**3GPP TSG-RAN WG4 Meeting # 102-e R4-220xxxx**

**Electronic Meeting, Feb 21st – Mar 3rd, 2022**

**Agenda item: 4.1.1, 4.2.1**

**Source:** Moderator (ZTE)

**Title:** Email discussion summary for [102-e][101] R15\_Maintenance

**Document for:** Information

# Introduction

*Briefly introduce background, the scope of this email discussion (e.g. list of treated agenda items) and provide some guidelines for email discussion if necessary.*

*List of candidate target of email discussion for 1st round and 2nd round*

* 1st round:
* 2nd round: TBA

# Topic #1: LTE maintenance

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

## Companies’ contributions summary

|  |  |  |  |
| --- | --- | --- | --- |
| **TDoc** | **Title** | **Source** | **Moderator’s remarks** |
| [**R4-2205307**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_102-e/Docs/R4-2205307.zip)R4-2205308 R4-2205309R4-2205310 | Draft CR for 36.101 to clarify the restriction of band 28 for CA\_20-28(R14) | Huawei, HiSilicon | For LTE, the clarification “This restriction also apply for any band combinations when CA\_20-28 is a subset of a higher order band combination.” is added.Mirror CRs: R4-2205308 Rel-15R4-2205309 Rel-16R4-2205310 Rel-17 |
| [**R4-2205662**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_102-e/Docs/R4-2205662.zip)R4-2205663R4-2205664R4-2205665 | Draft CR for 36.101 Correction to Bands for NB-IoT in the USA | Dish Network | For LTE. * DL Bands changed to refer operating band in table 5.5-1
* Band 70 added to table 5.5F-1.
 |

## Open issues summary

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

*No discussion points under this topic.*

## Companies views’ collection for 1st round

### CRs/TPs comments collection

*Major close to finalize WIs and Rel-15 maintenance, comments collections can be arranged for TPs and CRs. For Rel-16 on-going WIs, suggest to focus on open issues discussion on 1st round.*

|  |  |
| --- | --- |
| **CR/TP number** | **Comments collection** |
| [**R4-2205307**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_102-e/Docs/R4-2205307.zip)R4-2205308 R4-2205309R4-2205310Draft CR for 36.101 to clarify the restriction of band 28 for CA\_20-28(R14) | Company A |
| Company B |
|  |
| [**R4-2205662**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_102-e/Docs/R4-2205662.zip)R4-2205663R4-2205664R4-2205665Draft CR for 36.101 Correction to Bands for NB-IoT in the USA | Company A |
| Company B |
| Qualcomm: CR is ok if it can also be captured in the chairman’s notes: The changes in RAN4 doesn't mean the 100kHz at the DL edge will be tested for NB-IoT devices. The test configurations should follow RAN5 specs. |
| AT&T: We agree with Qualcomm’s way forward. RAN5 should continue to test with the standard Tx-Rx separation to keep consistency with industry certification testing efforts. |
| DISH: We are fine with the chairman note Qualcomm suggested. This change has no impact to RAN5 testing as it is.  |
| Ericsson: We don’t agree with the proposed change in this CR. We would like first to understand if there is really any concrete plan to use this 100kHz at band edge. When the UE certification issue in US was discussed, we agreed to consider the bands definition’s change and made the relevant updates in our SW. If we have to revert this, it would mean extra effort again.  |
| DISH: We would like to understand why Ericsson did not consider DL before then. This is a correction to allow full use of spectrum, including the 20MHz from B66 that was removed for some reason, making it something else than B66 (B66 DL is specified as up to 2200MHz, not 2180MHz as the change Ericsson is referring to suggests). |
| DISH: After offline discussion, to accommodate Ericsson concern, we can compromise to revise and correct only B66 DL (i.e. 2199.9MHz) and add the missing B70 using the same 100kHz limitation at the band edges for both UL and DL.  |
| Ericsson: To clarify our previous comment: we are not opposing to fix the mistake for band n66 and add n70, but we are opposing to reverting the decision of removing the 100 kHz at band edge for DL, for the reasons given above. The last proposal from DISH is then acceptable to us. |
| Qualcomm: We have concerns about to include the extended 20MHz for B66 and 10MHz for B70. Look at the NOTE 4 in Table 5.5-1 of TS 36.101, it is clearly saying 2180-2200MHz is not applicable for NB-IoT.The similar NOTE 10 can be found for B70:The current NB-IoT devices are not supporting these two frequency rangesAnother question to NW vendors, if NB-IoT device is deployed at the 1779.7-1779.9MHz for UL and 2199.7-2199.9MHz for DL, how the eNB indicate the UL and DL ARFCN? Will it indicate separate UL and DL ARFCN?We are OK with previous version as we commented since it is referring to the Table 5.5-1 of TS 36.101. |

## Summary for 1st round

### CRs/TPs

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

|  |  |
| --- | --- |
| **CR/TP number** | **CRs/TPs Status update recommendation**  |
| XXX | *Based on 1st round of comments collection, moderator can recommend the next steps such as “agreeable”, “to be revised”* |
| [**R4-2205307**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_102-e/Docs/R4-2205307.zip)R4-2205308 R4-2205309R4-2205310 | *No comments received, deemed as “agreeable”* |
| [**R4-2205662**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_102-e/Docs/R4-2205662.zip)R4-2205663R4-2205664R4-2205665 | *Revised.**Addressing the following concerns:**(1) Not reverting the previous agreement**(2) 20MHz extension for B66 and 10MHz for B70* |
| DISH | For moderator’s summary (2), it is not a n extension. Bands for NB-IoT are the same as defined in cl.5.5-1 and have been since the beginning of NB-IoT, which is the issue here. Somehow the FCC emissions requirement that led to a 100kHz change from each of the US bands’ edges, someone took 20MHz out from B66 ,which is DL (nothing to do with these emissions). And now Qualcomm is saying they want to take 10MHz out from B70 as well. First, to Qualcomm, we haven’t heard any band has extensions. Can you point us to where this specified? As mentioned offline, the specifications do not prevent from placing a NB-IoT configuration in that spectrum. How come this is any different from many features / parameters in the specs that are not necessarily supported? It has been there already in LTE in its entirety for Band 66 and Band 70, so now claiming years later that Qualcomm doesn’t want this spectrum to be used, is concerning. With NR in in-band solution, this becomes even more visible as NR supports asymmetric CH BWs,. Please take a look a 38.101-1 cl.5.3.6. It is clearly saying there are asymmetric CH BWs in NR. NB-IoT in-band solution can be flexible within the CH BW. We have hard time understanding how come a spectrum that is already defined would have been removed from DISH’s use without asking, not to mention changing Band 70 today (which is a release 14 band)? Emphasizing the fact that Band 66 and Band 70 have been there for several years without no complaints to NB-IoT operation. Even before NR and asymmetric CH BWs. Further, we don't understand the difference with refencing back to 5.5-1 vs. the US Bands table. Can Qualcomm explain this (other than the 100kHz)? As Ericsson is fine with using the frequency ranges in US Bands table, Qualcomm is not, and then the other way around (Ericsson is not ok to refer 5.5-1 and Qualcomm is ok), could either Ericsson or Qualcomm give us a solution how to place this then?As it is we are keeping the original CR that was fine with QC and we assume this is what AT&T meant as well, because otherwise it seems Band 66 and Band 70 spectrum definitions would be changed. This we are not sure RAN4 should be allowed to do without RAN level discussion. We are fine with the 100kHz limitation at the band edges, even with DL, but we are not fine with RAN4 removing large portion of spectrum from potential use because of it. |

## Discussion on 2nd round (if applicable)

# Topic #2: Release independence

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

## Companies’ contributions summary

|  |  |  |  |
| --- | --- | --- | --- |
| **TDoc** | **Title** | **Source** | **Moderator’s remarks** |
| [**R4-2203991**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_102-e/Docs/R4-2203991.zip) | Draft CR to TS 38.307 on NR intra-band CA BW class within FR1 (Rel-15) | ZTE Corporation | * Remove the invalid CA BW class “F” for intra-band contiguous CA configurations within FR1.
* Remove all unused CA BW classes other than “C” in Table 5.2.1-1.

Unify the notations for different types of configurations. |
| [**R4-2204069**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_102-e/Docs/R4-2204069.zip) | Discussion on the common UE RF requirement tables for the release independent features in TS 36.307 and TS 38.307 | CHTTL, ZTE | Propose to check and agree on the following release independent procedure:If an RF feature introduced in the same release as the release which the feature is independent from, (i.e. M=N), the common UE RF requirements table in annex B.4 is specified from release N+1, otherwise the common UE RF requirements table is specified from release N. |
| [**R4-2204070**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_102-e/Docs/R4-2204070.zip)R4-2204071R4-2204072 | draft CR for the procedure of introducing release independent features | CHTTL, ZTE | This draft CR is based on the agreed procedure in approved WF in R4-2202405 and additional aspect discussed in the discussion paper R4-2204069. |

## Open issues summary

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

### Sub-topic 2-1

*Sub-topic description: This sub-topic addresses how to implement the RAN4 agreements in TS 38.307.*

*In RAN4#101-bis-e , a WF (R4-2200698, Working procedures for updating release independence specification) was approved with the following agreements on the procedure of introducing release independent features for TS 36.307:*

**WayForward:**

**It is agreed to adopt the following procedure for introducing release independent features:**

**When a new feature is introduced only the latest release of release independent spec needs to be updated. The latest release of release independent spec refers to the release which the new feature is introduced in.
(i.e. CR to the frozen release might be needed when the release independent issue is missed to be resolved when the new feature is introduced, or when CR implementation errors occur in the previous release.)**

**- The general approach for updating the Common RF Requirements table (annex B.4 of 36.307/38.307 can be further investigated in the next meeting.**

**- Whether to capture the above procedure to the general section of 36.307/38.307 can be further discussed in the next meeting.**

*Open issues and candidate options before e-meeting:*

**Proposal 1: RAN4 to check and agree on the following release independent procedure:**

**If an RF feature introduced in the same release as the release which the feature is independent from, (i.e. M=N), the common UE RF requirements table in annex B.4 is specified from release N+1, otherwise the common UE RF requirements table is specified from release N.**

Note that the meaning of M and N specified in 38.307 is pasted below:

N Release in which a feature is introduced into TS 38.101 [2-5] or TS 38.133 [6]

M Release from which onwards (including release M) a feature is release independent

**Issue 2-1: Are the above proposed sentence agreeable?**

* Proposals
	+ Option 1: Yes
	+ Option 2: No
* Recommended WF
	+ TBA

## Companies views’ collection for 1st round

### Open issues

Sub topic 2-1

|  |  |
| --- | --- |
| **Company** | **Comments** |
| OPPO | For clarification:1. This proposal seems considering the case that feature and requirements are introduced in the same release, and then discuss about how to capture the requirements in 307 annex B. To confirm the understanding, for a feature is introduced in Rel-16, does the following two interpretation correct?
	1. If release independent from Rel-15, then annex B requirements are specified from Rel-16
	2. If release independent from Rel-16, then annex B requirements are specified from Rel-17

If it is correct understanding, then another question is does the following each release need to add these requirement table, for example Rel-18, 19…?1. Another question is that if a feature is introduced in Rel-15 but requirements are defined in Rel-16, then for the following two cases which release should capture the requirement tables?
	1. If requirement is release independent from Rel-15
	2. If requirement is release independent from Rel-16
 |
| CHTTL | To response OPPO.1. a) and b) are correct based on our understanding.The concept is if we are in the same release as the release independent from, there is no need to refer where the requirements are.2. is a little bit confused… as the release independent is related to the feature itself. So if a feature is introduced in Rel-15, then it will be mentioned in Rel.15 38.307 based on the rule of “When a new feature is introduced only the latest release of release independent spec needs to be updated. The latest release of release independent spec refers to the release which the new feature is introduced in.”So the feature will not be independent from Rel.16, the feature will be release independent from Rel.15, and the annex B will be mentioned from Rel.16 38.307, which is what specified in the current 38.307 specs. As there might be additional requirements introduced in Rel.16, so in Rel.16 38.307, there is a need to refer where those requirements are to imply that although the requirements are introduced in Rel.16, the related feature itself is release independent from Rel.15.Hope this clarifies. |
| Huawei | I understand this proposal. It should be the original meaning about release independence. But NR 307 spec which were created initially didn’t follow this principle.Based on the proposal, it seems that we don’t need a R15 307 spec. Since all the features and requirements which were introduced into R15 based on NR\_newRAT-Core can be release independent from R15 naturally, these features and requirements should be removed from R15. But the logic that we create R15 307 spec is to specify the release independence for each feature one by one, and seems against this proposal. If this proposal is only applicable to R16 forward features, it may cause some confusion in current 307 spec. R15 feature independent from R15 is recorded into R15 307 spec, but R16 feature independent from R16 have to be recorded into R17 spec.In my understanding, only the features that can be release independent from early release should be recorded into 307 spec. It can be considered as an exception.For example, One feature introduced in R16 can be release independent from R15. It can be recorded.One feature introduced in R15 can be release independent from R15. There is no need to record it into 307 spec. It’s nature or default principle.One feature introduced in R16 can be release independent from R16. There is no need to record it into 307 spec. It’s nature or default principle.Anyway, it’s worth to discuss the principle about 307, so that we can avoid confusion.It should be considered whether all the features should be recorded into 307 spec or only the exceptional features should be recorded. |
| CHTTL | To response Huawei.I think you have misunderstanding of the proposal…. The proposal is not related to whether to record which feature is release independent from which release in the spec. This proposal only relates to the “common UE RF requirements table in annex B.4”, so if a feature introduced in Rel.15 and can be release independent from Rel.15, still there is a need to record it in the Rel.15 38.307 spec, but there is no need to specify “common UE RF requirements table in annex B.4”.The proposal actually is reflecting the current spec… as you can see there is no annex B in Rel.15 38.307, and the column “requirements to be filled” is kept empty. |

### CRs/TPs comments collection

*Major close to finalize WIs and Rel-15 maintenance, comments collections can be arranged for TPs and CRs. For Rel-16 on-going WIs, suggest to focus on open issues discussion on 1st round.*

|  |  |
| --- | --- |
| **CR/TP number** | **Comments collection** |
| [**R4-2203991**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_102-e/Docs/R4-2203991.zip)Draft CR to TS 38.307 on NR intra-band CA BW class within FR1 (Rel-15) | Nokia (PV): We do not think that removal of CA BW classes is correct. Even though there are no CA configurations defined at the moment RAN4 has agreed that CA configurations using these CA BW classes in future are release independent from REL15. F can be removed of course. |
| ZTE: Response to Nokia: Per the guidance for TS38.307:**When a new feature is introduced only the latest release of release independent spec needs to be updated. The latest release of release independent spec refers to the release which the new feature is introduced in. (i.e. CR to the frozen release might be needed when the release independent issue is missed to be resolved when the new feature is introduced, or when CR implementation errors occur in the previous release.)**When combination with some CA BW classes are supported in release M and release independent from Rel-15, then it should be captured in release M TS38.307 spec, not Rel-15. So there is no need to include some CA BW classes (as removed in the CR) in Rel-15 spec.This is similar with inter-band NR CA, the CA configurations not supporting some CA BW classes in Rel-15 TS38.101-1 are not included in Rel-15 TS38.307.Furthermore, if we consider in advance the possible release independent feature in the previous releases, there will be no difference between the new release and the previous releases since all the possible features in the new release should also be included in the previous releases. |
|  |
| [**R4-2204070**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_102-e/Docs/R4-2204070.zip)R4-2204071R4-2204072draft CR for the procedure of introducing release independent features | Nokia (PV): We support these CRs |
| DOCOMO: Thank you for the contribution. We support these CRs. |
| See comment in topic 2-1. We should be more careful. |

## Summary for 1st round

### Open issues

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

|  |  |
| --- | --- |
|  | **Status summary**  |
| **Sub-topic#2-1** | *Tentative agreements:**There companies commented.* *Questions are raised and get replied by Proponent. The proposed change is a matter of fact for TS 38.307 regarding the common UE RF requirement table.* *From Moderator’s perspective, the proposed texts do not change but clarify the way as it is now on the common UE RF requirement table. However, more discussions may be continued in the second round to reach a common understanding on this proposal.**Candidate options:**Seek to reach a common understanding that* *the proposed change does not change but reflect/clarify the actual way as it is now on the common UE RF requirement table, and then agree on the texts.**Recommendations for 2nd round:*New issues 2-2 and 2-3 |

### CRs/TPs

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

|  |  |
| --- | --- |
| **CR/TP number** | **CRs/TPs Status update recommendation**  |
| XXX | *Based on 1st round of comments collection, moderator can recommend the next steps such as “agreeable”, “to be revised”* |
| [**R4-2203991**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_102-e/Docs/R4-2203991.zip) | *Agreeable.* *A concern was raised and then answered during the discussion.* |
| [**R4-2204070**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_102-e/Docs/R4-2204070.zip) | *Revised.**Subject to the outcome of Issue 2-1 on the following proposed sentence:*If an RF feature introduced in the same release as the release which the feature is independent from, (i.e. M=N), the common UE RF requirements table in annex B.4 is specified from release N+1, otherwise the common UE RF requirements table is specified from release N. |

## Discussion on 2nd round (if applicable)

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

**Issue 2-2: Do you agree that the proposed change does not change but reflect/clarify the actual way as it is now on the common UE RF requirement table?**

* Proposals
	+ Option 1: Yes
	+ Option 2: No
* Recommended WF
	+ TBA

**Issue 2-3: If the answer to Issue 2-2 is yes, any suggestion to revise the proposed sentence?**

* Proposals
	+ Option 1: Yes, please share your proposed changes
	+ Option 2: No, the proposed texts are agreeable
* Recommended WF
	+ TBA

|  |  |
| --- | --- |
| Company | Comment |
| Nokia (PV) | Issues descriptions are so vague that we not understand that we are talking about. We want to comment that R4-2203991 is not agreeable to us and the paragraph 2.4.2 needs a change. Decision for release independence aspects CA BW classes proposed to be removed was done long time ago, the agreement CR proponent is referring was done in last meeting.One of reason for this new agreement is to reduce CR load, what proponent of 3991 is doing is quire opposite as it increases workload. |
| CHTTL | It seems like the above two issues are related to R4-2204070, not 3991.In general, the proposed sentence below is only to clarify the current way for the annex B in the 38.307 specs. Hope our response in the 1st round clarifies.If an RF feature introduced in the same release as the release which the feature is independent from, (i.e. M=N), the common UE RF requirements table in annex B.4 is specified from release N+1, otherwise the common UE RF requirements table is specified from release N. |

# Topic #3: NR SA Maintenance – single carrier operation

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

## Companies’ contributions summary

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| --- | --- | --- | --- |
| **TDoc** | **Title** | **Source** | **Moderator’s remarks** |
| [**R4-2203605**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_102-e/Docs/R4-2203605.zip)R4-2203606R4-2203607 | Correction to FR1 UL RMCs | Rohde & Schwarz | * Correct Payload size from 32 to 24.

Add missing RB allocations for UL RMCs. |
| [**R4-2203608**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_102-e/Docs/R4-2203608.zip)R4-2203609R4-2203610 | Correction to Rel-15 FR2 RMCs | Rohde & Schwarz | * Correct Payload size for UL Pi/BPSK RMC.
* Correct Number of Binary Channel Bits Per Slot values.
* Correct max throughput per frame.
* Update number of allocated slots per frame.

Add clarifying notes to DL RMC tables |
| [**R4-2203670**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_102-e/Docs/R4-2203670.zip) | draftCR for TS 38.101-1 Rel-15: Corrections on single bands for UE co-existence | Apple | * n28: The protected band 73 does not require harmonic exception. Note 2 was removed ~~(Moderator: Note 2 still there for n28?).~~

n78: Seperated n77 and n78 coexistence requirements. Added the bands 32, 75 and 76 to the UE coexistence list of n78 as they are deployed in the same region. |
| [**R4-2203671**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_102-e/Docs/R4-2203671.zip)R4-2203672 | draftCR for TS 38.101-1 Rel-16: Corrections on single bands for UE co-existence | Apple | Similar change to R4-2203670. ~~Moderator: Note 2 not removed for n28?~~ |
| [**R4-2203678**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_102-e/Docs/R4-2203678.zip)R4-2203679R4-2203680 | draft CR to 38.101-1 on AMPR edge RB allocation for NS R15 | Apple | Correction in line with reply LS R4-2120027 to RAN5 (R4-2117029) on AMPR for edge RB allocation. |
| [**R4-2203811**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_102-e/Docs/R4-2203811.zip) | Correction of FR2 UE configured transmitted power | Apple | Resubmission of R4-2112141(endorsed but missing in the agreed big CR R4-2115130. |
| [**R4-2203999**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_102-e/Docs/R4-2203999.zip)R4-2204000R4-2204001 | Draft CR to TS 38.101-1 on removal the bracket for the note of NS\_01 | ZTE Corporation | * Remove the bracket for the note of NS\_01 below the A-MPR table.

Some other editorial corrections. |
| [**R4-2204002**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_102-e/Docs/R4-2204002.zip)R4-2204003R4-2204004 | Draft CR to TS 38.101-2 on corrections to UE maximum output power with additional requirements | ZTE Corporation | * Editorial corrections to UE A-MPR requirements in 6.2.3.
 |
| R4-2204165 | CR CatA n74 AMPR | Qualcomm Incorporated | Re-submission due to Cat-A upload error from RAN4#101-e?* Rel-16 mirror CR, ~~Not available?~~ -> uploaded to Inbox, mirror to the endorsed CR R4-2120029
 |
| R4-2204167 | CR CatA n74 AMPR | Qualcomm Incorporated | Re-submission due to Cat-A upload error from RAN4#101-e?Rel-17 mirror CR , ~~Not available?~~ -> uploaded to Inbox, mirror to the endorsed CR R4-2120029 |
| [R4-2204175](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_102-e/Docs/R4-2204175.zip)R4-2204176R4-2204177 | n1 NS\_05 ineqaulity error fix Cat F rel 15 | Qualcomm Incorporated | Correct inequality sign < to ≤ in region A because there is no AMPR defined for = condition in either region A or region B. |
| [~~R4-2204331~~](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_102-e/Docs/R4-2204331.zip)~~R4-2204313~~ |  ~~draft CR for n74 related CA co-existence requirements for TS 38.101-1~~ | ~~KDDI, NTT DoCoMo, Softbank~~ | ~~Reflect the changes related n74 in the UE co-existence table in TS38.101-1(R4-2119873) to CAs related to n74.~~ |
| [R4-2204596](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_102-e/Docs/R4-2204596.zip)R4-2204597R4-2204598 | Correction to Pcmax: application of p-NR-FR1 for one CG with one uplink serving cell | Ericsson | Configured tx power for a single carrier further capped by cell group tx power limit and total tx power for FR1. 🡪 aligned with CAModerator: In the IE CellGroupConfig, PhysicalCellGroupConfig shall be present even for single carrier case, thus the correction is required. |
| [R4-2204599](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_102-e/Docs/R4-2204599.zip)R4-2204600R4-2204601 | Correction to relative power tolerance | Ericsson | Correct the relative power tolerance for the special case of a 1 dB TPC step, Conformance test of the existing relative power control requirements is not possible due to the large power tolerance of the core requirement in view of the measurement uncertainty of the test system |
| [R4-2205220](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_102-e/Docs/R4-2205220.zip)R4-2205221R4-2205222 | DraftCR for TS 38.101-1 on correction on IL for SRS antenna switching | ZTE Wistron Telecom AB | The description of insertion loss for SRS antenna switching capability indicated as ‘t1r4-t2r4’ is incorrect. |
| [R4-2205294](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_102-e/Docs/R4-2205294.zip)R4-2205295R4-2205296 | Draft CR for 38.101-1 to align the UL channel bandwidth between clause 6.5.3.3 and 6.2.3.1 for n74(R15) | Huawei, HiSilicon | Align UL channel bandwidths between NS\_37 and NS\_39:* 5/20MHz are removed for NS\_37 in clause 6.5.3.3.6.
* 5MHz are removed for NS\_39 in clause 6.5.3.3.8.
 |
| [R4-2205617](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_102-e/Docs/R4-2205617.zip) | General SE requirements for n41 | Anritsu Limited | Discussion paper.A “coverage hole” is identified for spurious emission for n41 (12.75 ~ 13.45GHz), and propose to modify Note 1 to fill up the hole:Change Note 1 in Table 6.5.3.1-2 [1] as “Applies for Band for which the upper frequency edge of the UL Band is greater than 2.55 GHz and less than or equal to 5.2 GHz”.Moderator: If the change is only for n41, then another alternative as shown below might be simpler?Applies for Band that the upper frequency edge of the UL Band ~~more~~ no less than 2.69 GHz |
| [R4-2205618](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_102-e/Docs/R4-2205618.zip)R4-2205619R4-2205620 | Draft CR to correct the general SE requirements for n41 | Anritsu Limited | Implementing the proposal in R4-2205617 |

## Open issues summary

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

### Sub-topic 3-1

*Sub-topic description: This sub-topic addresses configured transmission power.*

*Open issues and candidate options before e-meeting:*

**Issue 3-1: Is the IE *CellGroupConfig::PhysicalCellGroupConfig* applicable for the single carrier operation?**

* Proposals
	+ Option 1: Yes, i.e., *p-NR-FR1* and *p-UE-FR1* is applicable for the single carrier operation
	+ Option 2: No
* Recommended WF
	+ TBA

### Sub-topic 3-2

*Sub-topic description: This sub-topic addresses the “coverage hole” identified in R4-2205617, i.e, spurious emission requirements for* *n41 (12.75 ~ 13.45GHz) are missing, and it originates from Note 1:*

Applies for Band that the upper frequency edge of the UL Band more than 2.69 GHz

*Open issues and candidate options before e-meeting:*

**Issue 3-2: Which of the following options do you prefer to resolve the missing spurious emission requirements for n41 (12.75 ~ 13.45GHz)?**

* Proposals
	+ Option 1: Applies for Band for which the upper frequency edge of the UL Band is greater than 2.55 GHz and less than or equal to 5.2 GHz ~~more than 2.69 GHz~~
	+ Option 2: Applies for Band that the upper frequency edge of the UL Band ~~more~~ no less than 2.69 GHz
* Recommended WF
	+ TBA

## Companies views’ collection for 1st round

### Open issues

Sub topic 3-1

|  |  |
| --- | --- |
| **Company** | **Comments** |
| SoftBank | Sorry we commented in the wrong sub topic. Please ignore the previous comment.  |
| Qualcomm | Option 1 |
| OPPO | Yes, as seen in 331 below |
| SoftBank-K | We need time to check if the proposed scheme is likely as:1) In the current proc., it is our understanding that *p-XX-FR1s* only work for CA/DC, not single band/UL.2) Since Japanese regulation is stringent on MOP, (unfortunately) we would be a prime user of *p-XX-FR1s* and current Japanese regulation is largely based on R15 scheme: even if single band HP-UE is allowed, CA/DCs remain PC3.3) If CA/DC HP-UE becomes popular, we may have to rely on *p-XX-FR1s* for compliance but the proposed CR will also stop a permitted single band operation such as PC2 in n41. We are afraid that this would give impacts on single band operation to comply with CA/DC regulation.4) In addition, the change of regulation could not always be fast as we change our spec, or could sometimes be conditional. Apart from regulatory issue:5) It would be cumbersome for a scheduler if UEs with two different behaviors are in the same cell, within the same release.  |
| Ericsson | Regarding the SoftBank comments:1. The proposed change is consistent with the procedures in 38.331: the network always configures an MCG that can consist of one serving cell (always the case at establishment of a connection). In that case the p-XX-FR1, if present, limits the maximum power of this cell. The CR is to correct the PCMAX,f,c for a serving cell *c* such that p-XX-FR1 is also applied (when present) in order to cover the single-cell case in a MCG*.* This does not affect the behaviour or maximum power when the UE is configured with multiple cells in a CG or when configured with an SCG.2. The p-XX-FR1 is UE specific and configured according to the mode of operation.3. The change will not stop permitted operation of single-band HPUEs since the limits are UE-specific. If the PC2 UE is configured with a single UL cell, then there is no limitation if p-XX-FR1 is absent or ≥ 26 dBm. When configured with DC/ULCA then the same UE can be configured with a p-XX-FR1 to limit operation to PC3 (total power), this limits all UL serving cells of the CA configuration.5. See item 3. |
| Huawei | We also have concern to make the changes. The proposed change may have impact to the legacy UE, and we agree with SoftBank that the signaling has different applicable scenarios, not ready to accept this kind of the changes.  |

Sub topic 3-2

|  |  |
| --- | --- |
| **Company** | **Comments** |
| SoftBank | Support Option 1.  |
| Anritsu | We support Option 1.In the case of Option 2, two rows then apply for the range 12.75GHz to Hm5 for bands like n46 (5150MHz – 5925MHz), it is not ideal even though currently the values are the (max lev, MeasBW) are the same for both rows.

|  |  |  |  |
| --- | --- | --- | --- |
| 12.75 GHz ≤ f < 5th harmonic of the upper frequency edge of the UL operating band in GHz | -30 dBm | 1 MHz | 1 |
| 12.75 GHz < f < 26 GHz | -30 dBm | 1 MHz | 2 |
| NOTE 1:   Applies for Band that the upper frequency edge of the UL Band more than 2.69 GHzNOTE 2:   Applies for Band that the upper frequency edge of the UL Band more than 5.2 GHzNOTE 3:   Applies for Band n41, CA configurations including Band n41, and EN-DC configurations that include n41 specified in clause 5.2B of TS 38.101-3 [3] when NS\_04 is signalled.NOTE 4:   Does not apply for Band n41, CA configurations including Band n41, and EN-DC configurations that include n41 specified in subclause 5.2B of TS 38.101-3 [3] when NS\_04 is signalled. |

There are other possibilities for Note 1, but we decided to propose Option 1 as even if it will probably not happen that a new FR1 band is created, but let say a new band with its upper frequency edge of the UL Band set between 2.55GHz (12.75GHz/5) and 2.69GHz like 2.6GHz is created, then in the case of Option 2 there will be again the same issue of 12.75GHz to Hm5 (5\*2.6GHz = 13GHz) being not covered. |
| Qualcomm | Option 1 |
|  |  |

### CRs/TPs comments collection

*Major close to finalize Wis and Rel-15 maintenance, comments collections can be arranged for TPs and CRs. For Rel-16 on-going Wis, suggest to focus on open issues discussion on 1st round.*

|  |  |
| --- | --- |
| **CR/TP number** | **Comments collection** |
| [**R4-2203605**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_102-e/Docs/R4-2203605.zip)R4-2203606R4-2203607 | Company A |
| Company B |
|  |
| [**R4-2203608**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_102-e/Docs/R4-2203608.zip)R4-2203609R4-2203610 | Company A |
| Company B |
|  |
| [**R4-2203670**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_102-e/Docs/R4-2203670.zip) | Company A |
| Company B |
| (Moderator: Note 2 still there for n28?). |
| [**R4-2203671**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_102-e/Docs/R4-2203671.zip)R4-2203672 | Company A |
| Company B |
| (Moderator: Note 2 still there for n28?). |
| [**R4-2203678**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_102-e/Docs/R4-2203678.zip)R4-2203679R4-2203680 | Company A |
| Company B |
| Huawei: “Unless stated otherwise” can be added.Apple: Thank you for the proposal. This would make a good addition.  |
| [**R4-2203811**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_102-e/Docs/R4-2203811.zip) | Ericsson: this clarification is not necessary, Ppowerclass is the “power class” defined in 6.2.1 as the peak EIRP. |
| Company B |
|  |
| [**R4-2203999**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_102-e/Docs/R4-2203999.zip)R4-2204000R4-2204001 | Company A |
| Company B |
| DOCOMO:We agree that we should remove []. But we slightly prefer to remove only [] instead of removing the whole sentence because the assumption when NS is absent is also captured in TS 38.331. It may be better to align with RAN2 specification.additionalSpectrumEmissionThe additional spectrum emission requirements to be applied by the UE on this uplink. If the field is absent, the UE uses value 0 for the additionalSpectrumEmission (see TS 38.101-1 [15], table 6.2.3.1-1A, and TS 38.101-2 [39], table 6.2.3.1-2). Network configures the same value in additionalSpectrumEmission for all uplink carrier(s) of the same band with UL configured. The additionalSpectrumEmission is applicable for all uplink carriers of the same band with UL configured. |
| We agree with DOCOMO. |
| [**R4-2204002**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_102-e/Docs/R4-2204002.zip)R4-2204003R4-2204004 | Company A |
| Company B |
|  |
| [R4-2204175](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_102-e/Docs/R4-2204175.zip)R4-2204176R4-2204177 | Skyworks: Thank you for bringing this CR. We have spotted other corrections for Table 6.2.3.4-1 that could be brought with this CR:* 5MHz CBW: the Lcrb > 2.52 MHz/12/SCS condition is such that there are no SCS15 Inner RB allocation that are eligible to A3. This is an issue for CP-OFDM QPSK, where A-MPR is <= 2dB for A3 Inner (table 6.2.3.4-2). According to this equation, A3 is met if Lcrb>14 and RBstart<9, so the first RB allocation that meets this condition is Lcrb=15 RBstart=8. This is an outer allocation. It is difficult to propose a correction since simulation results for CP-OFDM 5MHz SCS15 QPSK with carrier frequency 1922.5MHz are hard to trace back.
* For 15MHz and 1942.5 ≤ FC < 1947.5: the condition to be eligible to A5 is Lcrb> 7.2 MHz/12/SCS. For SCS15 the lowest Lcrb is 41 which is an outer allocation. So only outer RB allocations are eligible to A5. This is an issue for CP-OFDM 64QAM where A-MPR is specified at <=4dB for A5 Inner.
* Both cases are circled in blue below

 |
| Qualcomm: To Skyworks: This is an obvious error. Those inner AMPR values are never reached and need to be removed. A3 and A5 are outer regions only and AMPR simulations do not show any need for inner AMPR. We can provide revision to remove the inner columns of A3 and A5. The possible revision is placed in the round 1 draft folder.  |
|  |
| [~~R4-2204331~~](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_102-e/Docs/R4-2204331.zip)~~R4-2204313~~ | ~~Company A~~ |
| ~~Company B~~ |
| Moderator:Move to Thread [#103] |
| [R4-2204596](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_102-e/Docs/R4-2204596.zip)R4-2204597R4-2204598 | qualcomm: Ok |
| softBank-K: We’d like to defer the decision, at least to the next meeting. |
| KDDI: We would like to postpone the decision at this meeting, and also need to check domestic regulatory restrictions carefully.Ericsson to KDDI/SoftBank: see comments to Issue 3-1.Huawei: We disagree with the proposed changes. The parameters are for different purposes. The change may have impact to the legacy UE.  |
| Moderator: Related to the discussion on Sub-topic 3-1 |
| [R4-2204599](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_102-e/Docs/R4-2204599.zip)R4-2204600R4-2204601 | Company A |
| Company B |
| Qualcomm: We understand the motivation and appreciate the larger system benefit that this change will bring. More discussion is required to identify what other side condition changes are needed to help the UE out with imposition of this new requirement. We anticipate needing more point-wise exemptions to cover the full Tx dynamic range, for example.Huawei: Disagree with the proposed changes. For lower output power, the power accuracy would be degraded compared to the range in PUMAX ≥ P > Pint. Without further evaluation, the tightened requirements are not acceptable for the moment.  |
| [R4-2205220](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_102-e/Docs/R4-2205220.zip)R4-2205221R4-2205222 | qualcomm: Do not agree. The SRS needs the ∆TRxSRS when it indicates the t1r4-t2R4 capability. This capability means that if UE is configured with 1 port transmissions so the second TX chain is not active and UE can not wake it up within the scheduling latency and UE should be scheduled according to t14r. If that UE is configured for 2 port transmissions, then UE can be treated as t2r4.  |
| OPPO: Not agree, and similar as QC comment.Huawei: Disagree with the proposed changes. Similar view as QC.  |
| Nokia: We support the direction. At least it does not make sense to list all the possible capabilities which has multiple behaviors as fallback. Perhaps, one option would be to delete “when when the *SRS-TxSwitch* capability …”. In any case, it is clear that which capability UE has to deal with when the relaxation applies from “UE transmits SRS on the second, third and fourth SRS resources of the total 4 SRS resources from all configured SRS resource set(s) consisting of one SRS port” etc.  |
| Ericsson: not agreed. The downgrading capabilities relevant for Rel-15 should be listed. Better to align with the Rel-17 changes when agreed. |
| [R4-2205294](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_102-e/Docs/R4-2205294.zip)R4-2205295R4-2205296 | qualcomm: It is unclear whether or not 5MHz should be removed from the requirement even though AMPR is not required. Maybe Japan operators can comment. |
| DOCOMO:Our understanding is that protection requirements associated with NS\_37 and NS\_39 are specified according to NOTE46 and NOTE42 in general UE co-existence table for the case of 5MHz CBW, respectively. Therefore, removing 5MHz from NS\_37 and 39 seems fine from the perspective of meeting protection requirements.But we think it may be easier for spec readers to understand the content of NSs when 5MHz CBW is kept in NS\_37 and NS\_39. Otherwise, people need to find NOTE 42 and 46 in UE coexistence table to understand the whole picture.For 20MHz for NS\_37, we think it can be removed. |
|  |
| [R4-2205618](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_102-e/Docs/R4-2205618.zip)R4-2205619R4-2205620 | Company A |
| Company B |
| Moderator: Related to the discussion on Sub-topic 3-2 |
| R4-2204165R4-2204167 | Company A |
| Company B |
|  |

## Summary for 1st round

### Open issues

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

|  |  |
| --- | --- |
|  | **Status summary**  |
| **Sub-topic#3-1** | *Tentative agreements: 5 companies commented where 2 companies have different understanding on whether an MCG is created even for the single serving cell case at establishment of a connection, thus propose not to make a decision in this meeting.* *From Moderator’s understanding, it is the case that an MCG is created even for the single serving cell case. However, we can further discuss in the second round and if necessary, we can also seek for inputs from RAN2 on this regard.* *Candidate options:**1) Seek to reach a common understanding that even for non-MRDC case with only single NR serving cell, an MCG is still created at establishment of a connection.**2) If necessary, send an LS to RAN2 for confirmation.* *Recommendations for 2nd round:*Discuss new issues 3-1-2, 3-1-3. |
| **Sub-topic#3-2** | *Tentative agreements:**Unanimously going for Option 1.**Candidate options:**Agree the proposed CRs**Recommendations for 2nd round:**No more discussion needed in the second round.* |

### CRs/TPs

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

|  |  |
| --- | --- |
| **CR/TP number** | **CRs/TPs Status update recommendation**  |
| XXX | *Based on 1st round of comments collection, moderator can recommend the next steps such as “agreeable”, “to be revised”* |
| [**R4-2203605**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_102-e/Docs/R4-2203605.zip)R4-2203606R4-2203607 | No comments received, deemed as “Agreeable” |
| [**R4-2203608**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_102-e/Docs/R4-2203608.zip)R4-2203609R4-2203610 | No comments received, deemed as “Agreeable” |
| [**R4-2203670**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_102-e/Docs/R4-2203670.zip) | No comments received, deemed as “Agreeable” |
| [**R4-2203671**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_102-e/Docs/R4-2203671.zip)R4-2203672 | No comments received, deemed as “Agreeable” |
| [**R4-2203678**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_102-e/Docs/R4-2203678.zip)R4-2203679R4-2203680 | Revised.Adding “Unless stated otherwise” |
| [**R4-2203811**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_102-e/Docs/R4-2203811.zip) | Not pursued.  |
| [**R4-2203999**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_102-e/Docs/R4-2203999.zip)R4-2204000R4-2204001 | Revised.Remove only [ ] and keep the whole sentence. |
| [**R4-2204002**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_102-e/Docs/R4-2204002.zip)R4-2204003R4-2204004 | No comments received, deemed as “Agreeable” |
| [R4-2204175](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_102-e/Docs/R4-2204175.zip)R4-2204176R4-2204177 | Revised.Capturing other corrections on the same table spotted by Skyworks. |
| [~~R4-2204331~~](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_102-e/Docs/R4-2204331.zip)~~R4-2204313~~ |  |
| [R4-2204596](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_102-e/Docs/R4-2204596.zip)R4-2204597R4-2204598 | Return-toSubject to discussion on Topic #3-1 in the second round. |
| [R4-2204599](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_102-e/Docs/R4-2204599.zip)R4-2204600R4-2204601 | Not pursued.More discussions are required, and Proponent is encouraged to provide more inputs in the next meeting. |
| [R4-2205220](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_102-e/Docs/R4-2205220.zip)R4-2205221R4-2205222 | Revised.Removing “when the SRS-TxSwitch capability is indicated as …” and see if the group can agree. |
| [R4-2205294](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_102-e/Docs/R4-2205294.zip)R4-2205295R4-2205296 | Revised.Addressing the concern on 5MHz. |
| [R4-2205618](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_102-e/Docs/R4-2205618.zip)R4-2205619R4-2205620 | Agreeable |
| R4-2204165R4-2204167 | No comments received, deemed as “Agreeable” |

## Discussion on 2nd round (if applicable)

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

**Issue 3-1-2: Do you agree that even for non-MRDC cases with only single NR serving cell, an MCG is still created at establishment of a connection?**

* Proposals
	+ Option 1: Yes
	+ Option 2: No
* Recommended WF
	+ TBA

**Issue 3-1-3: Do you agree to send an LS to RAN2 for the confirmation on the above understanding?**

* Proposals
	+ Option 1: Yes
	+ Option 2: No
* Recommended WF
	+ TBA

# Topic #4 : NR SA Maintenance – UL MIMO related

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

## Companies’ contributions summary

|  |  |  |  |
| --- | --- | --- | --- |
| **Tdoc** | **Title** | **Source** | **Moderator’s remarks** |
| [**R4-2205610**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_102-e/Docs/R4-2205610.zip) | FR1 UL coherent MIMO | Anritsu Limited | Discussion paper.Proposal 1: Put details regarding UL coherent MIMO requirements in “Annex G (informative): Transmit signal quality”.Proposal 2: Channel estimation should be used for determining the relative phase and amplitude errors.Proposal 3: Use DMRS resource elements (DMRS symbol, DMRS subcarrier).Proposal 4: The “relative phase error” and “relative amplitude” shall be calculated in frequency domain. There should not be then mention of “instantaneous” or “average over a slot”.Proposal 5: CFO should be corrected for each slot.Proposal 6: Equalization should not be used by the TE for performing the test.Proposal 7: A block diagram shown in Figure 2 should be added in Annex G to indicate the reference point.Moderator: It seems that only P1 and P7 have direct impacts on specs, and the rest proposals related to TE implementation. However, per Proponent’s request, we will discuss the rest proposals at least in the first round. |
| [**R4-2206099**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_102-e/Docs/R4-2206099.zip) | MIMO EVM Measurement for FR1 | Lenovo | (1) Pseudo-inverse does not exist for a non-full-rank channel matrix(2) Pseudo-inverse is equal to channel matrix inverse for a full-rank channel matrixModerator: The same proposal was submitted in R4-2119551 in RAN4#101-e. For (1), in this case the proposed channel matrix inverse does not exist either. For (2), when channel matrix is of full rank, they are equal. And EVM is defined on a per-layer basis, a non-full-rank channel matrix scheduled with 2-layer transmission will fail anyway. |

## Open issues summary

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

### Sub-topic 4-1

*Sub-topic description: This sub-topic addresses general issues for UL coherent MIMO*

*Open issues and candidate options before e-meeting:*

**Issue 4-1-1: Do you agree to put details regarding UL coherent MIMO requirements in “Annex G (informative): Transmit signal quality”, including a block diagram to indicate the reference point?**

* Proposals
	+ Option 1: Yes
	+ Option 2: No
* Recommended WF
	+ TBA

**Issue 4-1-2: Do you agree to indicate in “Annex G (informative): Transmit signal quality” that channel estimation should be used for determining the relative phase and amplitude errors?**

* Proposals
	+ Option 1: Yes
	+ Option 2: No
* Recommended WF
	+ TBA

**Issue 4-1-3: Do you agree to indicate in “Annex G (informative): Transmit signal quality” that Use DMRS resource elements (DMRS symbol, DMRS subcarrier) , not DMRS + data for channel estimation?**

* Proposals
	+ Option 1: Yes
	+ Option 2: No
* Recommended WF
	+ TBA

**Issue 4-1-4: Do you agree to indicate in “Annex G (informative): Transmit signal quality” that “relative phase error” and “relative amplitude” shall be calculated in frequency domain without mentioning “instantaneous” or “average”?**

* Proposals
	+ Option 1: Yes
	+ Option 2: No
* Recommended WF
	+ TBA

**Issue 4-1-5: Do you agree to indicate in “Annex G (informative): Transmit signal quality” that CFO should be corrected for each slot?**

* Proposals
	+ Option 1: Yes
	+ Option 2: No
* Recommended WF
	+ TBA

**Issue 4-1-6: Do you agree to indicate in “Annex G (informative): Transmit signal quality” that Equalization should not be used by the TE for performing the test?**

* Proposals
	+ Option 1: Yes
	+ Option 2: No
* Recommended WF
	+ TBA

### Sub-topic 4-2

*Sub-topic description: This sub-topic addresses another attempt to replace the pseudo-inverse with matrix inverse in the description of ZF receiver.*

*Open issues and candidate options before e-meeting:*

**Issue 4-2: If channel matrix is not full-ranked, both the pseudo-inverse and normal matrix inverse do not exist, and for a full-ranked channel matrix, both the pseudo-inverse and normal inverse are equal. Considering these two cases, do you think the pseudo-inverse should be replaced by the normal matrix inverse?**

* Proposals
	+ Option 1: Yes
	+ Option 2: No
* Recommended WF
	+ TBA

## Companies views’ collection for 1st round

### Open issues

Sub topic 4-1

|  |  |
| --- | --- |
| **Company** | **Comments** |
| XXX |  |
| Qualcomm | Agree – thank you Anritsu for the deep dive into 6.4D.4. The paper also has many good proposals that may warrant more discussion towards confirming requirement details.Questions for Anritsu: General: is the understanding that the UE will be configured for 2L UL and scheduled for 2L PUSCH? i.e., is the requirement on PUSCH alone?On Proposal 4: The “relative phase error” and “relative amplitude” shall be calculated in frequency domain. There should not be then mention of “instantaneous” or “average over a slot”.Is the intent to average across the entire channel BW to determine phase and amplitude? (What if the UE uses a front-end filter?)On Proposal 5: CFO should be corrected for each slot.We think this requirement is to evaluate relative phase tracking in the two chains. Proposal 5 is not necessary and may even be not preferred because the TE will add its own uncertainty to the measurement via the CFO correction.(Agree with other proposals) |
| Anritsu | Thanks Qualcomm for taking the time to review R4-2205610 and sharing your comments.On “General” point:Yes, we share the same understanding, the requirement in on PUSCH alone and it includes DMRS.On Proposal 4:3 DMRS is used to estimate channel effectively, so each slot has its “relative phase error” and “relative amplitude”. And we think they should be averaged across the entire channel (= whole frequency range).As the filter should be normally time invariant and linear phase response in the passband, it is okay because the gain at the same subcarrier does not change. In calculation, TE should compare subcarriers on the same frequency between slots before averaging across the entire channel.On Proposal 5:If CFO is not corrected, phase rotation will occur depending on the distance from (Rx) DC subcarrier and so it decreases channel estimation accuracy seriously, we think. Also, we think the same procedure should be used as Cov-Enhance test.Does Qualcomm mean that because the 2 Tx chains are affected by the same CFO the same manner, it is better to leave it uncorrected? The TE measurement method relying almost entirely on the channel estimation makes the use of CFO necessary we think. |
| Rohde & Schwarz | Thank you Anritsu for this good paper. In general we agree with most of the proposals. This seems to follow what was agreed last meeting for th coverage enhancement work item, with respect to coherency. We would like to further check the details on possible implementations.The general principle proposed by Anritsu in the paper can be agreed, details of the spec implementation (which carriers to use for channel estimation, how to average, etc.) can be discussed based on a proposed CR in the coming meetings, since then it is easier to analyze where some tweaks may be needed. |

Sub topic 4-2

|  |  |
| --- | --- |
| **Company** | **Comments** |
| XXX |  |
| Qualcomm | Agree with the principle of Lenovo’s paper. We also agree with the moderator’s summary. We think the intent for specifying pseudo-inverse is to naturally implement MRC for rank1 UL. While not relevant for FR1, where TxD EVM is measured as a weighted sum of per-connector quantities, the pseudo-inverse based equalization is necessary for OTA demod of FR2 UL. We are ok to go with Lenovo proposal for rank 2, and the pseudo inverse for rank 1 UL. |
| Rohde & Schwarz | We have discussed this proposal from Lenovo already a couple of times during the last meetings and there is the same proposal from Lenovo for FR2 as well in this meeting.With this being said, as before, we do not disagree with the technical arguments, the main argument from has always been to have unified implementation for FR1, FR2, two and one layer cases. However, to conclude this discussion and to avoid further back and forth we can compromise to the Lenovo proposal for the 2x2 UL MIMO case. |
| Lenovo | Thanks to Rhode and Schwarz and to Qualcomm for agreeing to compromise with this proposal. |

## Summary for 1st round

### Open issues

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

|  |  |
| --- | --- |
|  | **Status summary**  |
| **Sub-topic#4-1** | *Tentative agreements:**In general, the proposals are appreciated and the general principle is agreeable, and there are questions/concerns cast to Proposal 4 and 5. However, the detailed spec implementation is expected in the coming meetings.**Candidate options:**Recommendations for 2nd round:*Further discussions to facilitate the CR expected in the coming meetings. |
| **Sub-topic#4-2** | *Tentative agreements: A compromised is possible: Normal channel matrix inverse for rank 2, and pseudo inverse for rank 1.**Candidate options:**Agreement captured in Chairman notes:* *For two-layer uplink MIMO in FR1, define the zero-forcing receiver as the inverse of the effective channel matrix if channel matrix rank is 2.**Recommendations for 2nd round:**No more discussion is needed in the second round.* |

## Discussion on 2nd round (if applicable)

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

# Topic #5: Maintenance for NR CA and EN-DC

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

## Companies’ contributions summary

|  |  |  |  |
| --- | --- | --- | --- |
| **Tdoc** | **Title** | **Source** | **Moderator’s remarks** |
| [**R4-2205304**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_102-e/Docs/R4-2205304.zip)R4-2205305R4-2205306 | Draft CR for 38.101-3 to add spurious response exception for intra-band EN-DC (R15) | Huawei, HiSilicon | Similar to R4-2205301 but for intra-band EN-DC. |
| [**R4-2205614**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_102-e/Docs/R4-2205614.zip)R4-2205615R4-2205616 | Draft CR to correct the output power in EN-DC Rx tests | Anritsu Limited | Apply the general requirement about the output power to all EN-DC tests to prevent and decrease the affect on NR operation by IMD during EN-DC Rx test, the output power of the E-UTRA uplink shall be set to 29 dB below PCMAX\_L for all EN-DC tests, not only for intra-band non-contiguous EN-DC. |
| [**R4-2205705**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_102-e/Docs/R4-2205705.zip) | draft Rel-15 CR 38101-3-fg0 to align spurious emission between R15 and R16 | Ericsson | * Adding protected NR band n77 to DC\_2\_n5, DC\_2\_n66, DC\_2\_n71, DC\_5\_n66, DC\_12\_n5, DC\_12\_n66, DC\_25\_n41, DC\_30\_n5, DC\_30\_n66, DC\_66\_n5 and DC\_66\_n71.
* Added protected E-UTRA band 51 to DC\_7\_n28.
* Added protected E-UTRA band 53 to DC\_12\_n66 and DC\_30\_n5.
* Added protected E-UTRA band 28 to DC\_38\_n78 and DC\_38\_n79.
* Removed E-UTRA bands 48 and 52 from DC\_30A\_n5A.
 |
| **[R4-2205301](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_102-e/Docs/R4-2205301.zip)**R4-2205302R4-2205303 | Draft CR for 38.101-1 to add spurious response exception for intra-band CA(R15) | Huawei, HiSilicon | The spurious response exception is missing for intra-band CA.Moderator: Polishing some wording and editorial changes may be required, and discussion may be also needed. |
| [**R4-2206063**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_102-e/Docs/R4-2206063.zip)R4-2206064R4-2206065 | Draft CR to 38.101-2: missing image location for CA IBE (cat. F) | Qualcomm Incorporated | Since image location detail is present in the single CC IBE requiement, but not present for CA cases, replicate image location detail in the IBE requirement from the single CC case to CA case. |

### CRs/TPs comments collection

*Major close to finalize Wis and Rel-15 maintenance, comments collections can be arranged for TPs and CRs. For Rel-16 on-going Wis, suggest to focus on open issues discussion on 1st round.*

|  |  |
| --- | --- |
| **CR/TP number** | **Comments collection** |
| [**R4-2205304**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_102-e/Docs/R4-2205304.zip)R4-2205305R4-2205306Draft CR for 38.101-3 to add spurious response exception for intra-band EN-DC (R15) | Company A |
| Company B |
| Moderator: Similar to R4-2205301 but for intra-band EN-DC. |
| [**R4-2205614**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_102-e/Docs/R4-2205614.zip)R4-2205615R4-2205616Draft CR to correct the output power in EN-DC Rx tests | qualcomm: At least the EUTRA or NR transmitter must remain 4dB below Pc, max while doing RX tests. Otherwise, this test is more relaxed than LTE-CA. We cannot agree to removing the notes. They could be modified to limit any potential IMD product. |
| We agree with Qualcomm.In addition, the CR proposes to replace “intra-band non-contiguous EN-DC” with “EN-DC” in general section, but inter-band EN-DC also uses different power setting. And this power setting for inter-band EN-DC should be kept to ensure Rx performance.For example, power setting for OBB for inter-band EN-DC from TS 38.101-3:*one E-UTRA uplink carrier with the output power set to 4 dB below PCMAX\_L,c and the NR band whose downlink is being tested has its uplink carrier output power set to 29 dB below PCMAX\_L,f,c.**one NR uplink carrier with the output power set to 4 dB below PCMAX\_L,f,c on the NR band with both E-UTRA and NR downlinks being tested with E-UTRA output power set to 29 dB below PCMAX\_L,c.* |
|  |
| [**R4-2205705**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_102-e/Docs/R4-2205705.zip)draft Rel-15 CR 38101-3-fg0 to align spurious emission between R15 and R16 | Company A |
| Company B |
| Huawei: Since band n77 protection was introduced from R16 for some region 2 bands, there is no need to change R15 spec. It may have an impact on the legacy UE. |
| [**R4-2205301**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_102-e/Docs/R4-2205301.zip)R4-2205302R4-2205303Draft CR for 38.101-1 to add spurious response exception for intra-band CA(R15) | Company A |
| Company B |
|  |
| [**R4-2206063**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_102-e/Docs/R4-2206063.zip)R4-2206064R4-2206065Draft CR to 38.101-2: missing image location for CA IBE (cat. F) | Huawei: We think the intention of this CR is understandable but the modification to NOTE 3 is not agreeable. Since the *txDirectCurrentLocation* is not introduced to NOTE 5, it still can be interpreted as the center of symmetry is always on the CC center, which is obviously not align with the single carrier case. In addition, when UE has DL configured for non-contiguous CA, carrier leakage may land outside the spectrum occupied by all configured UL and DL CC. Exception is allowed for FR2, but the proposed changes eliminate such exception, which tightened the requirements significantly. We disagree with the proposed changes.  |
| Company B |
|  |

## Summary for 1st round

### CRs/TPs

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

|  |  |
| --- | --- |
| **CR/TP number** | **CRs/TPs Status update recommendation**  |
| XXX | *Based on 1st round of comments collection, moderator can recommend the next steps such as “agreeable”, “to be revised”* |
| [**R4-2205304**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_102-e/Docs/R4-2205304.zip)R4-2205305R4-2205306 | *No comment received, deemed as “Agreeable”* |
| [**R4-2205614**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_102-e/Docs/R4-2205614.zip)R4-2205615R4-2205616 | *Revised.**Addressing the comments received, e.g., modifying the notes to limit any potential IMD product, and replace “intra-band non-contiguous EN-DC” with “EN-DC” in general section.* |
| [**R4-2205705**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_102-e/Docs/R4-2205705.zip) | *Not pursued.**Concerns raised on impacts on legacy UEs.* |
| [**R4-2205301**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_102-e/Docs/R4-2205301.zip)R4-2205302R4-2205303 | *No comment received, deemed as “Agreeable”* |
| [**R4-2206063**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_102-e/Docs/R4-2206063.zip)R4-2206064R4-2206065 | *Revised.**Addressing the comments received on the changes on Note 3.* |

## Discussion on 2nd round (if applicable)

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

# Topic #6: Reply LS to GCF on power ambiguity issue

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

## Companies’ contributions summary

|  |  |  |  |
| --- | --- | --- | --- |
| **Tdoc** | **Title** | **Source** | **Moderator’s remarks** |
| [**R4-2204967**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_102-e/Docs/R4-2204967.zip) | On draft reply LS in Power class issues for Rel-15 | vivo | Draft reply LS to GCF based on the conclusion on the power ambiguity issue. |

## Open issues summary

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

### Sub-topic 6-1

*Sub-topic description: This sub-topic addresses general issues for the reply LS to GCF on the Rel-15 power ambiguity issue.*

*In RAN4#95-e, an LS from GCF (R4-2006116, LS on requirement in Power Class 2 for UL MIMO Test cases) was received which triggered lengthy and intensive discussions on the Rel-15 power ambiguity issue in RAN4. A half-way reply LS was sent back to GCF (R4-2011903).*

*In RAN4#101-e, an WF (R4-2119835) was agreed to conclude the power class issue, thus a final reply LS may be required.*

*Open issues and candidate options before e-meeting:*

**Issue 6-1: Do you agree to send a final reply LS to GCF since RAN4 has concluded the Rel-15 power ambiguity issue?**

* Proposals
	+ Option 1: Yes
	+ Option 2: No
* Recommended WF
	+ TBA

**Issue 6-2: If the answer to Issue 6-1 is Yes, please provide your comments on the reply LS texts below.**

|  |
| --- |
| 1. **Overall Description:**

RAN4 would like to thank GCF CAG for the LS on power class ambiguities in RAN4 specification. Previously, the conclusion for Rel-16 has been sent back via LS R4-2011903 in RAN4#96-e, and the related revision has been applied in Rel-16. Now, RAN4 would like to inform GCF CAG about the conclusions for Rel-15:For the general description of EN-DC power class in Rel-15 TS 38.101-3 sub-clause 6.1, RAN4 has been decided to keep it as it is.For the fall back description for section 6.2D.1 of 3GPP 38.101-1, further revision was agreed in CR R4-2118286 and aligned with Rel-16 which is already implemented in TS 38.101-1 V15.16.0.With this, RAN4 consider this issue closed for Rel-15 and no more discussion is expected. The detailed study process can also reference to TR 38.837. |

## Companies views’ collection for 1st round

### Open issues

Sub topic 6-1

|  |  |
| --- | --- |
| **Company** | **Comments** |
| vivo | Option 1.As proponent, it is still suggested to send the reply LS, though the wording may still need a few minor refinement. |

## Summary for 1st round

### Open issues

|  |  |
| --- | --- |
|  |  |
|  |  |

|  |  |
| --- | --- |
|  | **Status summary**  |
| **Sub-topic#6-1** | *Tentative agreements:**No other comments received except from Proponent.**Candidate options:**(1) Agree to send a final reply LS to GCF**(2) Refine the wording of the reply LS**Recommendations for 2nd round:*Refine the wording of the reply LS. |

## Discussion on 2nd round (if applicable)

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

# Recommendations for Tdocs

## 1st round

**New tdocs**

|  |  |  |
| --- | --- | --- |
| **Title** | **Source** | **Comments** |
| WF on … | YYY |  |
| LS on … | ZZZ | To: RAN\_X; Cc: RAN\_Y |
| *WF on FR1 UL coherent MIMO* | *Anritsu* | *The intention of this WF is to facilitate the CR expected in the coming meetings.* |
| *Draft reply LS in Power class issues for Rel-15* | *Vivo* | *For refined texts* |

**Existing tdocs**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Tdoc number** | **Title** | **Source** | **Recommendation**  | **Comments** |
| R4-210xxxx | CR on … | XXX | Agreeable, Revised, Merged, Postponed, Not Pursued |  |
| [**R4-2203605**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_102-e/Docs/R4-2203605.zip) | Correction to FR1 UL RMCs | Rohde & Schwarz | Agreeable |  |
| R4-2203606 | Correction to FR1 UL RMCs | Rohde & Schwarz | Agreeable | Proponent, please upload the mirror CR |
| R4-2203607 | Correction to FR1 UL RMCs | Rohde & Schwarz | Agreeable | Proponent, please upload the mirror CR |
| [**R4-2203608**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_102-e/Docs/R4-2203608.zip) | Correction to Rel-15 FR2 RMCs | Rohde & Schwarz | Agreeable |  |
| R4-2203609 | Correction to Rel-15 FR2 RMCs | Rohde & Schwarz | Agreeable | Proponent, please upload the mirror CR |
| R4-2203610 | Correction to Rel-15 FR2 RMCs | Rohde & Schwarz | Agreeable | Proponent, please upload the mirror CR |
| [**R4-2203670**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_102-e/Docs/R4-2203670.zip) | draftCR for TS 38.101-1 Rel-15: Corrections on single bands for UE co-existence | Apple | Agreeable | Proponent, please upload the mirror CR |
| [**R4-2203671**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_102-e/Docs/R4-2203671.zip) | draftCR for TS 38.101-1 Rel-16: Corrections on single bands for UE co-existence | Apple | Agreeable |  |
| R4-2203672 | draftCR for TS 38.101-1 Rel-17: Corrections on single bands for UE co-existence | Apple | Agreeable | Proponent, please upload the mirror CR |
| [**R4-2203678**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_102-e/Docs/R4-2203678.zip) | draft CR to 38.101-1 on AMPR edge RB allocation for NS R15 | Apple | Revised |  |
| R4-2203679 | draft CR to 38.101-1 on AMPR edge RB allocation for NS R16 | Apple | Return-to | Please hold on until the revision is agreed |
| R4-2203680 | draft CR to 38.101-1 on AMPR edge RB allocation for NS R17 | Apple | Return-to | Please hold on until the revision is agreed |
| [**R4-2203811**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_102-e/Docs/R4-2203811.zip) | Correction of FR2 UE configured transmitted power | Apple | Not pursued |  |
| [**R4-2203991**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_102-e/Docs/R4-2203991.zip) | Draft CR to TS 38.307 on NR intra-band CA BW class within FR1 (Rel-15) | ZTE Corporation | Agreeable |  |
| [**R4-2203999**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_102-e/Docs/R4-2203999.zip) | Draft CR to TS 38.101-1 on removal the bracket for the note of NS\_01 | ZTE Corporation | Revised |  |
| R4-2204000 | Draft CR to TS 38.101-1 on removal the bracket for the note of NS\_01 (R16\_CAT\_A) | ZTE Corporation | Return-to | Please hold on until the revision is agreed |
| R4-2204001 | Draft CR to TS 38.101-1 on removal the bracket for the note of NS\_01 (R17\_CAT\_A) | ZTE Corporation | Return-to | Please hold on until the revision is agreed. |
| [**R4-2204002**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_102-e/Docs/R4-2204002.zip) | Draft CR to TS 38.101-2 on corrections to UE maximum output power with additional requirements | ZTE Corporation | Agreeable |  |
| R4-2204003 | Draft CR to TS 38.101-2 on corrections to UE maximum output power with additional requirements (R16\_CAT\_A) | ZTE Corporation | Agreeable | Proponent, please upload the mirror CR |
| R4-2204004 | Draft CR to TS 38.101-2 on corrections to UE maximum output power with additional requirements (R17\_CAT\_A) | ZTE Corporation | Agreeable | Proponent, please upload the mirror CR |
| [**R4-2204069**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_102-e/Docs/R4-2204069.zip) | Discussion on the common UE RF requirement tables for the release independent features in TS 36.307 and TS 38.307 | CHTTL, ZTE | Noted |  |
| [**R4-2204070**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_102-e/Docs/R4-2204070.zip) | draft CR for the procedure of introducing release independent features | CHTTL, ZTE | Revised |  |
| R4-2204071 | draft CR for the procedure of introducing release independent features | CHTTL, ZTE | Return-to | Please hold on until the revision is agreed |
| R4-2204072 | draft CR for the procedure of introducing release independent features | CHTTL, ZTE | Return-to | Please hold on until the revision is agreed |
| R4-2204165 | CR CatA n74 AMPR | Qualcomm Incorporated | Agreeable |  |
| R4-2204167 | CR CatA n74 AMPR | Qualcomm Incorporated | Agreeable |  |
| [**R4-2204175**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_102-e/Docs/R4-2204175.zip) | n1 NS\_05 ineqaulity error fix Cat F rel 15 | Qualcomm Incorporated | Revised | Capturing other corrections on the same table spotted by Skyworks. |
| R4-2204176 | n1 NS\_05 ineqaulity error fix Cat A rel 16 | Qualcomm Incorporated | Return-to | Please hold on until the revision is agreed |
| R4-2204177 | n1 NS\_05 ineqaulity error fix Cat A rel 17 | Qualcomm Incorporated | Return-to | Please hold on until the revision is agreed |
| ~~R4-2204313~~ |  ~~draft CR for n74 related CA co-existence requirements for TS 38.101-1~~ | ~~KDDI Corporation~~ |  |  |
| [**~~R4-2204331~~**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_102-e/Docs/R4-2204331.zip) |  ~~draft CR for n74 related CA co-existence requirements for TS 38.101-1~~ | ~~KDDI, NTT DoCoMo, Softbank~~ |  |  |
| [**R4-2204596**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_102-e/Docs/R4-2204596.zip) | Correction to Pcmax: application of p-NR-FR1 for one CG with one uplink serving cell | Ericsson | Return-to | Subject to the outcome of discussions on Sub-topic #3-1 in the second round. |
| R4-2204597 | Correction to Pcmax: application of p-NR-FR1 for one CG with one uplink serving cell | Ericsson | Return-to | Please hold on until the revision is agreed |
| R4-2204598 | Correction to Pcmax: application of p-NR-FR1 for one CG with one uplink serving cell | Ericsson | Return-to | Please hold on until the revision is agreed |
| [**R4-2204599**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_102-e/Docs/R4-2204599.zip) | Correction to relative power tolerance | Ericsson | Not pursued |  |
| R4-2204600 | Correction to relative power tolerance | Ericsson | Withdrawn |  |
| R4-2204601 | Correction to relative power tolerance | Ericsson | Withdrawn |  |
| [**R4-2204967**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_102-e/Docs/R4-2204967.zip) | On draft reply LS in Power class issues for Rel-15 | vivo | Noted | A reply LS assigned for refined texts. |
| [**R4-2205220**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_102-e/Docs/R4-2205220.zip) | DraftCR for TS 38.101-1 on correction on IL for SRS antenna switching | ZTE Wistron Telecom AB | Revised |  |
| R4-2205221 | DraftCR for TS 38.101-1 on correction on IL for SRS antenna switching | ZTE Wistron Telecom AB | Return-to | Please hold on until the revision is agreed |
| R4-2205222 | DraftCR for TS 38.101-1 on correction on IL for SRS antenna switching | ZTE Wistron Telecom AB | Return-to | Please hold on until the revision is agreed |
| [**R4-2205294**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_102-e/Docs/R4-2205294.zip) | Draft CR for 38.101-1 to align the UL channel bandwidth between clause 6.5.3.3 and 6.2.3.1 for n74(R15) | Huawei, HiSilicon | Revised |  |
| R4-2205295 | Draft CR for 38.101-1 to align the UL channel bandwidth between clause 6.5.3.3 and 6.2.3.1 for n74(R16) | Huawei, HiSilicon | Return-to | Please hold on until the revision is agreed |
| R4-2205296 | Draft CR for 38.101-1 to align the UL channel bandwidth between clause 6.5.3.3 and 6.2.3.1 for n74(R17) | Huawei, HiSilicon | Return-to | Please hold on until the revision is agreed |
| [**R4-2205301**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_102-e/Docs/R4-2205301.zip) | Draft CR for 38.101-1 to add spurious response exception for intra-band CA(R15) | Huawei, HiSilicon | Agreeable |  |
| R4-2205302 | Draft CR for 38.101-1 to add spurious response exception for intra-band CA(R16) | Huawei, HiSilicon | Agreeable | Proponent, please upload the mirror CR |
| R4-2205303 | Draft CR for 38.101-1 to add spurious response exception for intra-band CA(R17) | Huawei, HiSilicon | Agreeable | Proponent, please upload the mirror CR |
| [**R4-2205304**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_102-e/Docs/R4-2205304.zip) | Draft CR for 38.101-3 to add spurious response exception for intra-band EN-DC (R15) | Huawei, HiSilicon | Agreeable |  |
| R4-2205305 | Draft CR for 38.101-3 to add spurious response exception for intra-band EN-DC (R16) | Huawei, HiSilicon | Agreeable | Proponent, please upload the mirror CR |
| R4-2205306 | Draft CR for 38.101-3 to add spurious response exception for intra-band EN-DC (R17) | Huawei, HiSilicon | Agreeable | Proponent, please upload the mirror CR |
| [**R4-2205307**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_102-e/Docs/R4-2205307.zip) | Draft CR for 36.101 to clarify the restriction of band 28 for CA\_20-28(R14) | Huawei, HiSilicon | Agreeable |  |
| R4-2205308 | Draft CR for 36.101 to clarify the restriction of band 28 for CA\_20-28(R15) | Huawei, HiSilicon | Agreeable | Proponent, please upload the mirror CR |
| R4-2205309 | Draft CR for 36.101 to clarify the restriction of band 28 for CA\_20-28(R16) | Huawei, HiSilicon | Agreeable | Proponent, please upload the mirror CR |
| R4-2205310 | Draft CR for 36.101 to clarify the restriction of band 28 for CA\_20-28(R17) | Huawei, HiSilicon | Agreeable | Proponent, please upload the mirror CR |
| [**R4-2205610**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_102-e/Docs/R4-2205610.zip) | FR1 UL coherent MIMO | Anritsu Limited | Noted |  |
| [**R4-2205614**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_102-e/Docs/R4-2205614.zip) | Draft CR to correct the output power in EN-DC Rx tests | Anritsu Limited | Revised | *Addressing the comments received, e.g., modifying the notes to limit any potential IMD product, and replace “intra-band non-contiguous EN-DC” with “EN-DC” in general section.* |
| R4-2205615 | Draft CR to correct the output power in EN-DC Rx tests | Anritsu Limited | Return-to | Please hold on until the revision is agreed |
| R4-2205616 | Draft CR to correct the output power in EN-DC Rx tests | Anritsu Limited | Return-to | Please hold on until the revision is agreed |
| [**R4-2205617**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_102-e/Docs/R4-2205617.zip) | General SE requirements for n41 | Anritsu Limited | Noted |  |
| [**R4-2205618**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_102-e/Docs/R4-2205618.zip) | Draft CR to correct the general SE requirements for n41 | Anritsu Limited | Agreeable |  |
| R4-2205619 | Draft CR to correct the general SE requirements for n41 | Anritsu Limited | Agreeable | Proponent, please upload the mirror CR |
| R4-2205620 | Draft CR to correct the general SE requirements for n41 | Anritsu Limited | Agreeable | Proponent, please upload the mirror CR |
| [**R4-2205662**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_102-e/Docs/R4-2205662.zip) | Draft CR for 36.101 Correction to Bands for NB-IoT in the USA | Dish Network | Revised |  |
| R4-2205663 | Draft CR for 36.101 Correction to Bands for NB-IoT in the USA | Dish Network | Return-to | Please hold on until the revision is agreed |
| R4-2205664 | Draft CR for 36.101 Correction to Bands for NB-IoT in the USA | Dish Network | Return-to | Please hold on until the revision is agreed |
| R4-2205665 | Draft CR for 36.101 Correction to Bands for NB-IoT in the USA | Dish Network | Return-to | Please hold on until the revision is agreed |
| [**R4-2205705**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_102-e/Docs/R4-2205705.zip) | draft Rel-15 CR 38101-3-fg0 to align spurious emission between R15 and R16 | Ericsson | Not pursued[Ericsson]: We need this draft CR to be in status revised.Comments received from 1st round have been addressed in [revision of R4-2205705 draft Rel-15 CR 38101-3-fg0 to align spurious emission between R15 and R16](https://www.3gpp.org/ftp/tsg_ran/WG4_Radio/TSGR4_102-e/Inbox/Drafts/%5B102-e%5D%5B101%5D%20R15_Maintenance/Round%202/revision%20of%20R4-2205705%20draft%20Rel-15%20CR%2038101-3-fg0%20to%20align%20spurious%20emission%20between%20R15%20and%20R16.docx) |  |
| [**R4-2206063**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_102-e/Docs/R4-2206063.zip) | Draft CR to 38.101-2: missing image location for CA IBE (cat. F) | Qualcomm Incorporated | Revised |  |
| R4-2206064 | Draft CR to 38.101-2: missing image location for CA IBE (cat. A) | Qualcomm Incorporated | Return-to | Please hold on until the revision is agreed |
| R4-2206065 | Draft CR to 38.101-2: missing image location for CA IBE (cat. A) | Qualcomm Incorporated | Return-to | Please hold on until the revision is agreed |
| [**R4-2206099**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_102-e/Docs/R4-2206099.zip) | MIMO EVM Measurement for FR1 | Lenovo | Noted | Chair, could you please capture the following agreements?*For two-layer uplink MIMO in FR1, define the zero-forcing receiver as the inverse of the effective channel matrix if channel matrix rank is 2.* |

Notes:

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

## 2nd round

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| --- | --- | --- | --- | --- |
| **Tdoc number** | **Title** | **Source** | **Recommendation**  | **Comments** |
| R4-210xxxx | CR on … | XXX | Agreeable, Revised, Merged, Postponed, Not Pursued |  |
| R4-210xxxx | WF on … | YYY | Agreeable, Revised, Noted |  |
| R4-210xxxx | LS on … | ZZZ | Agreeable, Revised, Noted |  |
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Notes:

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

# Annex

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|  |  |  |
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Note:

1. Please add your contact information in above table once you make comments on this email thread.
2. If multiple delegates from the same company make comments on single email thread, please add you name as suffix after company name when make comments i.e. Company A (XX, XX)