**3GPP TSG-RAN WG4 Meeting # 98-e R4-21xxxxx**

**Electronic Meeting, January 25th – February 5th, 2021**

**Agenda item:** 11.11.1

**Source:** Moderator (Qualcomm)

**Title:** Email discussion summary for [98][312] NR\_Repeater\_General

**Document for:** Information

# Introduction

A new WI on the definition of RF repeaters was approved in RP-202927. This e-mail discussion will focus on the general issues regarding the work for developing the requirements for these devices.

The following topics are covered in this e-mail discussion

* 1st round:
	+ work plan
	+ Applicable bands
	+ Requirements and specification handling
	+ Handling of TDD repeaters
	+ Bandwidth Configuration
	+ Others
* 2nd round: TBA

# Topic #1: Work Plan

This section discusses the work plan proposed by the rapporteur.

## Companies’ contributions summary

|  |  |  |
| --- | --- | --- |
| **T-doc number** | **Company** | **Proposals / Observations** |
| R4-2102834 | Qualcomm | RAN4#98-e (This meeting)Agreement on work plan targeting RAN4 RF conclusion by RAN#95 and RAN4 RRM by RAN#96Discussion of parameters to be specifiedDiscussion on bands to be includedDiscussion on regulatory limitsDiscussion on which TS document(s) are neededDiscussion on EMCRAN4#98-bis-e Discussion on parameters to be specifiedAgreement on bands to be includedDiscussion on regulatory limitsAgreement on which TS document(s) are neededRRM topics TBDRAN4#99Normative values CR into draft TSsNormative value CR for regulatory limitsDraft TSs provided to RAN#93 for informationRRM topics TBDRAN4#100 bisNormative values CR into draft TSsRRM topics TBDRAN4#100 bis CRs into draft technical standard(s)RRM topics TBDRAN4#101CRs into draft technical standard(s)TSs to be provided in RAN#94 for approvalRRM topics TBDRAN4#102CRs into draft technical standard(s)RRM topics TBDRAN4#102 bisRRM topics TBDRAN4#103RRM topics TBD |
| R4-2102108 | Ericsson | **Observation 1: Some attention may need to be paid to the TDD conducted test definition and setup****Observation 1: The OTA test setup requires at least two spatially separated test gear transmission/reception points around the DUT.****Observation 2: Both the signal generator and DUT transmit in the test setup. Additional consideration is needed for emissions measurement.**The conformance discussion will start at a later stage in the WI. The purpose of this contribution is to highlight that conformance testing for repeaters is not a trivial re-use of BS and UE test principles and that a sufficient number of meetings should be planned for the conformance phase. |

## Open issues summary

The work plan should be discussed and agreed in this meeting such that the work can be organized accordingly.

### Sub-topic 1-1

Need for RRM requirements

The proposed work plan contains also work on RRM requirements as the WID TU allocation, this is like a miss from the TU allocation spreadsheet.

**Issue 1-1: RRM Work**

* Is there any need for any RRM related work?
	+ Option 1: No
	+ Option 2: Yes
* Recommended WF
	+ No

### Sub-topic 1-2

Overall work plan

Whether the work plan as proposed by the rapporteur, without the RRM part that is discussed separately, is agreeable or changes have to made. Especially, it should be discussed how to handle the conformance part.

**Issue 1-2: Overall workplan**

* Proposals
	+ Option 1: Yes, agreeable as is
	+ Option 2: No, changes are needed
* Recommended WF
	+ Option 2

The conformance part needs to be reflected in the work plan, companies should provide inputs on how the work should be organized.

### Sub-topic 1-3

WID Revision

If the answer to Sub-topic 1-1 is no, should the WID be revised in upcoming plenary to eliminate baseband TUs?

**Issue 1-3: WID Revision**

* Proposals
	+ Option 1: WID should be revised to remove baseband core TUs
	+ Option 2: No, baseband core TUs should be kept
* Recommended WF
	+ Option 1

## Companies views’ collection for 1st round

### Open issues

|  |  |
| --- | --- |
| **Company** | **Comments** |
| XXX | Sub topic 1-1: 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** |
| XXX | Company A |
| Company B |
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| YYY | 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** | *Tentative agreements:**Candidate options:**Recommendations for 2nd round:* |

*Recommendations on WF/LS assignment*

|  |  |  |
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|  | **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*

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| **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: Applicable Bands

This section discuss which bands will be applicable for repeaters.

## Companies’ contributions summary

|  |  |  |
| --- | --- | --- |
| **T-doc number** | **Company** | **Proposals / Observations** |
| R4-2100832 | CMCC | **Proposal 3: NR repeater is suggested to be designed for all operating bands specified in TS 38.104 including both FR1 and FR2.** |
| R4-2101041 | NTT Docomo | **Observation 2: NR repeater is expected to be widely used for covering areas and filling the gap of areas in NR bands including corresponding LTE FDD and TDD bands.****Proposal 1: RAN4 considers all of NR bands defined in TS 38.104 as NR repeater’s operating bands.** |
| R4-2102580 | Huawei | **Proposal 1**: NR Repeater specification shall consider all the duplex modes considered in the NR work so far, i.e. FDD, TDD, SDL, SUL.  |
| R4-2100635 | CommScope | **2.3** The NR repeater specification should include requirements for all NR operating bands (cf. TS 36.106 clause 5.5). The list of bands shall be prioritized to ensure that the most commonly used bands are included in the initial release of the specification. |

## Open issues summary

It should be discussed which bands should be applicable for the repeaters and whether there would be any priorities. Based on the input from several companies, there is a strong desire to have all the defined bands applicable.

### Sub-topic 2-1

Supported bands

**Issue 2-1: Which bands should be applicable to Repeaters and in the scope of the current WI**

* Proposals
	+ Option 1: All bands defined so far
	+ Option 2: Only some of the bands, criteria to choose/prioritise to be discussed
* Recommended WF
	+ Option 1

Based on the inputs, Option 1 is recommended. Given the large operator interest, it would be very difficult to include only some bands in the scope or set some priorities. The proposal in R4-2102580 would be automatically covered within Option 1.

## Companies views’ collection for 1st round

### Open issues

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

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| Company B |
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## Summary for 1st round

### Open issues

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

*Suggestion on WF/LS assignment*

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## Summary on 2nd round (if applicable)

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| --- | --- |
| **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: Requirements and Specification Handling

The scope of the work in terms of conducted and OTA requirements and how to handle the specification has to be clarified. Several papers provided proposals, one of the topics that is not clear is whether radiated requirements for FR1 will be handled or not.

## Companies’ contributions summary

|  |  |  |
| --- | --- | --- |
| **T-doc number** | **Company** | **Proposals / Observations** |
| R4-2100375 | CATT | **Proposal 1: No need to define NR repeater types, the requirement can be defined according to FR1 (conducted) and FR2 (radiated) frequency ranges.** |
| R4-2100635 | CommScope | The NR repeater specification shall include requirements for repeaters with both conducted and radiated interfaces (external and internal antennas). |
| R4-2100832 | CMCC | **Proposal 1: Two specifications are the baseline for NR repeater RF requirements, one for RF core requirements and the other for conformance parts, both including the conducted and radiated requirements just as how the IAB specifications have been categorized.**  |
| R4-2101963 | ZTE | **Proposal 1**: non-AAS based repeater should be prioritized for FR1 FDD NR based repeater;**Proposal 2**:use the requirements of TS 36.106 spec as starting point for FR1 FDD NR based repeater;**Proposal 3:** non-AAS based repeater should be prioritized for FR1 TDD NR based repeater |

## Open issues summary

Several contributions are discussing which specifications should be defined(conducted or radiated), how they should be handled(single spec vs. splitting in multiple specs). The main discussion point seems to be whether FR1 radiated requirements are needed or not, this will be treated in a separate sub-topic.

### Sub-topic 3-1

Conducted and Radiated Requirements

**Issue 3-1: Conducted and Radiated Requirements**

* Proposals
	+ Option 1: Define both conducted requirements(for FR1) and radiated requirements (FR2)
	+ Option 2: other proposals
* Recommended WF
	+ Option 1

Considering how all NR RF requirements are defined, there is a clear need for both conducted(FR1) and radiated requirements (FR2)

### Sub-topic 3-2

Radiated Requirements for FR1

Whether there is a need for FR1 radiated requirements is not yet clear, this issue needs discussion

**Issue 3-2: Need for Radiated Requirements in FR1**

* Proposals
	+ Option 1: Yes, radiated requirements are needed for FR1
	+ Option 2: No, only conducted requirements are enough in the current WI
* Recommended WF
	+ Option 1

AAS type of devices are not ruled out, deployment should be possible in the higher FR1 bands.

### Sub-topic 3-3

Specification handling

One of the issues raised is the spec handling, whether specifications should be split into conducted and radiated or not. Considering the WI just started, the moderator is proposing to focus on the RF core requirements for now and discuss the handling of the conformance specifications closer to the start of the performance part.

**Issue 2-1: Handling of RF Core Specifications**

* Proposals
	+ Option 1: Single specification covering both conducted and radiated
	+ Option 2: Separate specifications for conducted and radiated
* Recommended WF
	+ Option 1

The RF core specifications defined so far for network nodes are using a single specification covering both.

## Companies views’ collection for 1st round

### Open issues

|  |  |
| --- | --- |
| **Company** | **Comments** |
| 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.*

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| XXX | Company A |
| Company B |
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## Summary for 1st round

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

*Suggestion on WF/LS assignment*

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### CRs/TPs

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| **CR/TP number** | **CRs/TPs Status update recommendation**  |
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## Discussion on 2nd round (if applicable)

## Summary on 2nd round (if applicable)

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| --- | --- |
| **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: Handling of TDD Repeaters

TDD repeaters present several problems such as whether they have to be synchronized to the network, whether or not they have to be aware of the UL/DL configuration and how to handle dynamic TDD. These issues are discussed in this section.

## Companies’ contributions summary

|  |  |  |
| --- | --- | --- |
| **T-doc number** | **Company** | **Proposals / Observations** |
| R4-2102018 | Nokia | **Observation 2: Discussion is needed on how to handle synchronization in case TDD repeaters are decided to be worked on.****Proposal 1: Use cases and deployment scenarios need to be discussed and agreed to provide the starting point for requirement discussions.** |
| R4-2100375 | CATT | **Proposal 2: Transmitter off power needs to be defined for TDD repeaters, the same requirements as BS can be defined.****Observation 1: It’s not easy to define transient period requirement for TDD repeater.****Observation 2: TDD synchronization related requirements need more discussion.** |
| R4-2100832 | CMCC | **Proposal 2: at first, we should focus on the RF architecture discussion and clarify whether/how to distinguish different DL/UL terminologies at least for repeaters supporting TDD operating bands.** |
| R4-2101156 | Mediatek Inc | **Observation 1: NR repeater has no idea about the UE-specific information (e.g., SFI or DCI) that may overwrite the static UL/DL configuration in SIB.** **Proposal 1: RAN4 to discuss how to enable NR repeaters to get the SFI and scheduling DCI information for dynamic TDD deployments.****Observation 2: How the repeater determines the starting time for UL transmission is not clear.****Observation 3: How the repeater determines the starting time and duration for UL signal listening is not clear.** **Proposal 2: RAN4 to discuss how to the repeater determines the starting time for UL transmission as well as the starting time and duration for UL signal listening.** |
| R4-2101963 | ZTE | **Observation 1: f**or TDD NR based repeater, without explicit DL-UL pattern information or with static DL-UL pattern only at repeater, the deployment would be limited to certain scenarios;**Proposal 4:** for TDD NR based repeater, group delay introduced by repeater’s filter should be studied and clarified as this would impact DL-UL gap period and NCS configuration of PRACH channel. |
| R4-2102829 | Qualcomm | A TDD repeater can benefit from being able to switch direction matching the uplink and downlink slot structure used by the gNodeB. A repeater may be able to determine the subframe boundaries if the UL/DL pattern is fixed, however the uplink/downlink pattern can change with dynamic TDD. The fixed UL/DL repeater configuration would preclude network changes. An option is to include signalling from the gNodeB to the repeater, informing the repeater of the configuration. This allows flexibility in the network. It also allows higher gain TDD repeaters, additional coverage extension, and better end-to-end performance.**Proposal 3: Companies should discussion whether signalling would be beneficial for the TDD repeater.** |

## Open issues summary

Many papers are discussing the behaviour of repeaters in TDD bands, the need for synchronization and UL/DL configuration awareness. Other topics brought up are support for dynamic TDD and definition of requirements related to TDD such as Rx-Tx switching time, whether the repeater should be aware of the exact timing when UL starts.

### Sub-topic 4-1

Synchronization for TDD

It should be discussed whether the repeater has to be synchronized to the network and know the exact symbol timing.

**Issue 4-1: Synchronization for TDD**

* Proposals
	+ Option 1: Repeater has to synchronize to the gNB timing
	+ Option 2: Synchronization is not needed
* Recommended WF
	+ Option 1

In order for the repeater to function correctly in a TDD network, it needs to synchronize to the gNB timing

### Sub-topic 4-2

UL/DL Configuration Awareness

Some companies raised the problem that besides synchronization, the repeater also has to be aware of the UL/DL configuration.dd

**Issue 4-2: UL/DL Configuration Awareness**

* Proposals
	+ Option 1: Repeater needs to be aware of the UL/DL split
	+ Option 2: Repeater does not need to be aware of the UL/DL split
* Recommended WF
	+ Option 1

### Sub-topic 4-3

UL/DL Configuration Signaling

If the repeater should be aware of the UL/DL configuration, how will it acquire this information?

**Issue 4-3: UL/DL Configuration Signaling**

* Proposals
	+ Option 1: Repeater can acquire the UL/DL Configuration by reading the cell broadcast information(e.g. SIB)
	+ Option 2: Dedicated signaling would be needed to inform the repeater about the UL/DL configuration
* Recommended WF
	+ TBA

As multiple options are possible, this point will require some discussion, companies are invited to provide their views or proposals.

### Sub-topic 4-4

Support for dynamic TDD

Support for dynamic TDD was brought up in multiple papers. While the static or semi-static UL/DL configuration can be acquired from the broadcast information, this will not enable support for dynamic TDD

**Issue 4-4: Support for dynamic TDD**

* Proposals
	+ Option 1: Dynamic TDD should be supported
	+ Option 2: There is no need to support dynamic TDD
* Recommended WF
	+ Option 1

To enable deployment flexibility and forward compatibility, dynamic TDD should be supported

### Sub-topic 4-5

Requirements for TDD – Repeater Group Delay

Some companies brought up the need to introduce a requirement for group delay introduced by the repeater

**Issue 4-5: Repeater Group Delay Requirement**

* Proposals
	+ Option 1: Group delay requirement is needed
	+ Option 2: Group delay requirement is not needed
* Recommended WF
	+ Option 1

Since the delay introduced by the repeater will impact the guard period needed for UL-DL switching, such requirement is needed

### Sub-topic 4-6

UL Timing

The issue whether the repeater should be aware of the exact UL timing (when to start amplifying signals in UL) was brought up and should be discussed.

**Issue 4-6: UL Timing Knowledge**

* Proposals
	+ Option 1: Repeater needs to be aware of UL timing
	+ Option 2: Repeater does not need to be aware of the exact UL timing
	+ Option 3: Repeater can derive the UL timing autonomously
* Recommended WF
	+ TBA

Companies are encouraged to provide their views. If Option 1 is chosen then proposals on how to derive the timing would be needed. If Option 2 or 3 is chosen then the behavior of the repeater should be explained.

## Companies views’ collection for 1st round

### Open issues

|  |  |
| --- | --- |
| **Company** | **Comments** |
| XXX | Sub topic 4-1: Sub topic 4-2:….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** |
| XXX | Company A |
| Company B |
|  |
| YYY | 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** | *Tentative agreements:**Candidate options:**Recommendations for 2nd round:* |

*Suggestion on WF/LS assignment*

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| --- | --- | --- |
|  | **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*

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| --- | --- |
| **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)

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|  |  |
| --- | --- |
| **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 #5: Bandwidth Configuration

NR offers a lot of flexibility for the channel bandwidth configuration including configuring dedicated channel BWs to different UEs. Also, the channel bandwidth broadcast by the gNB is not necessarily the actual channel bandwidth used by the gNB.

## Companies’ contributions summary

|  |  |  |
| --- | --- | --- |
| **T-doc number** | **Company** | **Proposals / Observations** |
| R4-2101156 | Mediatek Inc | **Observation 4: It is not clear whether an NR Repeater does not have the knowledge aboutis able to acquire the real CBW signaled through dedicated RRC message to UE.** **Proposal 3: RAN4 to discuss how an NR repeater gets the information to the actual CBW used by the gNB.** |
| R4-2102829 | Qualcomm | One option the passband(s) is/are preconfigured during installation and is/are not a dynamically changeable.Another option is repeater passbands may be configured under network control.**Proposal 2: Interested companies should discuss the method for passband configuration.** |

## Open issues summary

The repeater should be configured to operate with a certain channel bandwidth, this could be pre-configured(manual configuration) or under network control

### Sub-topic 5-1

Channel Bandwidth Configuration

**Issue 5-1: Channel Bandwidth Configuration**

* Proposals
	+ Option 1: Repeater channel bandwidth is pre-configured
	+ Option 2: Repeater channel bandwidth is derived from the network
* Recommended WF
	+ TBA

Companies are invited to provide their opinions and if Option 2 is preferred, what would be the mechanism used.

## Companies views’ collection for 1st round

### Open issues

|  |  |
| --- | --- |
| **Company** | **Comments** |
| XXX | Sub topic 5-1: Sub topic 5-2:….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.*

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| --- | --- |
| **CR/TP number** | **Comments collection** |
| XXX | Company A |
| Company B |
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| YYY | Company A |
| Company B |
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## Summary for 1st round

### Open issues

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

*Suggestion on WF/LS assignment*

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

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## Summary on 2nd round (if applicable)

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|  |  |
| --- | --- |
| **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 #6: Other Topics

Several other issues were brought up by different companies. The observations and proposals are summarized in Section 6.1.

## Companies’ contributions summary

|  |  |  |
| --- | --- | --- |
| **T-doc number** | **Company** | **Proposals / Observations** |
| R4-2102018 | Nokia | **Observation 3: Beamforming and antenna array assumptions need to be discussed for both the backhaul between parent BS and NR repeater as well as for the access link between repeater and the UE.****Observation 5: Possible output power limitations need further clarifications****Observation 6: Understanding on use cases and deployment scenarios is needed before it can be evaluated how much LTE repeater and IAB RF specifications can be leveraged.****Proposal 1: Use cases and deployment scenarios need to be discussed and agreed to provide the starting point for requirement discussions.** |
| R4-2101156 | Mediatek | **Observation 5: The repeater may be only in the coverage of a specific DL Tx beam in FR2, but it is not clear whether the repeater has no idea is able to identify when the DL traffic will be transmitted along with that the Tx beam direction.** **Proposal 4: RAN4 to study how to inform repeater on which slot to forward or not to forward in FR2.** |
| R4-2101963 | ZTE | **Proposal 5:** RF architecture for FR2 NR based repeater should also be discussed firstly. |
| R4-2102829 | Qualcomm | **Proposal 1: RAN4 should discuss network control of repeater gain.****Proposal 5: Donor side repeater antennas can use the same technologies and beam steering methods as a UE.****Proposal 6: Service side repeater antennas may be fixed or autonomously adjustable.** |

## Open issues summary

Some other issues than the ones discussed in the previous sections were also brought up. These are summarized below for further discussion

### Sub-topic 6-1

Deployment scenarios

R4-2102018 brought up the issue on discussing use cases and deployment scenarios, however, this issue was not brought up in any other paper. It should be clarified what exactly is not clear and whether there is any impact expected on the requirements to be defined

**Issue 6-1: Deployment Scenarios**

* Proposals
	+ Option 1: There is no need for further discussion, the scenarios are clear.
	+ Option 2: Further discussion is needed on which scenarios to be supported
* Recommended WF
	+ TBA

Companies are invited to provide their views and potential impact to the future work and specification

### Sub-topic 6-2

RF Architecture and beam steering in FR2

Multiple papers brought up the need to discuss the RF architecture, especially for FR2. One issues is also whether the repeater could support beam steering or not

**Issue 6-2: RF Architecture**

* Proposals
	+ Option 1: Repeater will support active antennas with some beam steering
	+ Option 2: Repeater will have an antenna array with fixed gain and direction
	+ Option 3: other RF architecture
* Recommended WF
	+ TBA

Companies are invited to provide their comments on this issue and possible impact to the future work and RF requirements

### Sub-topic 6-3

Beam and slot awareness

In R4-2101156 the problem whether the repeater should be aware of which gNB Tx beam it should forward and how to be made aware of the slot in which this beam is transmitted

**Issue 6-3: Beam and slot awareness**

* Proposals
	+ Option 1: Does the repeater need to know which beam to forward and the slot in which it should forward it?
	+ Option 2: Repeater does not need to be aware
	+ Option 3: others
* Recommended WF
	+ TBA

Companies are invited to provide input on this issue and possible solutions or explanations of the repeater behavior in FR2

### Sub-topic 6-4

Repetear Gain Control

R4-2102829 proposes to discuss the possibility for the network to control the gain of the repeater

**Issue 6-4: TBA**

* Proposals
	+ Option 1: Network should be able to control the gain of the repeater
	+ Option 2: no need for the gain to be controlled by the network
	+ Option 3: Others
* Recommended WF
	+ TBA

Companies are invited to provide their input on this proposals

## 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** |
| XXX | Company A |
| Company B |
|  |
| YYY | 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”* |