**3GPP TSG-RAN WG4 Meeting # 104-e R4-2214163**

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

**Agenda item:** 4.4, 9.5.4

**Source:** Wubin Zhou (ZTE Corporation)

**Title:** Email discussion summary for [104-e][303] NR\_EMC

**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: TBA
* 2nd round: TBA

It is appreciated that the delegates for this topic put their contact information in the table below.

Contact information

|  |  |  |
| --- | --- | --- |
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| ZTE Corporation | Wubin Zhou (Moderator) | zhou.wubin@zte.com.cn |
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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)

For the RAN4 [104-e] [303] NR\_EMC, the main topics are about NR UE/BS EMC and NR repeaters EMC, where BS EMC, IAB EMC are included. Therefore, the discussions will separate into four parts:

Topic #1: Agenda item 4.4: NR UE/BS/IAB EMC

Topic #2: Agenda item 9.5.4: NR Repeaters EMC core requirement maintenance and performance requirement

# Topic #1: NR UE/BS/IAB EMC

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

## Companies’ contributions summary

|  |  |  |
| --- | --- | --- |
| **T-doc number** | **Company** | **Proposals / Observations** |
| **[R4-2212213](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_104-e/Docs/R4-2212213.zip)**  **Mirror CR:**  R4-2212221 | ZTE Corporation | Draft CR to TS 38.175 IAB exclusion band and radiated emission R16  ***Reason for change:*** The requirements for exclusion band and radiated emission in TS38.174 and TS 38.176 are separated for IAB-DU and IAB-MT. However such requirements in TS38.175 do not distinguish IAB-DU and IAB-MT.  ***Summary of change:*** Some changes have been made via exclusion band and radiated emission. IAB-DU and IAB-MT are considered separately in clauses 4.4 and 8.2. |
| **[R4-2212596](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_104-e/Docs/R4-2212596.zip)** | ZTE Corporation | **Observation 1:** The requirements of NB-IoT have already been included in TS 36.113 and TS 37.113, where the RF requirement and test requirement/configuration are from the TS 36.104 and TS 36.141, respectively.  **Observation 2:** The requirements of NB-IoT operation in NR in-band have already been included in NR BS RF and conformance test specification TS 38.104 and TS 38.141-1.  **Proposal 1:** The requirement of NB-IoT operation in NR in-band should be added in NR BS EMC specification TS 38.113. |
| **[R4-2212606](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_104-e/Docs/R4-2212606.zip)**  **Mirror CR:**  R4-2212607 | ZTE Corporation | Draft CR for supplement of the requirement of NB-IoT in TS 38.113 (R16)  ***Reason for change:*** The feature of NB-IoT have already been introduced in TS38.104/TS38.141-1 since Rel-16, more details can be referred to R4-2212596. However, there were no NB-IoT requirements/test defined in TS38.113. From the specification alignment aspect, NB-IoT shall be included in TS38.113.  ***Summary of change:*** Add the requirement of NB-IoT, including in the scope, definitions, abbreviations, test configurations, performance criteria etc. |
| **[R4-2213192](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_104-e/Docs/R4-2213192.zip)** | Ericsson | Discussion of BS EMC Enhancement for NR and LTE  **Proposal 1: Using NB-IoT test result cover GSM, and LTE cover WCDMA, then we can reduce EMC MR test scope to maximum in three RATs combination; Furthermore, if NR can cover LTE, or vice versa, we can reduce MSR test scope to maximum two RATs combination, as alternative test method for MSR BS.**  *Moderator note:* *This discussion paper is for Rel-18 WID of BS/UE EMC Enhancements for NR and LTE. However, in terms of the previous Chairman’s arrangement, this R18 EMC WID topic will be started from Q4, i.e. Oct. Meeting.* |
| **[R4-2214014](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_104-e/Docs/R4-2214014.zip)** | Huawei, HiSilicon | Further discussion on the updated IEC 61000-4-3:2020 specification: upper frequency range for radiated immunity requirements  **Proposal 1**: 6 GHz limit for the Radiated Immunity testing shall be removed from RAN4 EMC specifications which are referring to the IEC 61000-4-3, recognizing potential capability limitations of the test labs.  **Proposal 2:** the following 38-series NR-related EMC specifications require updates due to IEC 61000-4-3:2020 revision:   * TS 38.113 * TS 38.114 * TS 38.124 * TS 38.175   **Proposal 3**: RAN4 EMC modifications related to the IEC 61000-4-3 updates are to be applied from Rel-17 onwards. |
| **[R4-2214015](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_104-e/Docs/R4-2214015.zip)** | Huawei, HiSilicon | draft CR to TS 38.175: updates reflecting modifications in IEC 61000-4-3:2020 for the upper frequency range of the RI test, Rel-17  Draft CR to R17 TS 38.175 based on the discussion in R4-2214014.  ***Summary of change:*** Removal of the upper frequency limit of 6 GHz for the Radiated Immunity testing, with consideration of potantial capability limitations of the test labs. |
| **[R4-2214016](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_104-e/Docs/R4-2214016.zip)** | Huawei, HiSilicon | draft CR to TS 38.113: updates reflecting modifications in IEC 61000-4-3:2020 for the upper frequency range of the RI test, Rel-17  Draft CR to R17 TS 38.113 based on the discussion in R4-2214014.  ***Summary of change:*** Removal of the upper frequency limit of 6 GHz for the Radiated Immunity testing, with consideration of potantial capability limitations of the test labs.  *Moderator note: Except the correction on removal of the upper frequency limit of 6GHz,* *there are some other corrections related to IAB DU/MT exclusion band which are not mentioned in the CR cover (reason for change and Summary of change)* |
| **[R4-2214017](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_104-e/Docs/R4-2214017.zip)** | Huawei, HiSilicon | draft CR to TS 38.124: updates reflecting modifications in IEC 61000-4-3:2020 for the upper frequency range of the RI test, Rel-17  Draft CR to R17 TS 38.124 based on the discussion in R4-2214014.  ***Summary of change:*** Removal of the upper frequency limit of 6 GHz for the Radiated Immunity testing, with consideration of potantial capability limitations of the test labs. |
| **[R4-2214018](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_104-e/Docs/R4-2214018.zip)** | Huawei, HiSilicon | Draft CR to TS 38.114: updates reflecting modifications in IEC 61000-4-3:2020 for the upper frequency range of the RI test, Rel-17  Draft CR to R17 TS 38.114 based on the discussion in R4-2214014.  ***Summary of change:*** Removal of the upper frequency limit of 6 GHz for the Radiated Immunity testing, with consideration of potantial capability limitations of the test labs. |
| **[R4-2214029](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_104-e/Docs/R4-2214029.zip)**  **Mirror CR:**  R4-2214030  R4-2214031 | Huawei, HiSilicon | Draft CR to TS 38.113: correction of the RI requirement applicability note, Rel-15  ***Reason for change:*** Referring to TS 38.113 table 7.1-1, it was noticed that the applicability of the Radiated emission requirement fpr the BS is ambiguous due to lack of the note number.  ***Summary of change:*** Correction of the note number in table 7.1-1 for the Radiated emission requirement applicability. |

## Open issues summary

In last meeting, the issue of removal of the upper frequency limits of 6 GHz for the Radiated Immunity testing were discussed, but no consensus were reached.

In terms of the last discussion, majority companies had concerns on removal of the upper frequency limits of 6 GHz for the Radiated Immunity testing. However, proponent also gave the feedback to try to solve the other’s companies concern, and would like to encourage companies to provide further analysis and feedback.

**(Copied from last moderator summary in R4-2210506** **for convenience) Proponent suggest the WF in R4-2210627 (late submission): (Moderator note: Copy here for information)**

Companies are encouraged to provide further analysis and feedback on the following aspects:

* Analysis of IEC and RAN4 specifications inter-relations,
* Analysis of the consequences of 6 GHz frequency limit removal for RI test in RAN4 EMC specifications,
* Proposals on IEC 61000-4-3:2020 modifications consideration in RAN4 EMC specifications, including alternative approaches to the proposals in [3-6], if any,
* Set of RAN4 EMC specifications to be considered as impacts,
* Version of the specification (3gpp release) to consider as baseline for CRs,

Other related analyses are not precluded.

### Sub-topic 1-1 NB-IoT operation in NR in-band in TS 38.113

**Issue 1-1: Is it ok to** **introduce** **NB-IoT operation in NR in-band in TS38.113 form Rel-16?**

* Proposals
  + Option 1: Yes ([R4-2212596](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_104-e/Docs/R4-2212596.zip))
  + Option 2: No (please provide reasons)
* Recommended WF
  + Due to NB-IoT operation in NR in-band have already been included in TS38.104 in Rel-16, also NB-IoT operation was supported in TS 36.113 and TS 37.113, therefore it is recommend to introduce NB-IoT operation in NR in-band in TS38.113 form Rel-16, i.e. Option 1.

### Sub-topic 1-2 Upper limits for the radiated Immunity testing

**Issue 1-2:** **Is it ok to remove 6 GHz limit for the** **Radiated Immunity testing from RAN4 EMC specifications (i.e. TS 38.113/TS 38.114/TS 38.124/TS 38.175 ) which are referring to the IEC 61000-4-3?**

* Proposal:
  + Option 1: Yes ([R4-2214014](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_103-e/Docs/R4-2209668.zip))
  + Option 2: No (Please provide reasons)
* Recommended WF
  + TBA

## Companies views’ collection for 1st round

### Open issues

**Issue 1-1: Is it ok to introduce NB-IoT operation in NR in-band in TS38.113 form Rel-16?**

|  |  |
| --- | --- |
| **Company** | **Comments** |
| Qualcomm | Agree with the recommended WF. |
| Huawei | In principle to support to complete missing features in EMC specs, but there are two comments:  1. Multiple features missing in EMC specs are supposed to be studied under the Rel-18 EMC enhancements WI. It is suggested to include this NB-IoT topic to the Rel-18 EMC enh agenda (with possible WI update).  2. There were CR to 38.104/141-1 correcting the NB-IoT for NR. Due to comments received from Nokia and Ericsson on the applicability of the NB-IoT to the BS type 1-H, it was proposed to Not pursue those CRs, and come back next meeting. It would be preferable to first clarify the 38.104/141-1 and the applicability of the NB-IoT requirements, before related EMC spec corrections.  *Nokia: NB-IoT in NR guard-band definition was included per operators’ request (ref. R4-1907809 and R4-2000875). Moreover, WI proposal on NB-IoT for AAS was proposed but no agreement was reached in RAN (ref. RP-192828 and RP-193156), hence addition of NB-IoT for BS type 1-H should not be handled as necessary corrections in RAN4.*  *Ericsson: We cannot agree with many of the corrections, as NB-IoT is not supported for BS Type 1-H. We can work offline with Huawei to develop a new version of the CR* |

**Issue 1-2:** **Is it ok to remove 6 GHz limit for the Radiated Immunity testing from RAN4 EMC specifications (i.e. TS 38.113/TS 38.114/TS 38.124/TS 38.175 ) which are referring to the IEC 61000-4-3?**

|  |  |
| --- | --- |
| **Company** | **Comments** |
| ZTE | Option 2. There are still some open issues for above 6GHz in the current version of IEC61000-4-3 V2020. i.e. The frequency step for above 6GHz is still under consideration. Therefore, we recommend to wait for IEC finishing their above 6GHz section and then we can start to discuss this topic. |
| Ericsson | Option 2. Agree with ZTE. Furthermore, even if it is possible to extend the frequency range higher than 6GHz, for FR2 product, what is a level of possible exposing field. Is there risk for any high expositor at all due to transmitted field being concentrating in beams not directed to radio or BS? |
| Qualcomm | Agree with ZTE. Once the IEC6100-4-3 is finalized, we can change the affected specs. Also the reference to IET6100-4-3 within TS 38.113/TS 38.114/TS 38.124/TS 38.175 will need to be updated to reflect the latest published version. |
| Nokia | Support Option 2. Share the same views as the other companies. |
| Huawei | Option 1  Couple of clarifications below:  @ZTE, Qualcomm: The IEC61000-4-3 V2020 is a formally released specification. It is unclear why and how we can question that. For the frequency step size, IEC spec defines how it shall be handled. I agree with Qualcomm, that irrespective of multiple companies preferring not to update RAN4 specs, we need to clarify which IEC61000-4-3 spec version shall be used to define RI requirements.  @Ericsson: for the exposition field level: it is not RAN4 responsibility to define those field levels. Clearly IEC has removed the 6GHz limit for RI test.  As multiple companies prefer option 2, the following way forward is proposed until remaining concerns remain:  1. If RAN4 decide to disregard the available IEC61000-4-3 V2020 specification, related references to IEC61000-4-3 in RAN4 EMC specs must be corrected to indicate that the previous version (i.e. IEC 61000-4-3:2006+AMD1:2007+AMD2:2010) which contains the 6GHz limit. The current reference is non-specific, i.e. no specification version is provided. Therefore all related CRs must be revised to fix this anyhow.  2. For the second round, we shall continue the discussion to decide if we need to send LS to IEC asking clarifications for the questions raised here by companies (f. step size, field strength levels for FR2, etc.), so that we do not repeat the same discussion in future. |

### CRs/TPs comments collection

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

**IAB DU/MT corrections**

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| --- | --- |
| **CR/TP number** | **Comments collection** |
| **[R4-2212213](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_104-e/Docs/R4-2212213.zip)**  **Mirror CR:**  R4-2212221 | Huawei: in general the correction seems ok, but we would like to simplify its implementation. Some text editorial corrections also needed. E.g. new frequency symbols introduced to be corrected and added to section 3. |
| Company B |
|  |

**Supplement of NB-IoT to TS38.113**

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| --- | --- |
| **CR/TP number** | **Comments collection** |
| **[R4-2212606](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_104-e/Docs/R4-2212606.zip)**  **Mirror CR:**  R4-2212607 | Huawei: as discussed above, please refer to discussion in [301] and [302], where related CRs to the RF specs were discussed in R4-2214022 – 25. We shall first fix this issue in RF specs, in order not to propagate erroneous text. |
| Company B |
|  |

**CRs on Removal of** **the upper frequency limit of 6 GHz for the RI testing** **based on the** **IEC 61000-4-3 updates**

|  |  |
| --- | --- |
| **CR/TP number** | **Comments collection** |
| **[R4-2214015](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_104-e/Docs/R4-2214015.zip)** | ZTE: Wait for the decision of issue 1-2. |
| Qualcomm: Same as ZTE comment. |
| Huawei: even if we decide not to remove the 6GHz limit, CR needs to be revised to add IEC spec version, i.e. the previous version of IEC 61000-4-3:2006+AMD1:2007+AMD2:2010 to be referred, which captured the 6GHz limit. |
| **[R4-2214016](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_104-e/Docs/R4-2214016.zip)** | ZTE: Wait for the decision of issue 1-2. |
| Qualcomm: Same as ZTE comment. |
| Huawei: same comment as to R4-2214015 |
| **[R4-2214017](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_104-e/Docs/R4-2214016.zip)** | ZTE: Wait for the decision of issue 1-2. |
| Qualcomm: Same as ZTE comment. |
| Huawei: same comment as to R4-2214015 |
| **[R4-2214018](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_104-e/Docs/R4-2214018.zip)** | ZTE: Wait for the decision of issue 1-2. |
| Qualcomm: Same as ZTE comment. |
| Huawei: same comment as to R4-2214015 |

**4.** **Miscellaneous CRs**

|  |  |
| --- | --- |
| **CR/TP number** | **Comments collection** |
| **[R4-2214029](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_104-e/Docs/R4-2214029.zip)**  **Mirror CR:**  R4-2214030  R4-2214031 | 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** |
| **Issue 1-1: Is it ok to introduce NB-IoT operation in NR in-band in TS38.113 form Rel-16?** | *One company agree to introduce NB-IoT operation in NR in-band in TS38.113 form Rel-16, but one company hold different views, where it is proposed to remove to R18 EMC enhancenment NR\_LTE WID, meanwhile it was mentioned that the related discussion happened in RF section.*  *As moderator, it is not recommended to remove it to R18 EMC enh WID, due to in R18 enh WID, for the BS part, only MSR test configuartion simplication issues was included, there were no actions for the other NR BS specs, this parts were stable for a long time and not aim to add multiple BS features. Moderator’s understanding on’ Multiple features missing in EMC specs are supposed to be studied under the Rel-18 EMC enhancements WI’ is that this is only for UE EMC, not BS.*  *Tentative agreements:*  *- Come back in next meeting*  *Candidate options:*  *Recommendations for 2nd round:* |
| **Issue 1-2: Is it ok to remove 6 GHz limit for the Radiated Immunity testing from RAN4 EMC specifications (i.e. TS 38.113/TS 38.114/TS 38.124/TS 38.175 ) which are referring to the IEC 61000-4-3?** | *4 out of 5 object to remove 6GHz limit for the RI testing from the 3GPP EMC specifications, the opponents think there were open issue which were not completed in IEC 61000-4-3 spec, so the corrections on 3GPP EMC spec should be postponed.*  *Menawhile, proponents ask clarifications via a LS to IEC if needed.*  *Tentative agreements:*  *- No actions for removal of 6GHz limits for the RI testing in 3GPP EMC specs (i.e. TS 38.113/TS 38.114/TS 38.124/TS 38.175 ).*  *- Discuss how to reflect the updates in the above EMC specs after all the issues are solved in the IEC6100-4-3.*  *Candidate options:*  *Recommendations for 2nd round:*  *- Discuss the LS to IEC if needed.* |
|  |  |

For [R4-2213192](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_104-e/Docs/R4-2213192.zip), due to it is for Rel-18 EMC enhancement WID which will be started from Q4, in terms of the vice-chairman’s guidance:

*1) Remove this t-doc from [303] EMC thread discussion since it's out of maintenance scope  and this t-doc marked as "not treated" (once Rel-18 EMC WID started ,we can trigger official discussion on that which can also applied to previous releases specifications if needed)*

*2) If you want, you can try to collect  comments from offline manner during and/or meeting weeks; no official record for this offline discussion*

Therefore, the original issue 1-3 is removed from the moderator’s summary.

### CRs/TPs

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

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

|  |  |
| --- | --- |
| **CR/TP number** | **CRs/TPs Status update recommendation** |
| XXX | *Based on 1st round of comments collection, moderator can recommend the next steps such as “agreeable”, “to be revised”* |

## Discussion on 2nd round (if applicable)

### **Sub-topic 1-3 Necessity for the LS to IEC**

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

Note. If the companies think the LS is necessary, then huawei will draft the LS.

## Summary for 2nd 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 1-3 Necessity for the LS to IEC** | *Tentative agreements:*    *Candidate options:*  *Recommendations for 2nd round:* |

# Topic #2: NR Repeaters EMC

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

## Companies’ contributions summary

|  |  |  |
| --- | --- | --- |
| **T-doc number** | **Company** | **Proposals / Observations** |
| **[R4-2212223](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_104-e/Docs/R4-2212223.zip)** | ZTE Corporation | Discussion on NR Repeater EMC performance assessment  **Observation 1:** The RF test methods for OTA out of band gain, OTA unwanted emissions and OTA ACRR are all TRP.  **Observation 2:** During the RF test for FR1 TDD repeater, only one link direction at a time is being tested.  **Proposal 1:** Total radiated power(TRP) shall be measured for repeater type 2-O EMC performance assessment.  **Proposal 2:** Power accuracy seems to be a more suitable performance assessment method compared with gain for NR repeater.  **Proposal 3:** For FR1 TDD repeater EMC test, UL and DL can be tested separately. |
| **[R4-2212224](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_104-e/Docs/R4-2212224.zip)** | ZTE Corporation | Draft CR to TS 38.114 Clauses 4.1, 4.2 and 9.1  ***Summary of change:*** The empty clauses 4.1, 4.2 and 9.1 has been added by this draft CR. |
| **[R4-2214037](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_104-e/Docs/R4-2214037.zip)** | Huawei, HiSilicon | Draft CR to TS 38.114: exclusion bands, performance assessment, performance criteria (4.4, 5.1, 5.2, 6.1, 6.2)  **Proposal 1**: Approve the attached TP to TS 38.114, covering the following sections:   * 4.4 Exclusion bands * 5.1 Performance assessment: General * 5.2 Performance assessment: NR repeater * 6.1 Performance criteria for continuous phenomena for BS * 6.2 Performance criteria for transient phenomena for BS   *Moderator note: Contents (TP) are not consistency with the Title (draft CR).* |
| **[R4-2214038](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_104-e/Docs/R4-2214038.zip)** | Huawei, HiSilicon | Draft CR to TS 38.114: text corrections aligning with the NR repeater core RF specification  **Proposal 1**: Approve the attached TP to TS 38.114, covering the following corrections:   * Scope wording correction to align with the TS 38.113 * Incorporation of the NR repeater specific terminology and definitions, e.g. repeater type 1-C, repeater type 2-O * Spatial exclusion text further detailed and aligned with TS 38.113 * Missing references and cross-references added.   *Moderator note: Contents (TP) are not consistency with the Title (draft CR).* |
| **[R4-2214049](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_104-e/Docs/R4-2214049.zip)** | Nokia, Nokia Shanghai Bell | CR to 38.114: Test configurations and radiation (8.1 and 8.2)  ***Summary of change:*** Introducing test configurations and radiated emission requirements based on agreements in RAN4 in Sections 8.1 and 8.2, respectively. |

## Open issues summary

In last meeting, A WF was agreed (R4-2210628) on the criteria for performance assessment for NR Repeater EMC testing, the agreements were copied & pasted below:

*Issue 2-1 Could throughput be used as performance assessment for NR Repeater EMC?*

* ***Agreement 1: Throughput can not be used as the performance assessment for NR Repeater EMC.***

*Issue 2-2 Which candidate**criteria for performance assessment should be adopted for NR Repeater EMC testing?*

*Option 1: Gain;*

*Option 2: Power accuracy;*

*Option 3: Others are not precluded;*

* ***Agreement 2: Require further discussion. FFS***

In addition, in the agreed WF R4-2202987, there was an open issue on whether or not UL and DL are tested together.

*2.2 WF on the communication link configuration for TDD NR repeater EMC*

* *Encourage companies to further check if it is ok for* *UL and DL are tested together..*

In the WF R4-2207187, there was an agreement below:

*Issue 2-2: For the communication link configuration of TDD NR Repeater, whether or not UL and DL are tested together?*

* ***Proposal 2-2: UL and DL are worked together for the communication link configuration of TDD NR Repeater. But whether or not*** ***monitoring their performance together should wait for RF discussion results.***

Moreover, the work split for the draft CR to TS38.114 was agreed in R4-2210506.

### Sub-topic 2-1 Criteria for performance assessment

**Issue 2-1** **Which candidate criteria for performance assessment should be adopted for NR Repeater EMC testing?**

* Proposal:
  + Option 1: Gain (R4-2214037)
  + Option 2: Power accuracy (R4-2212223)
* Recommended WF
  + TBA

### Sub-topic 2-2 Monitoring performance for TDD NR repeater

**Issue 2-2: Whether or not monitor UL and DL performance for TDD NR repeater together?**

* Proposals
  + Option 1: No, UL and DL can be tested separately
  + Option 2: Yes
* Recommended WF
  + To follow up the RF TDD repeater test set-up agreement, i.e. Only one link direction at a time is being tested. It is recommended to agree with Option 1.

### Sub-topic 2-3 New added clause include the conducted and radiated requirement reference points NR EMC specs (TS38.114/38.113/38.175/37.113)

**Issue 2-3-1: Is it ok to add a new clause to** **include the conducted and/or radiated requirement reference points in NR EMC specs?**

* Proposals
  + Option 1: Yes
    - Option 1a: For all of NR EMC specs, i.e. TS38.113/TS38.175/TS37.113/TS38.114, and no actions for LTE EMC specs.
    - Option 1b: Only for TS38.114
  + Option 2: No
* Recommended WF
  + TBA

**Issue 2-3-2: If the answer for issue 2-3-1 is Option 1, then which release should be started from?**

* Proposals
  + Option 1: the earliest release of each spec, i.e. Rel-15 for 38.113, Rel-16 for TS38.175, etc
  + Option 2: the latest release for all specs, i.e. Rel-17
* Recommended WF
  + TBA

## Companies views’ collection for 1st round

### Open issues

**Issue 2-1 Which candidate criteria for performance assessment should be adopted for NR Repeater EMC testing?**

|  |  |
| --- | --- |
| **Company** | **Comments** |
| Qualcomm | Option 1 has its merit that it follows EUTRA but RAN4 needs to ensure that the testability using the gain is feasible as motivated by ZTE for their option 2. If not feasible, option 2 should be adopted. |
| Nokia | Preferred Option 2 as a starting point, which is aligned with RF sessions.  For Option 1, TRP is needed to compute gain. |
| Huawei | Similar as above, we are still lacking confidence in the selection of either of them. We would like to understand better how the NR repeater differs from EUTRA repeater in that respect. Reuse of EUTRA approach for 1-C would be straightforward, but have we already agreed to use the same metric for 1-C and 2-O?  More discussion needed. |

**Issue 2-2: Whether or not monitor UL and DL performance for TDD NR repeater together?**

|  |  |
| --- | --- |
| **Company** | **Comments** |
| Qualcomm | Ok with option 1. |
| Nokia | A question for clarification: Does Option 1 apply to Type 1-C and 2-O repeaters? |
| Huawei | Related RF session decision may not necessarily be equally applicable to the EMC testing. RF testing aims to verify RF chains performance. EMC testing has different goals. Furthermore, analysis of the EMC testing aspects requires more time.  All in all: we would like to have more time for analysis of such single link testing applicability for EMC, e.g. RF decision reuse to be confirmed by next meeting. |

**Issue 2-3-1: Is it ok to add a new clause to include the conducted and/or radiated requirement reference points in NR EMC specs?**

|  |  |
| --- | --- |
| **Company** | **Comments** |
| ZTE | Option 2. Not sure why we need to add this new clause? |
| Qualcomm | No strong opinion here but why not simply refer to 38-104/37.104, etc. |
| Nokia | What is the rationale behind this issue? |
| Huawei | Where is the proposal 1a coming from?  The motivation behind including reference point figures in R4-2214038 was to show the NR repeater 2-O – it was felt useful for better understanding the requirements derivation and applicability. We don’t have strong view to add new clause as such – we can also refer to core RF spec if this is more preferred option. |

**Issue 2-3-2: If the answer for issue 2-3-1 is Option 1, then which release should be started from?**

|  |  |
| --- | --- |
| **Company** | **Comments** |
| XXX |  |
|  |  |

### 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** |
| **[R4-2212224](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_104-e/Docs/R4-2212224.zip)** | Huawei: BS wording still used. Some other minor editorial corrections needed, i.e. subclause –> clause.  I guess we do not have to use capitals for the “Repeater”  The last sentence refers to “one antenna port”: this applies to 1-C, but not 2-O. this shall be somehow solved in the text. |
| Company B |
|  |
| **[R4-2214037](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_104-e/Docs/R4-2214037.zip)** | ZTE: NR repeater uses uplink and downlink instead of receiver and transmitter. is no longer used for NR repeater. Therefore the exclusion band used in TS38.113 is not suitable here. |
| Company B |
|  |
| **[R4-2214038](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_104-e/Docs/R4-2214038.zip)** | ZTE: Wait for the decision of issue 2-3-1. |
| Ericsson: Cannot agree on the correction of Section 9.2.2. There is no spatial exclusion described in ETSI 301489-50, 3GPP cannot refer to the content does not exist in ETSI. Moreover, 3GPP should consider to remove the spatial exclusion description in other EMC specifications as well, which was already mentioned in the offline email sent to Huawei after 103 e-meeting. |
| Nokia: Pending the outcome of Issue 2-3-1. |
| Huawei: irrespective of 2-3-1, revision is needed.  @Ericsson: reference to ETSI 301489-50 is related to frequency range above 690 MHz, not to the spatial exclusion zone – we agree that the spatial exclusion zone is not defined in -50. This 9.2.2 wording is simply alignment with the other RAN4 EMC spec.  If Ericsson wants to remove spatial exclusion zone now, related discussion and decision needs to be brought to RAN4, first. Then we can take appropriate action for all the related EMC specs in RAN4. |
| **[R4-2214049](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_104-e/Docs/R4-2214049.zip)** | ZTE: n49, n96 and n102 is not used in NR repeater. Therefore the table rows related to frequency range 12.75GHz-26GHz and corresponding MU should be deleted. |
| Nokia: Thanks for your comments, ZTE. We will update the draft CR accordingly. |
| Huawei: BS wording still used. |

## Summary for 1st round

### Open issues

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

|  |  |
| --- | --- |
|  | **Status summary** |
| **Issue 2-1 Which candidate criteria for performance assessment should be adopted for NR Repeater EMC testing?** | *Companies’ views are diverse, further discussion are needed.*  *Tentative agreements:*   * + *Option 1: Gain*   + *Option 2: Power accuracy*   *Candidate options:*  *Recommendations for 2nd round:*  *- Further discussion the above two options in the WF* |
| **Issue 2-2: Whether or not monitor UL and DL performance for TDD NR repeater together?** | *Two companies prefer Option 1, i.e. UL and DL can be tested separately, but seems other companies hold different view.*  *Tentative agreements:*  *- N/A*  *Candidate options:*  *Recommendations for 2nd round:*  *- Further discussion in the WF* |
| **Issue 2-3-1: Is it ok to add a new clause to include the conducted and/or radiated requirement reference points in NR EMC specs?** | *Majority companies think there is no need to add a new clause, instead of refer to core RF spec.*  *Tentative agreements:*  *- Refer to the core RF spec.*  *Candidate options:*  *Recommendations for 2nd round:*  *- focus on the revised CR.* |
| **Issue 2-3-2: If the answer for issue 2-3-1 is Option 1, then which release should be started from?** | *No discussion on this issue.*  *Tentative agreements:*  *- N/A*  *Candidate options:*  *Recommendations for 2nd round:*  *- No action in 2nd 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”* |

## Discussion on 2nd round (if applicable)

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

# Recommendations for Tdocs

## 1st round

**New tdocs**

|  |  |  |  |
| --- | --- | --- | --- |
| **New Tdoc number** | **Title** | **Source** | **Comments** |
|  | WF on … | YYY |  |
|  | LS on … | ZZZ | To: RAN\_X; Cc: RAN\_Y |
| *R4-22xxxxx* | *WF on NR Repeater EMC testing performance* | *ZTE* |  |

**Existing tdocs**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Tdoc number** | **Revised to** | **Title** | **Source** | **Recommendation** | **Comments** |
| R4-22xxxxx |  | CR on … | XXX | Agreeable, Revised, Merged, Postponed, Not Pursued |  |
| **[R4-2212213](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_104-e/Docs/R4-2212213.zip)** |  | Draft CR to TS 38.175 IAB exclusion band and radiated emission R16 | ZTE Corporation | To be revised |  |
| R4-2212221 |  | Draft CR to TS 38.175 IAB exclusion band and radiated emission R17 | ZTE Corporation |  | Mirror CR |
| **[R4-2212596](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_104-e/Docs/R4-2212596.zip)** |  | Discussion on supplement of the requirement of NB-IoT in EMC specification | ZTE Corporation | Noted |  |
| **[R4-2212606](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_104-e/Docs/R4-2212606.zip)** |  | Draft CR for supplement of the requirement of NB-IoT in TS 38.113 (R16) | ZTE Corporation | Postponed |  |
| R4-2212607 |  | Draft CR for supplement of the requirement of NB-IoT in TS 38.113 (R17) | ZTE Corporation | Not Pursued | Mirror CR |
| **[R4-2213192](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_104-e/Docs/R4-2213192.zip)** |  | Discussion of BS EMC Enhancement for NR and LTE | Ericsson | Not handled | No TU for R18 WID in this meeting |
| **[R4-2214014](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_104-e/Docs/R4-2214014.zip)** |  | Further discussion on the updated IEC 61000-4-3:2020 specification: upper frequency range for radiated immunity requirements | Huawei, HiSilicon | Noted |  |
| **[R4-2214015](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_104-e/Docs/R4-2214015.zip)** |  | draft CR to TS 38.175: updates reflecting modifications in IEC 61000-4-3:2020 for the upper frequency range of the RI test, Rel-17 | Huawei, HiSilicon | To be revised |  |
| **[R4-2214016](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_104-e/Docs/R4-2214016.zip)** |  | draft CR to TS 38.113: updates reflecting modifications in IEC 61000-4-3:2020 for the upper frequency range of the RI test, Rel-17 | Huawei, HiSilicon | To be revised |  |
| **[R4-2214017](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_104-e/Docs/R4-2214017.zip)** |  | draft CR to TS 38.124: updates reflecting modifications in IEC 61000-4-3:2020 for the upper frequency range of the RI test, Rel-17 | Huawei, HiSilicon | To be revised |  |
| **[R4-2214018](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_104-e/Docs/R4-2214018.zip)** |  | Draft CR to TS 38.114: updates reflecting modifications in IEC 61000-4-3:2020 for the upper frequency range of the RI test, Rel-17 | Huawei, HiSilicon | To be revised |  |
| **[R4-2214029](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_104-e/Docs/R4-2214029.zip)** |  | Draft CR to TS 38.113: correction of the RI requirement applicability note, Rel-15 | Huawei, HiSilicon | Agreeable |  |
| R4-2214030 |  | Draft CR to TS 38.113: correction of the RI requirement applicability note, Rel-16 | Huawei, HiSilicon | Agreeable | Mirror CR |
| R4-2214031 |  | Draft CR to TS 38.113: correction of the RI requirement applicability note, Rel-17 | Huawei, HiSilicon | Agreeable | Mirror CR |
| **[R4-2212223](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_104-e/Docs/R4-2212223.zip)** |  | Discussion on NR Repeater EMC performance assessment | ZTE Corporation | Noted |  |
| **[R4-2212224](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_104-e/Docs/R4-2212224.zip)** |  | Draft CR to TS 38.114 Clauses 4.1, 4.2 and 9.1 | ZTE Corporation | To be revised |  |
| **[R4-2214037](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_104-e/Docs/R4-2214037.zip)** |  | Draft CR to TS 38.114: exclusion bands, performance assessment, performance criteria (4.4, 5.1, 5.2, 6.1, 6.2) | Huawei, HiSilicon | To be revised | Moderator note: Title is draft CR to TS38.114, but the contents are TP to TS38.114. |
| **[R4-2214038](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_104-e/Docs/R4-2214038.zip)** |  | Draft CR to TS 38.114: text corrections aligning with the NR repeater core RF specification | Huawei, HiSilicon | To be revised | Moderator note: Title is draft CR to TS38.114, but the contents are TP to TS38.114. |
| **[R4-2214049](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_104-e/Docs/R4-2214049.zip)** |  | CR to 38.114: Test configurations and radiation (8.1 and 8.2) | Nokia, Nokia Shanghai Bell | To be revised |  |

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

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Tdoc number** | **Revised to** | **Title** | **Source** | **Recommendation** | **Comments** |
| R4-22xxxxx |  | CR on … | XXX | Agreeable, Revised, Merged, Postponed, Not Pursued |  |
| R4-22xxxxx |  | WF on … | YYY | Agreeable, Revised, Noted |  |
| R4-22xxxxx |  | LS on … | ZZZ | Agreeable, Revised, Noted |  |
|  |  |  |  |  |  |

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