is not supported well in the current specification, and it involves the work for other working groups. Thus we think it is not appropriate to add the scenario in a spectrum related basket WI. If the scenario is necessary, discussion in RAN plenary is needed. |
| CHTTL | If my understanding is correct, in the proposed scenario, the B1 and n1 are using the same channel bandwidth or partial overlapping channel bandwidth, I am afraid currently the EN-DC notation cannot support this, maybe a dedicate WI is better to have more discussion on general issue. |

## Companies views’ collection for 1st round

### CRs/TPs comments collection

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| **CR/TP number** | **Comments collection** |
| R4-2100129 (R4-2100130 CAT A CR) | ***Title:*** CR to TS 38.101-3 on correction to hanging paragraph in the spec (Rel-16) |
| Huawei: Table 7.3E.2.3-1 and 7.3E.2.3-2 should be corrected correspondingly.Qualcomm: There are a references in 5.3E.1 and 5.3E.2to the table 5.3.B-1 that should be also corrected. maybe a better way is to create an additional section for 7.3E.2.3.1 V2X Requirements in addition to “General” now generated. There is a sentence “Table 7.3E.2.3-1 is proposed the reference sensitivity requirements for inter-band con-current V2X UE reception without any self-interference problem.”Why does the specification says “proposed”. Maybe we can also correct this to say “Requirements are in table..”ZTE2: Thanks for Huawei and Qualcomm’s comments. The revised CR is uploaded as below.https://www.3gpp.org/ftp/tsg\_ran/WG4\_Radio/TSGR4\_98\_e/Inbox/Drafts/%5B98e%5D%5B113%5D%20NR\_R16\_Maintenance/R4-2100129r1%20--%20CR%20to%20TS%2038.101-3%20on%20correction%20to%20hanging%20paragraph%20in%20the%20spec.docx |
| R4-2100148 (R4-2100149 CAT A CR) | ***Title:*** TS 38.101-3: Addition of missing lower order fallbacks R16 |
| ZTE2: The affected test specification should be added in the cover sheet which is now filled as ‘Y’.In Table 5.5B.4.2-1, the order of ‘DC\_30A-66A\_n66A’ should be placed after ‘DC\_30A-66A\_n5A’ and ‘DC\_30A-66A-66A\_n5ADC\_30A-66A-66A-66A\_n5A’In Table 6.2B.4.2.3.2-1, the ΔTIB,c for DC\_30-66\_n66 should be placed after DC\_30-66\_n2.In Table 7.3B.3.3.2-1, the ΔRIB,c for DC\_30-66\_n66 should be placed after DC\_30-66\_n2. |
| R4-2100150CAT B CR | ***Title:*** TR 37.716-21-11: Addition of missing lower order fallbacks |
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| R4-2100878 (R4-2100879 CAT A CR) | ***Title:*** CR for 38.101-3: Update of simultaneous Rx/Tx capability for some EN-DC band combinations Rel-16 |
| ZTE: we wonder if we can agree that it is mandatory simultaneous Rx/Tx for FDD-TDD ENDC combinations? Also, NR CA/DC and ENDC should be the same for simultaneous Rx/Tx capability.Qualcomm: This topic is also discussed in threads [102] and it is unclear whether to have the note at this time.Ericsson: follow the decisions in [102]. |
| R4-2101176 (R4-2101179 CAT A CR) | ***Title:*** CR to TS 38.101-3 clarification on the single uplink allowance for DC\_3A\_n3A |
| ZTE2: The affected test specification is missing in the cover sheet.Ericsson: not agreed. Requirements only apply for single UL (Rel-15). This allowance was due to VCO architecture issues and originally intended only for Rel-15 (but has now spread to other combinations specified in Rel-16). See also the general discussion in [108]Nokia: should the Note 2 be voided as only the new note applies in REL16.CHTTL: To Ericsson, in Rel.16 DC\_3A\_n3A support both single uplink switched and dual uplink, we also have concern in the discussion in [108] that cause inconsistency to Rel.16 or even future release.To Nokia, Note 2 comes from rel.15 spec, we are not sure if it can be voided in Rel.16, it’s a good point, maybe it can, and I’ll change it based on your suggestion.To ZTE, thanks for checking, will fix it. |
| R4-2101725CAT F CR | ***Title:*** Requirements Type 2 UEs supporting inter-band MRDC with overlapping DL |
| Huawei: In table 5.5B.4.3-1, wording “for the Band 42 and Band n77/n78 combination” in Note 7 can be removed for the band combinations with DC\_20A\_n28A.In general 7.1, it’s unclear how to verify the minimum requirements apply for an input power of the anchor signal up to [30 dB] greater than the input power of the wanted NR. Not sure current ACS requirements for EN-DC is enough or not?It’s recommended to merge note 4, 11 and 13 in table 5.5B.4.1-1, in order to avoid the redundant information and make specification more stable and readable.Qualcomm: Please explain why notes need to be put in 3,4, 5 band tables. The note says the requirement applies to higher order band combinations. Regarding RX requirement. Up to 30dB is ambiguous. Need to cap the value to a maximum, albeit in square brackets, but analysis needed to test the validity of requirement. So, in essence, work needs to be done to see what the value needs to be when even declaring this new capability. Perhaps the 30dB value needs to be reduced because you don’t have RX selectivity anymore and you are effectively introducing another jammer. Another comment is the frequency of 2490MHz. How does the added requirement cover 20-n28? The requirement for this new capability must cover LB-LB combinations as well.So, I recommend a WF to “nail” down this value. We are breaking new ground here and you cannot simply put a blanket 30dB ACS type value.Ericsson: To Huawei: yes, note 7 should be removed from DC\_20A-n28, an error. We put the [30] dB tentative anticipating further analysis. We did not dare to merge the notes at this point (they could be merged).To Qualcomm: a table note only applies to the entries within the table (self-contained) so if restrictions apply to two-band combination that are part of higher-order combination, they have to be repeated in the 3-5 band tables (this was a real challenge for the CR editor). The waiver for bands above 2490 MHz does not cover DC\_20-n28, which is why [FDD-FDD] was put in between brackets.We can create a WF for the Type 2 changes. In the meantime, the CR could be revised to cover the Type 1 changes only.Qualcomm: We still need to define a Type 2 RX requirement for 20\_n28. |
| R4-2101804 (R4-2101805 CAT A CR) | ***Title:*** CR for 38.101-3 to add the missing Tib Rib for DC\_2-7-7-66\_n78/ DC\_2-7-66-66\_n78/ DC\_2-7-7-66-66\_n78 (Rel-16) |
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| R4-2102146 (R4-2102147 CAT A CR) | ***Title:*** CR for 38.101-3: Correction for CA\_n66A-n260 |
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| R4-2102205 (R4-2102206 CAT A CR) | ***Title:*** CR to TS38.101-3: Correction on duty cycle signalling terminology for PC2 inter-band ENDC |
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| R4-2102395 (R4-2102396 CAT A CR) | ***Title:*** CR for TS 38.101-3 correction of intra-band contiguous EN-DC for DC\_(n)66\_R16*Moderator note: The spec in coversheet is incorrect (38.101-6).* |
| T-Mobile USA: This doesn’t seem to be correcting an error, it seems to be adding a new band combination (DC\_(n)66AA) outside of the normal basket request process. We don’t think there is a signalling issue. Since DC\_(n)66AA is not defined, a UE should always include the intraBandENDC-Support field for EN-DC combinations with Band 66 and n66. If it doesn’t that is a device error, not a signalling problem. We shouldn’t add band combinations to fix device misbehavior. Also, the CR seems to be incomplete. Where is the BCS for DC\_(n)66AA? Where is the maximum output power? And, since it is likely that this combination would be used with higher order EN-DC combinations and not alone, adding DC\_(n)66AA doesn’t seem to fix the problem that there would still need to be higher order combinations requested. If this combination is needed, we think the right approach is to add it to the intra-band basket and add the other associated combinations to the appropriate baskets as well. We would support adding this request to the WID as a late request at this meeting. ZTE:ZTE: First, Lots of errors in the CR cover. Second, why only include DC\_(n)66? Are there any agreements that “there is no corresponding contiguous EN-DC, which may cause problem in the field deployment”？ Was DC\_(n)66 requested? shouldn’t all the corresponding intra-band contiguous ENDC in table Table 5.5B.3-1 be captured in the Table 5.5B.2-1? If they were not requested, does it means the intra-band non-contiguous ENDC without the corresponding intra-band contiguous ENDC are illegal?Qualcomm: This is not a correction, but this is the addition of a new DC configuration for which there has not been any discussion. We’re not sure how this causes a field deployment issue since there is no planned deployment of contiguous intra-band EN-DC in Band 66/n66 or else there would have been a request for it. If there is a planned deployment and a need, then it should go through the normal procedure, not by adding it with a CatF CR without any justification or discussion.Nokia: It is a bit odd to add this configuration to spec based on RAN2 signaling. There seems not to be operator demand for this as it is not requested. Also we would like to understand what are the problems in the field deployment mention in CR cover sheet.CHTTL: We share the same view as above, we are confused about what the problem is. And DC\_(n)66 was not requested in the Rel.16 1 band LTE + 1 band NR WID, if needed, please follow the basket procedure and request it before the deadline of the Tdoc submission of the next meeting. |
| R4-2102402 (R4-2102403 CAT A CR) | ***Title:*** CR for TS 38.101-3: Adding delta TIB and RIB requirement for DC\_2-7-7-66\_n78 (R16) |
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| R4-2102412 (R4-2102413 CAT A CR) | ***Title:*** Notational amendment and correction to PCMAX for EN-DC |
| Huawei: The work item code [NR\_newRAT-Core] is for Rel-15 instead of Rel-16. Current version 16.6.0 should be corrected.ZTE：1:We think the description for ΔPPowerClass,E-UTRA should be added for intra-band contiguous ENDC, rather inter-band ENDC since it is first appeared in intra-band contiguous ENDC Pcmax equation.2: The description of “ΔPPowerClass,NR is 3 dB, 6 dB, or 0 dB according to clause 6.2.4 of TS 38.101-1 [2] for a UE that supports power class 2 or power class 1.5 in the NR band of the EN-DC combination as defined in clause 6.2.1 of TS 38.101-1 [2];” , we believe the 0dB is for power class 3. Same for ΔPPowerClass,EUTRA. In addition, why is it need to include 6dB since no PC1.5 inter-band ENDC are supported in Rel-16 spec? |
| R4-2102826CAT F CR | ***Title:*** CR for correction of Rel-16 Dual Connectivity of 1LTE band (1DL/1UL) and 1NR band (1DL/1UL) with FR1*Moderator note: Coversheet error, should be Rel-16 not Rel-17. And CR number is missing. The contents for Rel-17 is covered by R4-2100260 in another thread.* |
| Huawei: Based on the CR quality control, it can be postponed in next meeting. |

## Summary for 1st round

### Open issues

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|  | **Status summary**  |
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*Recommendations on WF/LS assignment*

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|  | **WF/LS t-doc Title**  | **Assigned Company,****WF or LS lead** |
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### CRs/TPs

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| **CR/TP number** | **CRs/TPs Status update recommendation** |
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## Discussion on 2nd round

### WF

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| **CR/TP number** | **Comments**  |
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### CRs/TPs

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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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| **WF number** | **Status update recommendation**  |
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| **CR/TP number** | **Status update recommendation** |
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