**3GPP TSG-RAN WG4 Meeting # 99-e *R4-211xxxx***

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

**Agenda item:** 5.1.1.1 and 5.1.1.3

**Source:** Moderator (Samsung)

**Title:** Email discussion summary for [99e][205] NR\_eMIMO\_RRM (1st round)

**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.*

Rel-16 NR eMIMO WI (i.e., Enhancements on MIMO for NR) is a RAN1 leading WI with below major enhancement in RAN1 area, in which the following items are identified for having RAN4 RRM requirement impact, based on previous RAN4 discussion:

* Enhancements on multi-beam operation
	+ DL/UL beam indication with reduced latency and overhead
	+ Beam failure recovery for SCell
	+ L1-SINR measurement

In RAN#96e meeting, main tasks within the RRM core work scope have completed. In the subsequent meetings, online discussion will focus on the eMIMO RRM performance requirement of the above aspects for Release-16. In the last meeting (RAN4#97e), some agreements are reached and captured in the WF R4-2017375. In RAN4#98e, the remaining issues of Rel-16 eMIMO RRM part was discussed and the whole WI was completed then. In this meeting (RAN4#99e), we need to cope with some maintenance issues following the WF R4-2104068.

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

As the rapporteur company for Rel-16 MIMO enhancement WI, we would like to suggest the following candidate target of 1st and 2nd round email discussion:

* 1st round: Collect more views on all topics and to get progress as much as possible:
* 2nd round: Based on results from 1st round, complete outstanding issues and reach the consensus for the WF.

# Topic #1: Core Requirement Maintenance

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

## Companies’ contributions summary

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| --- | --- | --- |
| **T-doc number** | **Company** | **Proposals / Observations** |
| N/A | N/A |  |

[**Moderator**] For the maintenance stage, the submitted contributions are mainly CRs instead of discussion papers. In the 1st round online discussion, companies’ comments on CRs will be collected. Please make comments in 1.3.2 for the CRs where a brief summary is added for each 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

***Requirements to multi-TRxP***

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

**Issue 1-1: Applicability of MRTD/MTTD requirements**

* Proposal: To capture 96e agreements on Multi-TRP in the spec, explicitly add an explanation for applicability of the requirements to Multi-TRxP. (Apple R4-2109336, captured as below)

|  |
| --- |
| 3.6.11 Applicability of MRTD/MTTD requirements in intra-band DC/CAUnless explicitly stated otherwise the Maximum Transmission Timing Difference (MTTD) and Maximum Receive Timing Difference (MRTD) requirements in clauses 7.5.3, 7.6.3 and 7.6.4 for co-located deployment are applicable when* The network configures MIMO or TX diversity
* When UE is configured to receive multiple PDCCH
* When UE is configured by *repetitionScheme* set to one of 'fdmSchemeA', 'fdmSchemeB' and 'tdmSchemeA'
 |

* + Option 1: Support
	+ Option 2: Do not support
* Recommended WF
	+ Based on companies’ views in 1st round discussion. An outstanding issue long been discussed. Hope we could draw the conclusion this meeting.

## Companies views’ collection for 1st round

### Open issues

*One of the two formats, i.e. either example 1 or 2 can be used by moderators.*

**Issue 1-1: Applicability of MRTD/MTTD requirements**

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| --- | --- |
| **Company** | **Comments** |
| Apple | We would like to capture the agreements from RAN4#96e in spec. Common understanding in RAN4 might not be obvious to someone not attending RAN4 meetings. In previous meetings there was concern of using terminology of multi-TRP, we have reworded that in the current proposal. We don’t think this is core requirement change, we are merely capturing common understanding in the spec. Also, regarding comments in previous meetings that we need not capture this as requirements are applicable for mTRP, we also have section 3.6.8:3.6.8 Applicability of 2-step RA and 4-step RA in RRM requirements Unless explicitly stated otherwise the requirements under the following clauses, where the UE transmits random acess to NR serving cell or NR target cell, are applicable for both 2-step RA and 4-step RA procedures [3]:  |
| Qualcomm | Option1 is supported. Alternatively, how about adding an obvious note that requirements in 7.6.4 are applicable to intra-band contiguous CA scenarios?  |
| MediaTek | Support option 1 |
| Huawei | Support option 2.The current MRTD/MTTD requirements are defined for general scenarios, which shall be applied for all the UEs. Since there is no impacts on the existing MRTD/MTTD requirements due to multi-TRxP transmission. There is no need to introduce additional applicability rules for multi-TRxP transmission. |
| Samsung | Basically we do not prefer capturing RAN4 common understanding by means of adding an applicability section. Besides, following Apple’s logic, the problem becomes whether people other than RAN4 gays could know the applicable scenarios of the requirements. We still doubt about the necessity of explicitly capturing this agreement in the spec. |
| Nokia | Option 2 is supported because the requirements are implicitly applicable with regard to the agreement. Therefore, applicability is not needed. Further, the proposed text adds confusion rather than clarify to the specification.  |
| Ericsson | Support option 2.Same view as Huawei. The existing MRTD/MTTD is applicable for MIMO/TxD + CA/DC from LTE, and multi-TRxP transmission is same as MIMO from gNB point of view. We don’t need to add clarification in Rel-16. There are many RAN4 RRM agreements only captured in the chairmans note or way forward, but not captured in the spec. |

### 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.*

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| --- | --- |
| **CR/TP number** | **Comments collection** |
| R4-2109334Apple | Moderator: Editorial changes for CBD requirement. |
| Qualcomm: agreeable |
| Nokia: What are the changes in “Start of Change 1”? |
| R4-2109336Apple | Moderator: Explicitly add an explanation for applicability of the requirements (corresponding to issue 1-1). To explicitly capture what was agreed in previous meeting instead of adding new requirement, it is supposed to be a category F CR. |
| Apple: This is adding sub-section under 3.6, hence it should be Cat B CR.  |
| Qualcomm: CR is supported. |
| Samsung: Though adding a new sub-section, no new requirement is added. Thus it is not Cat B CR. |
| Nokia: The same comment as in Issue 1-1. |
| Ericsson: Related to Issue 1-1. The clarification is not necessary.  |
| R4-2109643R4-2109644MTK | Moderator: Correction on BFR for complete the section, as agreed in WF. Category A CR could be submitted after the CR is agreed. |
| Apple:Minor editorial, formatting and wording changes:8.5.9 Requirements for Beam Failure Recovery in SCell8.5.9.1 IntroductionFor the UE provided with a configuration of PUCCH transmission with a link recovery request (LRR) as described in clause 9.2.4 in TS 38.213 [3], if beam failure is detected in any of SCells, the UE shall transmit SR for SCell BFR MAC CE, followed by MAC CE providing one index for at least one corresponding SCell with radio link quality is worse than Qout,LR, and the index $q\_{new}$ for a periodic CSI-RS configuration or for a SSB provided by higher layer, as described in clause 5.17 of TS38.321 [7], if any, for a corresponding SCell.For the UE not provided with a configuration of PUCCH transmission with a link recovery request (LRR) as described in clause 9.2.4 in TS 38.213 [3], if beam failure is detected in any of SCells, the UE shall transmit preamble for UL-SCH resource application, followed by MAC CE providing one index for at least one corresponding SCell with radio link quality is worse than Qout,LR, and the index $q\_{new}$ for a periodic CSI-RS configuration or for a SSB provided by higher layer, as described in clause 5.17 of TS38.321 [7], if any, for a corresponding SCell. |
| MediaTek: We are ok to Apple’s suggestion. |
| Samsung: The description in CR is not clear. We suggest:if beam failure is detected => if beam recovery procedure is triggeredthe UE shall transmit SR for SCell BFR MAC CE => the UE shall transmit SR for UL resource application2110144 could be referred for above revision. |
| Ericsson:We also prefer to change From: if beam failure is detected in any of SCells, the UE shall transmit …To: if beam failure procedure is triggered for any of SCells, the UE shall transmit …In our understanding SR is transmitted after BFR is triggered, not after beam failure is detected, according to TS38.321. |
| R4-2110144Samsung | Moderator: Correction on BFR for complete the section, as agreed in WF. |
| Apple: provided comments on preferred wording aboveQualcomm: prefer the section title of 8.5.9.2 as is (as R4-2109643); Btw, was there a consensus to add some description in 8.5.9.2 for the requirements of scenario1(even it follows legacy sPCell BFR) without PUCCH being configured? @Moderator  |
| Samsung: If MTK’s CR accept our suggestions, this CR can be merged.To Qualcomm: no consensus for that; keeping the title of 8.5.9.2 is fine for us. |
| Ericsson: Propose to merge to R4-2109643. We prefer to keep the title of 8.5.9.2 as is. |
| R4-2110285Huawei | Moderator: Correction on L1-SINR measurement to align with the description in RLM/BFD/CBD/L1-RSRP measurements. |
| Apple: In general OK with changes. |

## 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** | **Issue 1-1: Applicability of MRTD/MTTD requirements** * Proposal: To capture 96e agreements on Multi-TRP in the spec, explicitly add an explanation for applicability of the requirements to Multi-TRxP. (Apple R4-2109336, captured as below)
	+ Option 1: Support
	+ Option 2: Do not support

***Tentative agreements:*** *No agreement.* ***Moderator’s opinion:*** *An outstanding issue long been discussed. Hope we could draw the conclusion this meeting. Apple propose this for several meetings but many companies object strongly.****Recommendations for 2nd round:*** *Moderator suggests discussing the issue in GTW session.***Issue 1-2: Correction on Scell BFR section (**R4-2109643)* Proposal: complete the SCell BFR section

***Tentative agreements:*** *No agreement.* ***Moderator’s opinion:*** *Based on companies’ views, suggest revised to Text Proposal:*

|  |
| --- |
| 8.5.9 Requirements for Beam Failure Recovery in SCell8.5.9.1 IntroductionFor the UE provided with a configuration of PUCCH transmission with a link recovery request (LRR) as described in clause 9.2.4 in TS 38.213 [3], if beam failure procedure is triggered for any of SCells, the UE shall transmit SR for SCell BFR UL resource, followed by MAC CE providing one index for at least one corresponding SCell with radio link quialty worse than Qout,LR, and the index $q\_{new}$ for a periodic CSI-RS configuration or for a SSB provided by higher layer, as described in clause 5.17 of TS38.321 [7], if any, for a corresponding SCell.For the UE not provided with a configuration of PUCCH transmission with an LRR, if beam failure procedure is triggered for any of SCells, the UE shall transmit preamble for SCell BFR UL resource, followed by MAC CE on the UL-SCH providing one index for at least one corresponding SCell with radio link quialty worse than Qout,LR, and the index $q\_{new}$ for a periodic CSI-RS configuration or for a SSB provided by higher layer, as described in clause 5.17 of TS38.321 [7], if any, for a corresponding SCell. |

***Recommendations for 2nd round:*** *continue discussion in 2nd round and revise the CR.* |
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### 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**  |
| R4-2109643 | *Based on companies’ views, suggest revised to Text Proposal:*

|  |
| --- |
| 8.5.9 Requirements for Beam Failure Recovery in SCell8.5.9.1 IntroductionFor the UE provided with a configuration of PUCCH transmission with a link recovery request (LRR) as described in clause 9.2.4 in TS 38.213 [3], if beam failure procedure is triggered for any of SCells, the UE shall transmit SR for SCell BFR UL resource, followed by MAC CE providing one index for at least one corresponding SCell with radio link quialty worse than Qout,LR, and the index $q\_{new}$ for a periodic CSI-RS configuration or for a SSB provided by higher layer, as described in clause 5.17 of TS38.321 [7], if any, for a corresponding SCell.For the UE not provided with a configuration of PUCCH transmission with an LRR, if beam failure procedure is triggered for any of SCells, the UE shall transmit preamble for SCell BFR UL resource, followed by MAC CE on the UL-SCH providing one index for at least one corresponding SCell with radio link quialty worse than Qout,LR, and the index $q\_{new}$ for a periodic CSI-RS configuration or for a SSB provided by higher layer, as described in clause 5.17 of TS38.321 [7], if any, for a corresponding SCell. |

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## Discussion on 2nd round (if applicable)

# Topic #2: Performance Requirement Maintenance

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

## Companies’ contributions summary

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| **T-doc number** | **Company** | **Proposals / Observations** |
| R4-2110034Discussion on FR2 L1-SINR measurement accuracy OTA test | Samsung | ***Observation 1: The reason why two assumptions are added for FR2 L1-SINR accuracy requirement is to secure no impact on UE L1-SINR measurement accuracy due to the difference of antenna power gain between CMR and IMR.******Observation 2: Due to time limitation, RAN4 did not assess how much the impact is on FR2 L1-SINR accuracy error if the two test restrictions are not followed. If the impact is trivial, they can hardly affect the accuracy requirement of L1-SINR measurement.******Observation 3: FR2 OTA test results show that even though CMR and IMR are not scheduled at the same slot, there is no impact on measurement accuracy requirement considering ±0.5 granularity of the requirement.******Observation 4: For NR OTA test, the DUT is tested in dark chamber where the channel is simpler and the fluctuation of measured RSRP will be much less than presented OTA test where indoor scenario with a complex multi-path channel is tested.******Observation 5: No need to apply the restriction “CMR/IMR in the test come from the same direction” in order to keep the L1-SINR accuracy test cases simpler and clearer; other involved test cases would also benefit.******Proposal 1:*** ***For the two FR2 exclusive conditions of L1-SINR accuracy requirement (TS38.133 section 10.1.28):**** ***Keep the condition “CMR and IMR in the test come from the same direction.”***
* ***Remove the condition “CMR and IMR in the test are scheduled in the same slot.”***
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[**Moderator**] For the maintenance stage, the submitted contributions are mainly CRs instead of discussion papers. In the 1st round online discussion, companies’ comments on CRs will be collected. Please make comments in 2.3.2 for the CRs where a brief summary is added for each 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

***Conditions on FR2 L1-SINR accuracy requirement***

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

**Issue 2-1-1: FR2 exclusive condition of L1-SINR accuracy test**

* Proposals:
	+ Option 1: For FR2 L1-SINR accuracy test, remove the unnecessary condition “CMR and IMR in the test are scheduled in the same slot.”
	+ Option 2: others.
* Recommended WF
	+ Based on the 1st round discussion.

## Companies views’ collection for 1st round

### Open issues

**Issue 2-1-1: FR2 exclusive condition of L1-SINR accuracy test**

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| **Company** | **Comments** |
| Apple | The main purpose of adding the conditions was because additional margin for CMR+IMR case was not added. The requirements should apply to all channel conditions, not only AWGN or specific test set-up in dark chamber.  |
| Qualcomm | We are fine with option1.Thanks for the lab data demonstrating the impact of beam shape upon different AoAs. |
| MediaTek | More discussion is needed |
| Samsung | To justify our proposal we provide measurement data from OTA test in an indoor multi-path channel environment. The data show the restriction “CMR and IMR in the test are scheduled in the same slot” is not necessary and it will bring problems for settings of some test cases.To Apple: dedicated margin for fading channel is already added for L1-SINR accuracy requirement. Please note that CMR and IMR will not be too far away in time. A several slot distance will raise very little inaccuracy. |
| Ericsson | Thanks for providing the measurement results from the lab. For clarification, did you test with static channel condition or with fading channel condition like TDL or CDL channel? If the lab measurement shows the derivation is within 0.5dB even with fading channel condition, we support Option 1. |
| Samsung | To Ericsson:For the shown data they are tested in multi-path channel condition which could be modeled (simplified) as a CDL fading channel model. |

### 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** |
| R4-2110035Samsung | Moderator: For FR2 L1-SINR requirement, remove the unnecessary condition “CMR and IMR in the test are scheduled in the same slot.” (Corresponding to R4-2110034). |
| Apple: Comments provided in Issue 2-1-1. |
| Qualcomm: CR can be agreeable to us. |
| Samsung: Remove the unnecessary restriction and leave more flexibility to test cases defining. |
| R4-2110280Huawei | Moderator: Corrections on L1-SINR accuracy requirements. |
| Apple: If CMR Es/Iot = NZP-IMR Es/Iot is always true, then SINR will always be 0 dB. That was agreement for the test case in our understanding, not for all accuracy requirements. |
| Huawei: we are OK not to introduce the condition “CMR Es/Iot = NZP-IMR Es/Iot”. |
| Samsung: “The value of SSB CMR Ês/Iot is assumed to be equal to the value of NZP-IMR Ês/Iot.” May this be added as a condition to derive the accuracy requirement instead of a Note? |
| Nokia: More discussions are needed since there is no discussion or agreement about the added note:The value of SSB CMR Ês/Iot is assumed to be equal to the value of NZP-IMR Ês/Iot. |
| R4-2110283Huawei | Moderator: To update reference section numbers used in L1-SINR measurement accuracy tests. |
| Samsung: Agreeable. |
| R4-2110476R4-2110477Huawei | Moderator: Complete the section B.2 for L1-SINR accuracy. To add conditions for defined requirements in Annex, it should be a category F CR. Category A CR could be submitted after the CR is agreed. |
| Huawei: R17 version will be a bit different with R16 version since PC5 is added from R17. So, R17 version R4-2110477 is not a cat-A CR. |
| Samsung: R4-2110476 can be merged into Nokia’s CR. R4-2110477 can be kept considering PC5. Not a new requirement, it should be a Cat F for both CRs. |
| Nokia: Samsung’s suggestion is fine by splitting the CRs into Rel-16 and Rel-17. Rel-16 CR is based on Nokia’s R4-2111272).  |
| Ericsson: It looks it is similar CR as R4-2111272 (Nokia). Comparing both CRs, Huawei’s CR sets SSB\_RP 3dB higher than Nokia’s one. Could you explain the reason? From the spec structure point of view, we prefer Huawei’s CR where it refers to the L1-RSRP for L1-SINR with CMR-only and ZP-IMR. We prefer this one to avoid duplication of the table. |
| R4-2110654Ericsson | Moderator: Corrections on antenna configurations for BFR test. |
| R4-2111272Nokia | Moderator: Complete the section B.2 for L1-SINR accuracy. To add conditions for defined requirements in Annex, it is supposed to be a category F CR. |
| Huawei: it is better that the structure of condition requirements is aligned with the structure of L1-SINR measurement/accuracy requirements. Otherwise, the description of referred section number will be complicated. |
| Nokia: The structure can be modified if needed. However, section numbering is used for referencing so it is clear and unambiguous.  |
| R4-2111287Nokia | Moderator: Editorial changes on a Table caption for L1-SINR accuracy. |
| Huawei: This editorial change has been captured in R4-2110280 |
| Samsung: It could be merged into Huawei’s CR. |
| R4-2111322Ericsson | Moderator: Correction on beam assumptions in the L1-SINR test. |
| Apple: We have Note 12 and Note 23 in Table A.7.6.6.1.2-2, instead of Note 1 and Note 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.*

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|  | **Status summary**  |
| **Sub-topic#2-1** | **Issue 2-1-1: FR2 exclusive condition of L1-SINR accuracy test*** Proposals:
	+ Option 1: For FR2 L1-SINR accuracy test, remove the unnecessary condition “CMR and IMR in the test are scheduled in the same slot.”
	+ Option 2: others.

***Tentative agreements: N/A*** ***Moderator’s opinion: Option 1 is majority view with justification data.******Recommendations for 2nd round: Continue discussion. If companies cannot justify the restriction is necessary, then Option 1 will be agreed.*** |
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### 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**  |
| R4-2110280 | Further discussion is needed for “The value of SSB CMR Ês/Iot is assumed to be equal to the value of NZP-IMR Ês/Iot.” |
| R4-2110476R4-2110477 | Some small issues may be discussed in 2nd round.“Comparing both CRs, Huawei’s CR sets SSB\_RP 3dB higher than Nokia’s one. Could you explain the reason? ”R4-2110476 => merged to Nokia’s CRR4-2110477 keep as Huawei’s CRShould be Cat. F. |
| R4-2111272 | Same as R4-2110476. Discussion in 2nd round. |
| R4-2111322 | Revision is needed. |

## 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: Test Case for Pathloss RS Activation

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

## Companies’ contributions summary

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| **T-doc number** | **Company** | **Proposals / Observations** |
| R4-2108763 | ZTE Corporation | **Proposal 1: Test cases for MAC-CE based pathloss RS activation delay shall be defined in TS 38.133.****Proposal 2: Agree on CR [4].****Proposal 3: Define test cases for both FR1 and FR2.** |
| R4-2110282 | Huawei, HiSilicon | ***Proposal 1: At least two pathloss-RSs need to be configured to the serving cell in the test, and at least two time periods are needed for activating different PL-RSs.******Observation 1: The PHR value is determined by many parameters and the measured RSRP value of pathloss-RS is only one of them.******Proposal 2: For PHR-based test, except the activated pathloss-RS index, all the other power control related parameters indicated by RRC message or in DCI format shall be clarified and unchanged during the whole test.******Proposal 3: For FR2 test, the TCI state of activated pathloss-RS shall be configured and the TCI state information indicates QCLed Type-D to the SSB for L1-RSRP measurements.*** |
|  |  |  |

## 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

***Define Test case for Pathloss RS Activation***

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

**Issue 3-1-1: Whether to define the test case for PL RS**

* Proposals: Test cases for MAC-CE based pathloss RS activation delay shall be defined in TS 38.133.
	+ Option 1: Support
	+ Option 2: Do not support
* Recommended WF
	+ Based on the 1st round discussion.

**Issue 3-1-2: Define the test case for which cases**

* Proposals:
	+ Option 1: Define test cases for both FR1 and FR2.
	+ Option 2: Others
* Recommended WF
	+ Based on the 1st round discussion.

**Issue 3-1-3: How to define the test case for PL RS**

* Proposals:
	+ Option 1: At least two pathloss-RSs and two time periods are needed in the test
	+ Option 2: All power control related parameters other than PL RS indicated by RRC shall be clarified and unchanged during the whole test.
	+ Option 3: For FR2 test, the TCI state of activated pathloss-RS shall be configured and the TCI state information indicates QCLed Type-D to the SSB for L1-RSRP measurements.
	+ Option 4: Other proposals.
* Recommended WF
	+ Based on the 1st round discussion.

## Companies views’ collection for 1st round

### Open issues

*One of the two formats, i.e. either example 1 or 2 can be used by moderators.*

**Issue 3-1-1: Whether to define the test case for PL RS**

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| --- | --- |
| **Company** | **Comments** |
| Apple | We prefer not to introduce test case. The pathloss is one of the many variables/ parameters that is used in TX power or PH calculation. We have not evaluated the accuracy of pathloss measurement or have any accuracy requirements for pathloss. So, we cannot ensure that the levels chosen in the testcase are valid.  |
| Qualcomm | Assume the test approach is by changing the SNR of TE, RSRP, which is the effective signal per-RE power shall remain the same. Then computed PL(based on measured RSRP) will not change and PHR remains the same. As such, TE may not capture the PHR report to further determine if the test is passing.May other companies share some comments if our understanding is correct. Before this is clarified, we prefer not to define the test. |
| MediaTek | Support not to introduce test case for PL-RS. Share same view with Apple.  |
| Huawei | As we pointed out in our paper, the PHR value is determined by many parameters and the measured RSRP value of PL-RS is only one of them. How to avoid the impact on PHR value due to other parameters is not provided by any company and it may introduce the testing complexity. So, we also prefer not to define the test case for PL-RS activation. |
| Samsung | The test case could be defined provided two conditions are satisfied:* Calculated pathloss changes before and after PL RS switching;
* No conditions of triggering PHR other than calculated PL changing are meet.

To Qualcomm: It seems possible by changing SNR as I check for example RA test case where SSB#1 and SSB#2 have the same Noc but different Es/Iot. In other words, transmitting power is different for the two SSBs. Other comments on this issue are welcomed.To solve Apple’s concern, we could set the power difference between 2 SSBs to be very large than RSRP accuracy requirement.Specific feasibility issues are encourage to be analyzed and proposed to justify  |
| ZTE | We think that this is absolutely testable. Companies mention that “the PHR value is determined by many parameters and the measured RSRP value of PL-RS is only one of them”, in the CR we provided, no other parameter is changed, and thus, PHR can only be triggered by PL RS change. Agree with Samsung that “No conditions of triggering PHR other than calculated PL changing are met” and this can be guaranteed by simply not changing other parameters during the test.To apple’s question on accuracy, actually, in TS 38.321, it says clearly that “*phr-ProhibitTimer* expires or has expired and the path loss has changed more than *phr-Tx-PowerFactorChange* dB...’. Thus, we don’t agree that the accuracy was not defined in any spec.Hope that the above clarifications would help to provide enough information. |

**Issue 3-1-2: Define the test case for which cases**

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| --- | --- |
| **Company** | **Comments** |
| Apple | No testcase is defined |
| Samsung | If the test method is feasible for both common FR1 test and FR2 OTA test, test cases can be defined for both. |
| ZTE | Both FR1 and FR2. |
|  |  |

**Issue 3-1-3: How to define the test case for PL RS**

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| --- | --- |
| **Company** | **Comments** |
| Samsung | Support option 1. UE could be configured two RSs with different transmitting power for PL RS switching. Current CR need to take Huawei’s proposal into consideration. Two SSBs configured and switching RS from one to another could be a good design.Also the case needs to guarantee no conditions of triggering PHR are meet other than calculated PL changing.For FR2 we need to first discuss on if the same Tx/Rx beam is used in the test. |
| ZTE | Option 1 is feasible. Can FFS for FR2. |
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### 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.*

|  |  |
| --- | --- |
| **CR/TP number** | **Comments collection** |
| R4-2108761ZTE | Moderator: CR text proposed by ZTE for PL RS test. |
| Apple: We don’t support defining the test case. |
| Huawei: The CR has not mentioned how to avoid the impact on PHR value due to other parameters. Besides, the PHR change due to PL-RS activation is also not mentioned in this CR. The test setup provided in this CR seems not testable for verifying PL-RS activation delay. |
| Samsung: Based on discussion of Sub-topic 3-1. 2 RSs configured for PL RS switching is a good design. Need to guarantee no other event take place to trigger PHR. |
| 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.*

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| --- | --- |
|  | **Status summary**  |
| **Sub-topic #1-1** | **Issue 3-1-1: Whether to define the test case for PL RS*** Proposals: Test cases for MAC-CE based pathloss RS activation delay shall be defined in TS 38.133.
	+ Option 1: Support
	+ Option 2: Do not support

***Tentative agreements: N/A******Moderator’s opinion:***The test case could be defined provided two conditions are satisfied:* Calculated pathloss changes before and after PL RS switching;
* No conditions of triggering PHR other than calculated PL changing are meet.

*If these two conditions are satisfied, then define the test case.****Recommendations for 2nd round: Continue discussion on this issue. Companies could share views on whether the two conditions can be satisfied.*****Issue 3-1-2: Define the test case for which cases*** Proposals:
	+ Option 1: Define test cases for both FR1 and FR2.
	+ Option 2: Others

***Tentative agreements: N/A******Moderator’s opinion:*** *focus on FR1 first.****Recommendations for 2nd round: In 2nd round*** *focus on FR1 first. If FR1 test is defined, then discussion FR2.***Issue 3-1-3: How to define the test case for PL RS*** Proposals:
	+ Option 1: At least two pathloss-RSs and two time periods are needed in the test
	+ Option 2: All power control related parameters other than PL RS indicated by RRC shall be clarified and unchanged during the whole test.
	+ Option 3: For FR2 test, the TCI state of activated pathloss-RS shall be configured and the TCI state information indicates QCLed Type-D to the SSB for L1-RSRP measurements.
	+ Option 4: Other proposals.

 ***Tentative agreements: Option 1 can be agreeable.******Moderator’s opinion:*** *Option 1 can be used as test method that 2 SSBs are configured and switch PL RS from one to another. 2 SSB have different transmitting powers. The difference should be large to neglect the impact of RSRP accuracy.**Threshold should not be 0. It should be bigger than RSRP accuracy.**Moderator is not sure whether to treat this in GTW. Let me know your views.****Recommendations for 2nd round: ZTE could consider companies opinions in their test case and revise the CR accordingly. Focus on FR1 test case first.*** |
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### 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**  |
| R4-2108761 | *Suggestions for CR revision:**Option 1 can be used as test method that 2 SSBs are configured and switch PL RS from one to another. 2 SSB have different transmitting powers. The difference should be large to neglect the impact of RSRP accuracy.**Threshold should not be 0. It should be bigger than RSRP accuracy.* |

## Discussion on 2nd round (if applicable)

# Recommendations for Tdocs

## 1st round

**New tdocs**

|  |  |  |
| --- | --- | --- |
| **Title** | **Source** | **Comments** |
| WF on NR eMIMO RRM requirement Maintenance | Samsung | To capture the meeting agreements in the WF. |
| LS on … | ZZZ | To: RAN\_X; Cc: RAN\_Y |
|  |  |  |

**Existing tdocs**

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| --- | --- | --- | --- | --- |
| **Tdoc number****CRs** | **Title** | **Source** | **Recommendation**  | **Comments** |
| R4-2109334 | CR to 38.133 on Link recovery requirements - R16 | Apple | Agreeable | Editorial changes for CBD requirement. |
| R4-2109336 | CR to 38.133 on applicability of requirements to multi-TRxP - R16 | Apple | Return to | More discussion needed.It is not Cat B CR. Should be Cat F CR. |
| R4-2109643R4-2109644 | Introduce the SCell beam failure recovery without the dedicated PUCCH resource in R16Introduce the SCell beam failure recovery without the dedicated PUCCH resource in R17 | MTK | Revised | Revised according to comments. |
| R4-2110144 | *CR to 38.133 Correction on SCell BFR for no dedicated PUCCH case (Rel-16)* | Samsung | Merged | *Merged to* R4-2109643 |
| R4-2110285 | *CR on maintaining L1-SINR measurent requirements R16* | Huawei | Agreeable |  |
| R4-2110035 | *CR to 38.133 Correction on the requirement of FR2 L1-SINR measurement accuracy (Rel-16)* | Samsung | Return to  | *Based on Issue 2-1-1* |
| R4-2110280 | *CR on maintaining L1-SINR measurent accuracy requirements R16* | Huawei | Revised | More discussion needed. |
| R4-2110283 | *CR on maintaining L1-SINR measurement accuracy tests R16* | Huawei | Agreeable |  |
| R4-2110476 | *CR on condition requirements for L1-SINR measurements R16* | Huawei | Merged | *Merged to* Nokia’s CR |
| R4-2110477 | *CR on condition requirements for L1-SINR measurements R17* | Huawei | Revised | Revised according to 2nd round discussion.supposed to be a category F CR. |
| R4-2110654 | *Correction of test case of link recovery with link recovery requests* | Ericsson | Agreeable |  |
| R4-2111272 | *CR to TS 38.133: Adding conditions for L1-SINR reporting (Annex B.2)* | Nokia | Revised | supposed to be a category F CR.No Cat A CR corresponding to this CR. |
| R4-2111287 | *CR to TS 38.133: Corrections to the table for L1-SINR absolute accuracy for CSI-RS based CMR only (10.1.27.1.1)* | Nokia | Merged | *Merged to* Huawei’s CR |
| R4-2111322 | *Correction to beam assumptions in L1-SINR FR2 tests* | Ericsson | Revised | Revised according to comments. |
| R4-2108761 | *[CR] Test cases for applicable timing for PL RS activated by MAC-CE* | ZTE | Revised | Revised according to comments and 2nd round discussion. |

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| **Tdoc number****Non CRs** | **Title** | **Source** | **Recommendation**  | **Comments** |
| R4-2110034 | Discussion on FR2 L1-SINR measurement accuracy OTA test | Samsung | Noted |  |
| R4-2108763 | Test cases for applicable timing for PL RS activated by MAC-CE | ZTE | Noted |  |
| R4-2110282 | Discussion on testbility of pathloss-RS activation delay | Huawei, HiSilicon | Noted |  |

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** |
| R4-210xxxx | CR on … | XXX | Agreeable, Revised, Merged, Postponed, Not Pursued |  |
| R4-210xxxx | WF on … | YYY | Agreeable, Revised, Noted |  |
| R4-210xxxx | LS on … | ZZZ | Agreeable, Revised, Noted |  |
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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