**3GPP TSG-RAN WG4 Meeting # 99-e R4-2108675**

**Electronic Meeting, 19th – 27th May 2021**

**Agenda item: 6.1.3, 6.1.4**

**Source:** Moderator (ZTE)

**Title:** Email discussion summary for [99-e][304] NR\_unlic\_BS\_Conformance

**Document for:** Information

# Introduction

The e-mail discussion covers Rel-16 NR-U BS core requirement maintenance and the remaining issues for NR-U conformance testing.

All contributions submitted are CRs, and divided into the following Topics:

1. NR-U BS core requirement maintenance
2. NR-U wideband operation
3. CR submitted in RAN4#98-bis-e

# Topic #1: 1. NR-U BS core requirement maintenance

## Companies’ contributions summary

(Cat A CRs are not listed)

|  |  |  |
| --- | --- | --- |
| **T-doc number** | **Company** | **Proposals / Observations** |
| R4-2109381 | Nokia, Nokia Shanghai Bell | Correct and define the frequency offset symbols used in the tables for spectrum emission mask for non-transmitted channels. |

## Companies views’ collection for 1st round

### CRs/TPs comments collection

|  |  |
| --- | --- |
| **CR/TP number** | **Comments collection** |
| R4-2109381 | ZTE: fine with that. |
| Company B |
|  |
| R4-2109382 | 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:* |

### 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”* |
| R4-2109381 | *Agreed* |
| R4-2109382 | *Agreed* |

## Discussion on 2nd round (if applicable)

# Topic #2: 2. NR-U BS wideband operation

The topic 2 mainly focus on the conformance testing for NR-U wideband operation.

## Companies’ contributions summary

(Cat A CRs are not listed)

|  |  |  |
| --- | --- | --- |
| **T-doc number** | **Company** | **Proposals / Observations** |
| R4-2110134 | Nokia, Nokia Shanghai Bell | .***Proposal: It is proposed to define modified TC for band n46 and n96 for NRTC1 and NRTC3 where the one 40 MHz transmitted sub-block is placed at one edge of the NR-U BS channel bandwidth, and the one 40 MHz transmitted sub-block is placed at another edge, in order to provide a more demanding TC for the Operating Band Unwanted Emission tests.*** |
| R4-2110135 | Nokia, Nokia Shanghai Bell |  |
| R4-2110136 | Nokia, Nokia Shanghai Bell |  |
| R4-2110619 | ZTE | **Proposal 1:** 20MHz as testing signal should be still as baseline;**Proposal 2**: more clarifications might be needed:1. For NR TC 1, to place as many as 40MHz carriers within maximum BS RF bandwidth or place two 40MHz at the upper Base Station RF Bandwidth edge and lower Base Station RF Bandwidth edge and fit 20MHz carriers for the rest of remaining gap;
2. For NR TC 3, it should be clarified that whether 60MHz gap is still valid for 40MHz carrier or it should extend up to 120MHz. In addition, it has the similar open issues on how to place 40MHz carrier within each sub-block.
 |

## 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 2-1-1: test signal for NR-U conformance testing except for NR-U wideband operation**

* + Option 1: 20MHz
* Recommended WF

**Issue 2-1-2: test configuration for NR-U wideband operation**

* Proposals
	+ Option 1: Option 1 as proposed in R4-2110135/R4-2110136
	+ Option 2: Option 1 with more clarity for testing configuration for remaining filling up signals.
* Recommended WF

------------------GTW Note----------

Huawei: Existing TCs can be used for non-contiguous spectrum. For wideband operation, additional TC can be considered.

E///: Why we need to these additional test configurations? We think current test configuration enough.

Nokia: We are open to discuss additional TCs. This will be applicable for wideband operation based on BS declaration.

Agreement: NO changes on existing TCs, further discuss whether additional TC needed for “wideband operation”, and the details of such TC.

-If introduced, such TC only applied for “wideband operation” based on BS declaration.

-Further work on the term to be aligned with BS specification

## Companies views’ collection for 1st round

### Open issues

|  |  |
| --- | --- |
| **Company** | **Comments** |
| Nokia | Sub topic 2-1-1: Option 1 Sub topic 2-1-2: We support option 1. Clarification is already in proposed CRs R4-2110135/R4-2110136 as we are not proposing further changes in clause 4.7.2. 20MHz CBW can be used to fill the signal bandwidth for the gap larger than 60 MHz.….Others: |
| Ericsson | Sub topic 2-1-1: The proposed text in R4-2110135/R4-2110136 is mandating a BS RF Bandwidth of at least 80 MHz, which might not be the case for some products. This new text will only apply for receiver, as for the transmitter the BS RF Bandwidth is filled with 20 MHz carriers anyway. There is no explanation in the contributions why existing NR TCs are not appropriate. We would like to know others opinion on what can go wrong if we keep testing one carrier at each side for the receiver, as currently mentioned in NR TCs.An addition to existing TCs, as proposed, would be only acceptable if it is clearly applicable only for those BS that can operate at least 80 MHz of spectrum in a configuration using 40 MHz sub-blocks. The use of “wideband operation” is not appropriate, as it contradicts with UE related definition, please see the definition in 38.101-1 where “wideband operation” involves only channels larger than 20 MHz. We believe that NRTC1 and NRTC3 are sufficient as they are right now and we see no reason for adding additional text. We also prefer to not affect the existing text of the NR TCs every time we come up with new features.Sub topic 2-1-2: same as above |
| ZTE | Sub topic 2-1-1: Option 1 Sub topic 2-1-2: no strong opinions on NR-U wideband operation testing, however this CR from Nokia is not clear enough to describe how to fill up the remaining gap after putting two 40MHz signals at the edge and which signal would be placed, this clarify is needed.  |
| Huawei | Sub topic 2-1-1: option 1, 20 MHz is used as baselineSub topic 2-1-2: sub-block and sub-block gap are applied to non-contiguous spectrum which is different with non-transmitted channels for wideband operation. It looks the proposed test is only for non-contiguous spectrum case. |
| ZTE (status summary for GTW) | Nokia propose to add NR-U wideband operation in NRTC1 and NRTC3;Ericsson don’t see the necessity to define that and existing TCs is sufficient and Huawei also express that non-contiguous in NRTC3 is defined forr sub-block gp instead of non-contiguous spectrum. ZTE don’t have strong opinions on that, however agree with HW’s concerns and if really necessary, to add one more TC is better for clarity. |

### CRs/TPs comments collection

|  |  |
| --- | --- |
| **CR/TP number** | **Comments collection** |
| R4-2110135 | Company A |
| Company B |
|  |
| R4-2110136 | 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:*Agreement: NO changes on existing TCs, further discuss whether additional TC needed for “wideband operation”, and the details of such TC. -If introduced, such TC only applied for “wideband operation” based on BS declaration. -Further work on the term to be aligned with BS specification*Recommendations for 2nd round:*WF on NR-U non-contiguous transmission testing, Nokia  |

### 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”* |
| R4-2110135 | *Noted , non-transmitted channels TC update includes to the big CR* R4-2110620 *of ZTE if WF is agreed*  |
| R4-2110136 | *Noted, non-transmitted channels TC update includes to the big CR* R4-2110919 *of Ericsson if WF is agreed*  |
| R4-2110134 | *Noted* |
| R4-2110619 | *Noted*  |

## 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 #3: 3. CRs submitted in RAN4#98-bis-e

## Companies’ contributions summary

(Cat A CRs are not listed)

|  |  |  |
| --- | --- | --- |
| **T-doc number** | **Company** | **Proposals / Observations** |
| R4-2110133 | Nokia, Nokia Shanghai Bell | CR to TS 37.107 with NR-U introduction for performance part |
| R4-2110620 | ZTE Corporation | CR to TS 38.141-1: introduction of NR-U BS [Cat B] |
| R4-2110621 | ZTE Corporation | CR to TS 38.141-1: introduction of NR-U BS [Cat A] |
| R4-2110622 | ZTE Corporation | CR to TS 36.141: introduction of NR-U BS [Cat B] |
| R4-2110623 | ZTE Corporation | CR to TS 36.141: introduction of NR-U BS [Cat A] |
| [R4-2110756](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_99-e/Docs/R4-2110756.zip) | Huawei, HiSilicon | CR to CR TS 37.145-1: Introduction of NR-U [Cat B] |
| R4-2110746 | Huawei, HiSilicon | CR to CR TS 37.145-1: Introduction of NR-U [Cat A] |
| R4-2110918 | Ericsson | TS 37.145-2: Introduction of NR-U co-existence requirements [Cat B] |
| R4-2110920 | Ericsson | TS 37.145-2: Introduction of NR-U co-existence requirements [Cat A] |
| R4-2110919 | Ericsson | TS 38.141-2: Introduction of NR-U co-existence requirements [Cat B] |
| R4-2110921 | Ericsson | TS 38.141-2: Introduction of NR-U co-existence requirements [Cat A] |
| R4-2111216 | Nokia, Nokia Shanghai Bell | CR to 37.141: Introduction of NR-U co-existence requirements (Rel-16) [Cat B] |
| R4-2111217 | Nokia, Nokia Shanghai Bell | CR to 37.141: Introduction of NR-U co-existence requirements (Rel-16) [Cat B] |

## Companies views’ collection for 1st round

### CRs/TPs comments collection

|  |  |
| --- | --- |
| **CR/TP number** | **Comments collection** |
|  R4-2110620 | Nokia: * Table 6.6.5.5.1.3-1: for rows for Band 46 or NR Band n46 and n96 last column should be: “This is not applicable to BS operating in Band n46 or n96”. (There was agreement capture in Chair notes during RAN4#98-e meeting that this not should be introduce to spec 38.141-1, but not needed to other specs (i.e 37 series).
* Table 6.6.5.5.1.4-1: similar comments as above.
* Annex A.1: Space missing before new text added.
 |
| ZTE: okay, it’s fine to update it. |
|  |
| [R4-2110918](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_99-e/Docs/R4-2110756.zip) | Nokia: * Table 6.7.6.5.5.1-1: Question for clarification why ‘E-UTRA” is proposed to be remove from title of the table?
* Table 6.7.6.5.5.2-1: Additional empty row included below new row for E-UTRA Band 46 or NR band n46 – it should be removed.
 |
| Ericsson: we deleted “E-UTRA” from tables title because the table is in the clause related to MSR requirements. A special clause for E-UTRA is also present in 6.7.6.5.5.3 |
|  |
| R4-2110919 | Nokia: It seems some further updates are needed as BS type 1-H is also introduced for NR-U.Ericsson: can you please specify which changes related to Type 1-H shall be included in 38.141-2? |

## 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:**Further discuss the remaining issues in* [R4-2110918](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_99-e/Docs/R4-2110756.zip) and [R4-2110918](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_99-e/Docs/R4-2110756.zip) |

### 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”* |
| R4-2110133 | *agreed* |
| R4-2110620 | *Revise to*  |
| R4-2110621 | *Return to ,* |
| R4-2110622 | *agreed* |
| R4-2110623 | *Agreed* |
| [R4-2110756](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_99-e/Docs/R4-2110756.zip) | *Agreed* |
| R4-2110746 | *Agreed* |
| R4-2110918 | *Return to*  |
| R4-2110920 | *Return to*  |
| R4-2110919 | *Return to*  |
| R4-2110921 | *Return to*  |
| R4-2111216 | *agreed* |
| R4-2111217 | *Revise to*  |
|  |  |

## 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 |
| **R4-2108511** WF on NR-U non-contiguous transmission testing |  Nokia  | *If possible, please directly provide text for additional TCs* |

**Existing tdocs**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Tdoc number** | **Title** | **Source** | **Recommendation**  | **Comments** |
| R4-210xxxx | CR on … | XXX | Agreeable, Revised, Merged, Postponed, Not Pursued |  |
| R4-2109381 | CR to TS 38.104: Corrections on frequency offset symbols for spectrum emission mask for non-transmitted channels | Nokia  | Agreed |  |
| R4-2109382 | CR to TS 38.104: Corrections on frequency offset symbols for spectrum emission mask for non-transmitted channels | Nokia | Agreed |  |
| R4-2110134 | Discussion on test configurations for wideband NR-U operation | Nokia | Noted |  |
| R4-2110135 | CR to TS 38.141-1 – Test configurations for NR-U BS conformance tests | Nokia | Noted |  |
| R4-2110136 | CR to TS 38.141-2– Test configurations for NR-U BS conformance tests | Nokia | Noted |  |
| R4-2110619 | Discussion on NR-U BS wideband operation | ZTE | Noted |  |
| R4-2110133 | CR to TS 37.107 with NR-U introduction for performance part | Nokia | Agreed |  |
| R4-2110620 | CR to TS 38.141-1: introduction of NR-U BS [Cat B] | ZTE | Revise to **R4-2108512** |  |
| R4-2110621 | CR to TS 38.141-1: introduction of NR-U BS [Cat A] | ZTE | Return to  |  |
| R4-2110622 | CR to TS 36.141: introduction of NR-U BS [Cat B] | ZTE | agreed |  |
| R4-2110623 | CR to TS 36.141: introduction of NR-U BS [Cat A] | ZTE | agreed |  |
| [R4-2110756](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_99-e/Docs/R4-2110756.zip) | CR to CR TS 37.145-1: Introduction of NR-U [Cat B] | Huawei, HiSilicon | agreed |  |
| R4-2110746 | CR to CR TS 37.145-1: Introduction of NR-U [Cat A] | Huawei, HiSilicon | agreed |  |
| R4-2110918 | TS 37.145-2: Introduction of NR-U co-existence requirements [Cat B] | Ericsson | **Revised to R4-2108742** |  |
| R4-2110920 | TS 37.145-2: Introduction of NR-U co-existence requirements [Cat A] | Ericsson | Return to  |  |
| R4-2110919 | TS 38.141-2: Introduction of NR-U co-existence requirements [Cat B] | Ericsson | **Revised to R4-2108743** |  |
| R4-2110921 | TS 38.141-2: Introduction of NR-U co-existence requirements [Cat A] | Ericsson | Return to  |  |
| R4-2111216 | CR to 37.141: Introduction of NR-U co-existence requirements (Rel-16) [Cat B] | Nokia | Agreed |  |
| R4-2111217 | CR to 37.141: Introduction of NR-U co-existence requirements (Rel-16) [Cat B] | Nokia | **Revised to R4-2108711** |  |

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** | **Title** | **Source** | **Recommendation**  | **Comments** |
| R4-2108511  | WF on NR-U non-contiguous transmission testing | Nokia  | Agreeable |  |
| R4-2108512 | CR to TS 38.141-1: introduction of NR-U BS [Cat B] | ZTE | Agreeable |  |
| R4-2110621 | CR to TS 38.141-1: introduction of NR-U BS [Cat A] | ZTE | Agreeable |  |
| R4-2108742 | TS 37.145-2: Introduction of NR-U co-existence requirements [Cat B] | Ericsson | Agreeable |  |
| R4-2110920 | TS 37.145-2: Introduction of NR-U co-existence requirements [Cat A] | Ericsson | [Agreeable] | Not uploaded yet |
| R4-2108743 | TS 38.141-2: Introduction of NR-U co-existence requirements [Cat B] | Ericsson | Agreeable |  |
| R4-2110921 | TS 38.141-2: Introduction of NR-U co-existence requirements [Cat A] | Ericsson | [Agreeable] | Not uploaded yet |
| R4-2108711 | CR to 37.141: Introduction of NR-U co-existence requirements (Rel-16) [Cat A] | Nokia | Agreeable |  |

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