**3GPP TSG-RAN WG4 Meeting # 98e R4-200XXXX**

**Electronic Meeting, 25 Jan – 5 Feb, 2021**

**Agenda item:** 7.1.3, 7.1.4

**Source:** Moderator (ZTE Corporation)

**Title:** Email discussion summary for [98e][304] NR\_unlic\_BSRF\_Conformance

**Document for:** Information

# Introduction

*Briefly introduce background, the scope of this email discussion and provide some guidelines for email discussion if necessary.*

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

* 1st round:
* Maintenance for NR-U core requirement ;
* NR-U performance testing
* 2nd round: TBA

# Topic #1: maintenance for 36.104,37.104,37.105

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

## Companies’ contributions summary

|  |  |  |
| --- | --- | --- |
| **T-doc number** | **Company** | **Proposals / Observations** |
| R4-2101972 | ZTE Corporation | CR to TS 36.104: corrections of NR-U BS RF requirements |
| R4-2101973 | ZTE Corporation | Cat A CR |
| R4-2101974 | ZTE Corporation | CR to TS 37.104: corrections of NR-U BS RF requirements |
| R4-2101975 | ZTE Corporation | Cat A CR |
| R4-2101976 | ZTE Corporation | CR to TS 37.105: corrections of NR-U BS RF requirements |
| R4-2101977 | ZTE Corporation | Cat A CR |

## 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 1-1 **R4-2101972**

*Sub-topic description:*

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

**Issue 1-1:** Note for Tx co-location requirements of n96 in Table 6.6.4.4.1-2 and Table 6.6.4.4.1-3

* Proposals
  + Option 1: remove the Note for n96 in Table Table 6.6.4.4.1-2 and Table 6.6.4.4.1-3 since the note is only applicable for bands overlapping with bands of co-located BS, however band n96 is not overlapping with B46.
  + Option 2: other
* Recommended WF
  + TBA

**Issue 1-2:** co-location blocking requirements in Table 7.6.2.1-2 and Table 7.6.2.1-3

* Proposals
  + Option 1: remove the NOTE \*\* for n46 and n96 since in-band NB-IoT is not supported for NR-U
  + Option 2: other
* Recommended WF
  + Option 1

### Sub-topic 1-2 **R4-2101974**

*Sub-topic description:*

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

**Issue 2-1:** Note for Tx co-location requirements of n96 in Table 6.6.1.4.1-1

* Proposals
  + Option 1: update the Note in last row of Table 6.6.1.4.1-1 since the note is only applicable for bands overlapping with bands of co-located BS, however band n96 is not overlapping with B46.
  + Option 2: other
* Recommended WF
  + TBA

**Issue 2-2:** co-location blocking requirements in Table 7.5.2-1.

* Proposals
  + Option 1: remove the NOTE \*\* for n46 and n96 since in-band NB-IoT is not supported for NR-U
  + Option 2: other
* Recommended WF
  + Option 1

### Sub-topic 1-3 **R4-2101976**

*Sub-topic description:*

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

**Issue 3-1:** Note for Tx co-location requirements of n96 in Table .

;

* Proposals
  + Option 1: add the Notes for band 46 and n96 in section 9.7.6.3.4.2 and 9.7.6.3.4.2 which is missing.
  + Option 2: other
* Recommended WF
  + TBA

## Companies views’ collection for 1st round

### Open issues

|  |  |
| --- | --- |
| **Company** | **Comments** |
| XXX | Sub topic 1-1:  Sub topic 1-2:  ….  Others: |
| Nokia, Nokia Shanghai Bell | Issue 1-1: Note for Tx co-location requirements of n96 in Table 6.6.4.4.1-2 and Table 6.6.4.4.1-3  We don’t agree with this proposal. This update is not needed, and current text should stay in specification.  Issue 1-2: co-location blocking requirements in Table 7.6.2.1-2 and Table 7.6.2.1-3  There is no NB-IoT support for NR-U, thus we don’t see need to update references to “Note\*\*”  Issue 2-1: Note for Tx co-location requirements of n96 in Table 6.6.1.4.1-1  This update can be considered if the same will happen to Band 46 since these bands are not defined in MSR specs.  Issue 2-2: co-location blocking requirements in Table 7.5.2-1.  There is no NB-IoT support for NR-U, thus we don’t see need to update references to “Note\*\*”  Issue 3-1: Note for Tx co-location requirements of n96 in Table.  These updates are not needed in MSR spec. |
| Ericsson | Issue 1-1: we think the note should stay. One interesting discussion is to re-formulate all these notes, in a normative manner…using “shall”. Bands n96 and 46 are indeed not overlapping but they are adjacent, and both unlicensed, and do not need to protect eachother.  Iissue 2-1: shouldn’t be band 46 and n96 together in the note? See also comment for issue 1-1 |
| ZTE | Issue 1-1:  Disagree with Nokia, only bands overlapping with 1st column should be added in the last column for applicability issue, can you give me some other examples?  Issue 1-2: co-location blocking requirements in Table 7.6.2.1-2 and Table 7.6.2.1-3  The suggestion is to remove \*\* instead of adding \*\*, current wording is not applicable  Issue 2-1: Note for Tx co-location requirements of n96 in Table 6.6.1.4.1-1  Yes, the Note was already added for band n46;  Issue 2-2: co-location blocking requirements in Table 7.5.2-1.  The same as Issue 1-2, please Nokia double check that.  Issue 3-1: Note for Tx co-location requirements of n96 in Table.  Disagree with Nokia, it has been captured in TS 37.104, why cannot be applied for TS 37.105? |

### 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** |
| R4-2101972 | Nokia: Based on comments above CR is not needed. |
| ZTE: disagree with Nokia |
|  |
| R4-2101974 | Nokia: Based on comments above, first update can be considered if the same will happen to Band 46 since these bands are not defined in MSR specs. 2nd update for CR is not needed. |
| Company B |
|  |
| R4-2101976 | Nokia: Based on comments above CR is not needed. |
| ZTE: disagree with Nokia |
|  |

## 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#1** | *Tentative agreements:*  *Candidate options:*  *Recommendations for 2nd round:* |

*Recommendations on WF/LS assignment*

|  |  |  |
| --- | --- | --- |
|  | **WF/LS t-doc Title** | **Assigned Company,**  **WF or LS lead** |
| #1 |  |  |

### CRs/TPs

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

|  |  |
| --- | --- |
| **CR/TP number** | **CRs/TPs Status update recommendation** |
| 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)

## Summary on 2nd round (if applicable)

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

|  |  |
| --- | --- |
| **CR/TP/LS/WF number** | **T-doc Status update recommendation** |
| XXX | *Based on 2nd round of comments collection, moderator can recommend the next steps such as “agreeable”, “to be revised”* |

# Topic #2: maintenance for TS 38.104 Tx requirements

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

## Companies’ contributions summary

|  |  |  |
| --- | --- | --- |
| **T-doc number** | **Company** | **Proposals / Observations** |
| R4-2101978 | ZTE Corporation | CR to TS 38.104: corrections of NR-U BS Tx requirements |
| R4-2101979 | ZTE Corporation | Cat A CR |
| R4-2102835 | Nokia, Nokia Shanghai Bell | CR to TS 38.104 corrections to NR-U BS RF Tx requirements |
| R4-2102836 | Nokia, Nokia Shanghai Bell | Cat A CR |

## 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:*

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

**Issue 2-1:** remove the undefined notes in section 6.6.4.2A [R4-2101978]

* Proposals
  + Option 1: agree
  + Option 2: disagree
* Recommended WF
  + TBA

**Issue 2-2:** add the MR for n96 which is missing in section 6.6.4.2.4A [R4-2101978]

* Proposals
  + Option 1: agree
  + Option 2: disagree
* Recommended WF
  + TBA

**Issue 2-3:** Add -13dBm/MHz for 12.75GHz-26GHz in Table 6.6.5.2.1-1; [R4-2101978,R4-2102835]

* Proposals
  + Option 1: agree
  + Option 2: disagree
* Recommended WF
  + TBA

**Issue 2-4:** Update the note for n46 and n96 in Table 6.6.5.2.3-1 and 6.6.5.2.4-1; [R4-2101978,]

* Proposals
  + Option 1: agree
  + Option 2: disagree
* Recommended WF
  + TBA

**Issue 2-5:** Modification to ACLR tables description to capture excluding band n46 and n96 that have own tables; [R4-R4-2102835]

* Proposals
  + Option 1: agree
  + Option 2: disagree
* Recommended WF
  + TBA

**Issue 2-6:** Editorial Correction of Note 6 in table 5.4.3.3-1; [R4-2102835, R4-2101968]

* Proposals
  + Option 1: agree
  + Option 2: disagree
* Recommended WF
  + TBA

## Companies views’ collection for 1st round

### Open issues

|  |  |
| --- | --- |
| **Company** | **Comments** |
| XXX | Sub topic 2-1:  Sub topic 2-2:  ….  Others: |
| Nokia, Nokia Shanghai Bell | **Issue 2-1:** remove the undefined notes in section 6.6.4.2A [R4-2101978]  We are fine with proposal.  **Issue 2-2:** add the MR for n96 which is missing in section 6.6.4.2.4A [R4-2101978]  We are fine with proposal.  **Issue 2-3:** Add -13dBm/MHz for 12.75GHz-26GHz in Table 6.6.5.2.1-1; [R4-2101978,R4-2102835]  We agree with proposal.  **Issue 2-4:** Update the note for n46 and n96 in Table 6.6.5.2.3-1 and 6.6.5.2.4-1; [R4-2101978]  We do NOT agree with proposal of update. This change is not needed.  **Issue 2-5:** Modification to ACLR tables description to capture excluding band n46 and n96 that have own tables; [R4-R4-2102835]  We agree with proposal.  **Issue 2-6:** Editorial Correction of Note 6 in table 5.4.3.3-1; [R4-2102835, R4-2101968]  We agree with proposal.  General comment: There are valid proposals of updates in Tx part and Rx part for TS 38.104 in different CRs thus some merge is needed. Suggestion to do split between companies for revision of merge CRs for Tx and Rx part, to share works equally. |
| ZTE | **Issue 2-4:** Update the note for n46 and n96 in Table 6.6.5.2.3-1 and 6.6.5.2.4-1; [R4-2101978]  Disagree with Nokia, please see the above reasons as explained. Could you tell me specific reason why we need that? |

### 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** |
| R4-2101978 | Company A |
| Company B |
|  |
| R4-2102835 | 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#1** | *Tentative agreements:*  *Candidate options:*  *Recommendations for 2nd round:* |

*Suggestion on WF/LS assignment*

|  |  |  |
| --- | --- | --- |
|  | **WF/LS t-doc Title** | **Assigned Company,**  **WF or LS lead** |
| #1 |  |  |

### 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)

## Summary on 2nd round (if applicable)

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

|  |  |
| --- | --- |
| **CR/TP/LS/WF number** | **T-doc Status update recommendation** |
| XXX | *Based on 2nd round of comments collection, moderator can recommend the next steps such as “agreeable”, “to be revised”* |

# Topic #3: maintenance for TS 38.104 Rx requirements

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

## Companies’ contributions summary

|  |  |  |
| --- | --- | --- |
| **T-doc number** | **Company** | **Proposals / Observations** |
| R4-2101980 | ZTE Corporation | CR to TS 38.104: corrections of NR-U BS Rx requirements |
| R4-2101981 | ZTE Corporation | Cat A CR |
| R4-2102837 | Nokia, Nokia Shanghai Bell | CR to TS 38.104 corrections to NR-U BS RF Rx requirements |
| R4-2102838 | Nokia, Nokia Shanghai Bell | Cat A CR |

## 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:*

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

**Issue 3-1:** Correction and addition of text in section 7.2.2,7.3.2,7.4.1,7.7.2 reference sensitivity with description of requirements for all bands and only for bands n46 and n96 [R4-2102837]

* Proposals
  + Option 1: agree
  + Option 2: disagree
* Recommended WF
  + TBA

**Issue 3-2:** update the note for table 7.4.1.2-1a [R4-2101980]

* Proposals
  + Option 1: agree
  + Option 2: disagree
* Recommended WF
  + TBA
  + TBA

**Issue 3-4:** .update the note for table7.4.2.2-1b [R4-2101980]

* Proposals
  + Option 1: agree
  + Option 2: disagree
* Recommended WF
  + TBA

**Issue 3-5:** .update the note for table 7.5.2-1a [R4-2101980]

* Proposals
  + Option 1: agree
  + Option 2: disagree
* Recommended WF
  + TBA

**Issue 3-6:** .add general intermodulation requirements for n46 and n96. [R4-2101980]

* Proposals
  + Option 1: agree
  + Option 2: disagree
* Recommended WF
  + TBA

**Issue 3-7:** .update the requirements in table 7.8.2-3c. [R4-2101980]

* Proposals
  + Option 1: agree
  + Option 2: disagree
* Recommended WF
  + TBA

## Companies views’ collection for 1st round

### Open issues

|  |  |
| --- | --- |
| **Company** | **Comments** |
| XXX | Sub topic 2-1:  Sub topic 2-2:  ….  Others: |

### 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** |
| R4-2101980 | Company A |
| Company B |
|  |
| R4-2102837 | 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#1** | *Tentative agreements:*  *Candidate options:*  *Recommendations for 2nd round:* |
| **Nokia, Nokia Shanghai Bell** | **Issue 3-1:** Correction and addition of text in section 7.2.2,7.3.2,7.4.1,7.7.2 reference sensitivity with description of requirements for all bands and only for bands n46 and n96 [R4-2102837]  We support this update.  **Issue 3-2:** update the note for table 7.4.1.2-1a [R4-2101980]  We support this update.  **(Issue 3-3 is missing in summary numbering)**  **Issue 3-4:** .update the note for table7.4.2.2-1b [R4-2101980]  We support this update.  **Issue 3-5:** .update the note for table 7.5.2-1a [R4-2101980]  We support this update.  **Issue 3-6:** .add general intermodulation requirements for n46 and n96. [R4-2101980]  We support this update.  **Issue 3-7:** .update the requirements in table 7.8.2-3c. [R4-2101980]  In general proposal is fine to update levels for interfering signal mean power, as there should be accommodated 1dB from NF change for n96. However, for 60kHz SCS cases we reused legacy NR values, thus only 15kHz and 30kHz SCS should be updated. |

*Suggestion on WF/LS assignment*

|  |  |  |
| --- | --- | --- |
|  | **WF/LS t-doc Title** | **Assigned Company,**  **WF or LS lead** |
| #1 |  |  |

### 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)

## Summary on 2nd round (if applicable)

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

|  |  |
| --- | --- |
| **CR/TP/LS/WF number** | **T-doc Status update recommendation** |
| XXX | *Based on 2nd round of comments collection, moderator can recommend the next steps such as “agreeable”, “to be revised”* |

# Topic #3: NR-U BS conformance testing

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

## Companies’ contributions summary

|  |  |  |
| --- | --- | --- |
| **T-doc number** | **Company** | **Proposals / Observations** |
| R4-2101982 | ZTE Corporation | CR to TS 38.141-1: introduction of NR-U BS |
| R4-2101983 | ZTE Corporation | Cat A CR |
| R4-2101566 | Nokia, Nokia Shanghai Bell | On NR-U measurement uncertainties for BS conformance tests |
| R4-2102444 | Nokia, Nokia Shanghai Bell | Draft CR to 37.141: Introduction of NR-U co-existence requirements |
| R4-2101567 | Nokia, Nokia Shanghai Bell | Draft CR to TS 37.107 With NR-U intorduction for performance part |
| R4-2101733 | Ericsson | TS 37.145-2: Tx spurious limits for co-existence and co-location with of NR-based access to unlicensed spectrum (NR-U) |
| R4-2101734 | Ericsson | Cat A |
| R4-2101735 | Ericsson | TS 38.141-2: Tx spurious limits for co-existence and co-location with of NR-based access to unlicensed spectrum (NR-U) |
| R4-2101736 | Ericsson | Cat A |
| R4-2102144 | Ericsson | TS 37.145-2: Rx blocking limits for co-existence and co-location with of NR-based access to unlicensed spectrum (NR-U) |
| R4-2102145 | Ericsson | Cat A |

## 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:*

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

*In the 1st round, companies are encouraged to discuss the MU and TT and then further discuss how to draft CR based on consensus if reached in 1st round.*

**Issue 3-1: MU and TT for n46 and n96**

* Proposals
  + Option 1: propose to extend NR upper frequency from 6GHz to 7.125GHz; [ZTE, R4-2101982]
  + Option 2: reuse LAA MU requirements for n46 and n96; [Nokia, R4-2101566]
  + Option 3: other
* Recommended WF
  + TBA

## Companies views’ collection for 1st round

### Open issues

|  |  |
| --- | --- |
| **Company** | **Comments** |
| XXX | Sub topic 2-1:  Sub topic 2-2:  ….  Others: |
| Nokia, Nokia Shanghai Bell | **Issue 3-1: MU and TT for n46 and n96**  As already discuss in our contribution we support option 2 to reuse LAA MU/TT. As NR-U is design for unlicensed bands, we believe that reusing LAA approach is the best way. If we would use for NR-U NR MU/TT than for the same band 46/n46 we would have different tolerance and measurements uncertainties which is not the case right now for the same E-UTRA and NR bands.  It should be noted that even when legacy NR MU/TT was discussed in Rel-15, and decided to extend ranges from 4.2 GHz to 6GHz a note in specification was added to highlight that this is only for licensed bands:  NOTE: Test system uncertainty values for 4.2 GHz < f ≤ 6 GHz apply for BS operates in licensed spectrum only. |
| ZTE | **Issue 3-1: MU and TT for n46 and n96**  For MU or TT, this value is tightly related with test setup and test environment , for NR-U and NR BS with same size and testing chamber most likely, then why we need to have different MU/TT for unlicensed and licensed. |

### 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** |
| R4-2102444 | Company A |
| Company B |
|  |
| R4-2101567 | Company A |
| Company B |
|  |
| R4-2101733 | Company A |
| Company B |
|  |
| R4-2101735 | Company A |
| Company B |
|  |
| R4-2102144 | 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#1** | *Tentative agreements:*  *Candidate options:*  *Recommendations for 2nd round:* |

*Suggestion on WF/LS assignment*

|  |  |  |
| --- | --- | --- |
|  | **WF/LS t-doc Title** | **Assigned Company,**  **WF or LS lead** |
| #1 |  |  |

### 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)

## Summary on 2nd round (if applicable)

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

|  |  |
| --- | --- |
| **CR/TP/LS/WF number** | **T-doc Status update recommendation** |
| XXX | *Based on 2nd round of comments collection, moderator can recommend the next steps such as “agreeable”, “to be revised”* |