**3GPP TSG-RAN WG4 Meeting # 94-e-Bis R4-200XXXX**

**Electronic Meeting, 20 – 30 Apr., 2020**

**Agenda item:** 4.5

**Source:** Moderator (Huawei)

**Title:** [97e][303] NR\_Conformance\_Maintenance

**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: TBA
* 2nd round: TBA

# Topic #1: CLTA

There are 2 issues related to the CLTA

1. Discussion papers and CR’s to update the CLTA definition based on the WF from last meeting.
2. New issue on co-location for adjacent operating bands

The update effects TS 37.145-2 and TS 38.141-2 so the CR’s for these 2 specification are grouped together in the tables below.

## Companies’ contributions summary

|  |  |  |
| --- | --- | --- |
| **T-doc number** | **Company** | **Proposals / Observations** |
| R4-2014394 | CATT | **Proposal 1: Adopt option 2 for out-of-band CLTA as following:****The half-power vertical beam width of the out of band CLTA equals .****Where,** **h is the test object vertical radiating length in meter.****is the narrowest declared (D.3) vertical beam width of test object antenna.** **is the centre frequency of operating band of test object antenna.** **is the centre frequency of co-located band.****Observation 1: The availability condition for option 1 is not clear, which may affect the selection of out-of-band CLTA and requirement verification.****Observation 2: For option 1, two candidate out-of-band CLTAs might be available for a specific co-located band, which will result in different out-of-band CLTA selection and different test results.** **Observation 3: For option 1, there is the case that no candidate out-of-band CLTA for a specific co-located band is available.****Observation 4: 1.5m height limit could be used as the height limit for option 2.** |
| R4-2016067 | Huawei | **Proposal 1:** Update CLTA definition according to option 1.**Observation 1:** As both CLAT definitions offer a conformance test which is either equivalent to or tougher than the existing one, both are compliant with the core definition of the co-location reference antenna and hence no modification to the core requirements are needed.**Observation 2:** Option 1 seems to offer more flexibility and avoids having to agree a fixed max length**Observation 3:** Option 1 does not mandate a tougher requirements where option 2 may in some circumstances. |
| R4-2016284 | Nokia | no strong preference for either of the two. Since Option 1 incurs minimum changes to the TS, it is Ok to proceed with Option 1 provided Note 2 is revised as follows |
| R4-2012495 (15)R4-2012496 (16) | CATT | CR for TS 38.141-2: Correction on half-power vertical beam width for the out of band CLTA |
| R4-2015716 | Ericsson | CR to TS 38.141-2: Improvement of out-of-band CLTA characteristics(Option 1) |
| R4-2016068R4-2016079 | Huawei | CR to TS 37.145-2 - Update CLTA definition, Rel-15CR to TS 38.141-2 - Update CLTA definition, Rel-15 |
| R4-2016286 | Nokia | CR to TS 38.141-2: Out-of-band co-location test antenna definition |
| R4-2016072 | Huawei | **Observation 1:** For systems where the frequency are so close the co-location requirements cannot be met, there are site solution to allow co-location of non-AAS systems but not for AAS systems(Note the summary in this paper is incorrect – please igore) |

## 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 – CLTA height

There are 2 options from last meetings WF, 4 companies have contributed with the following views:

 Option 1: 3 companies

 Option 2: 1 company

**Issue 1-1-1: CLTA max height**

* Proposals
	+ Option 1: Proceed with CR’s using option 1 from WF
	+ Option 2: Continue to consider option 1 and option 2 from WF
* Recommended WF
	+ Agree option 1 above.

**Issue 1-1-2: CLTA max height CR’s**

Considering option 1from WF, there are 2 approaches in the CR’s and a single approach for option 2 from WF

* Proposals
	+ Option 1: Huawei and Nokia CR’s table update
	+ Option 2: Ericson table update
	+ Option 3: CATT (if option 2 is still on the table)
* Recommended WF
	+ Agree option 1 or 2

### Sub-topic 1-2 Co-lcoation adjacent operating bands

For systems where the frequency are so close the co-location requirements cannot be met, there are site solution to allow co-location of non-AAS systems but not for AAS systems

**Issue 1-2: TBA**

* Proposals
	+ Option 1: Update CLTA alignment table with note as suggested
	+ Option 2: Continue to discuss alternate site solution approaches.
* Recommended WF
	+ TBA

## Companies views’ collection for 1st round

### Open issues

|  |  |
| --- | --- |
| **Company** | **Comments** |
| XXX | Sub topic 1-1-1: Sub topic 1-1-2:Sub topic 1-2:….Others: |
| XXX | Sub topic 1-1-1: Sub topic 1-1-2:Sub topic 1-2:….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** |
| R4-2012495 (15)R4-2012496 (16) | Company A |
| Company B |
|  |
| R4-2015716 | Company A |
| Company B |
|  |
| R4-2016068R4-2016079 | Company A |
| Company B |
|  |
| R4-2016286 | Company A |
| Company B |
|  |
|  |  |
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|  |

## 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#1-1** | *Tentative agreements:**Candidate options:**Recommendations for 2nd round:* |
| **Sub-topic#1-2** | *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: RF Corrections

Contains corrections to the RF requirements (not including test model and FRC generation) to 27.105, 37.145-2 and 37.145-2.

## Companies’ contributions summary

|  |  |  |
| --- | --- | --- |
| **T-doc number** | **Company** | **Proposals / Observations** |
| R4-2015949 | Huawei | CR to TS 37.145-1: correction of manufacturer's declarations for test signal configurations, Rel-13 |
| R4-2015953 | Huawei | CR to TS 37.145-2: correction of manufacturer's declarations for test signal configurations, Rel-13 |
| R4-2016079 | Huawei  | Discussion on AAS UEM additional requirements**Observation 1:** There is an error in the UEM addition requirements between MSR and single RAT E-UTRA**Proposal 1:** Update the E-UTRA core requirement so the referenced requirements are basic limits like the MSR reference.**Proposal 2:** The missing UEM addition requirements (MSR and SR E-UTRA) in 37.145-2 are copied from the MSR requirements in 37.105**Observation 2**: Additional UEM requirements E-UTRA, MSR and AAS specification may need updating to ensure all additional requirement are still necessary. |
| R4-2016073 | Huawei | CR to TS 37.145-1: Corrections to conformance requirements, Rel-15 |
| R4-2016075 | Huawei | CR to TS 37.145-2: Corrections to conformance requirements including UEM additional requirements, Rel-15 |
| R4-2016077 | Huawei | CR to TS 37.105: Corrections to core requirements including UEM additional requirements, Rel-15 |
| R4-2016080 | Huawei | CR to TS 37.145-2: Corrections to single RAT E-UTRA additional requirements for band 89, Rel-16 |
| R4-2016127 | ZTE | CR to 37.145-2: Correction on NR REFSENS |
| R4-2016152 | Keysight | CR to 38.141-2: Annex C correction on frequency range of FR2 TT table (C.2) |
| R4-2016202 | Nokia | CR to 37.145-1: Correction to applicability of additional BC3 requirement (Rel-15) |
| R4-2016204 | Nokia | CR to 37.145-2: Correction to applicability of additional BC3 requirement (Rel-15) |
| R4-2016502 | Ericsson | TS 37.145-2: Corrections OTA SEM, OTA Rx intermod and OTA ACS |
|  |  |  |

## Open issues summary

There are a large number of correction CR’s on a number of subjects, those with technical discussion required are highlighted in the list of open issues below. Simple CR’s are only included in the CR tables.

### Sub-topic 2-1 – UEM additional requirements

There is an error between the implementation of the UEM additional requirements between MSR and E-UTRA in both the core specification. In addition the conformance specification test requirements do not correctly implement the core requirements.

**Issue 2-1-1: Correct core UEM additional limits**

* Proposals
	+ Option 1: Update the E-UTRA core requirement so the referenced requirements are basic limits like the MSR reference.
* Recommended WF
	+ Option 1

**Issue 2-1-2: Correct conformance UEM additional limits**

* Proposals
	+ Option 1: The missing UEM addition requirements (MSR and SR E-UTRA) in 37.145-2 are copied from the MSR requirements in 37.105
* Recommended WF
	+ Option 1

## Companies views’ collection for 1st round

### Open issues

|  |  |
| --- | --- |
| **Company** | **Comments** |
| XXX | Sub topic 2-1-1: Sub topic 2-1-2:….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** |
| R4-2015949 | Company A |
| Company B |
|  |
| R4-2015953 | Company A |
| Company B |
|  |
| R4-2016073 | Company A |
| Company B |
|  |
| R4-2016075 | Company A |
| Company B |
|  |
| R4-2016077 | Company A |
| Company B |
|  |
| R4-2016080 | Company A |
| Company B |
|  |
| R4-2016127 | Company A |
| Company B |
|  |
| R4-2016152 | Company A |
| Company B |
|  |
| R4-2016202 | Company A |
| Company B |
|  |
| R4-2016204 | Company A |
| Company B |
|  |
| R4-2016502 |  |
| 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: TRP

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

## Companies’ contributions summary

|  |  |  |
| --- | --- | --- |
| **T-doc number** | **Company** | **Proposals / Observations** |
| R4-2016289 | Nokia | Discussions on TRP procedures*Observation* *1*: The TRP formula for the two orthogonal cuts with pattern multiplication requires continuous data points, which is not suitable to integrate a set of discrete data samples.**Proposal 1: A numerical form of the TRP integral for the two orthogonal cuts with pattern multiplication is defined to allow computation of TRP estimate from discrete data samples.** **Proposal 2: Criteria for determining whether correlation exists before applying the beam-based directions procedure should be added to the TR 37.941 as background information, which are as follows:** 1. **Maximum radiation of unwanted emissions occurs in the same direction as the wanted signal.**
2. **The main lobe of the wanted signal and the unwanted emissions with respect to the axis of maximum radiation should have the same symmetry.**
3. **HPBW in the azimuth and elevation direction for the unwanted emissions should correspond to those of the wanted signal.**
4. **The directivity-beamwidth product of the unwanted emissions should correspond to that for the wanted signal.**
 |
|  |  |  |

## Open issues summary

The paper makes 2 proposals for updates to the TRP calculations background.

### Sub-topic 3-1 –Two orthogonal cuts with pattern multiplication

Two orthogonal cuts with pattern multiplication

**Issue 3-1:** Two orthogonal cuts with pattern multiplication

* Proposals
	+ Two orthogonal cuts with pattern multiplication.
* Recommended WF:…

### Sub-topic 3-2 –Beam-based directions

Two orthogonal cuts with pattern multiplication

**Issue 3-2:** Two orthogonal cuts with pattern multiplication

* Proposals
	+ Criteria for determining whether correlation exists before applying the beam-based directions procedure should be added to the TR 37.941 as background information.
* Recommended WF:…

## Companies views’ collection for 1st round

### Open issues

|  |  |
| --- | --- |
| **Company** | **Comments** |
| XXX | Sub topic 3-1: Sub topic 3-2:….Others: |
| XXX | Sub topic 3-1: Sub topic 3-2:….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** |
|  | 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 #4: NR Test models

This topic contains updates to the NR test models data content.

## Companies’ contributions summary

|  |  |  |
| --- | --- | --- |
| **T-doc number** | **Company** | **Proposals / Observations** |
| R4-2015378 | Nokia | **Observation 1: Current specification is ambiguous and generation of PN23 is not clear. It can be noticed that 2 different interpretation (options) of PN23 sequence generation can exist.****Observation 2: It is not clear how PN sequence should be generated for TDD.****Proposal: It is proposed to clarify PN sequence generation for NR TMs to avoid ambiguity as proposed in CRs [10-13].** |
| R4-2015379 | Nokia | CR to TS 38.141-1 clarification on PN23 sequence generation |
| R4-2015381 | Nokia | CR to TS 38.141-2 clarification on PN23 sequence generation |

## Open issues summary

There are a large number of correction CR’s on a number of subjects, those with technical discussion required are highlighted in the list of open issues below. Simple CR’s are only included in the CR tables.

### Sub-topic 4-1 – PN23 sequence generation

The discussion paper on the PN23 sequence proposes a clarifiction.

**Issue 2-1: Clarify PN23 sequence generation**

* Proposals
* Option 1: It is proposed to clarify PN sequence generation for NR TMs to avoid ambiguity as proposed in CRs to 38.141-1 and 38.141-2 [10-13].
* Recommended WF

## Companies views’ collection for 1st round

### Open issues

|  |  |
| --- | --- |
| **Company** | **Comments** |
| XXX | Sub topic 4-1: ….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** |
| R4-2015379 | Company A |
| Company B |
|  |
| R4-2015381 | Company A |
| Company B |
|  |
|  | 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”* |