

3GPP TSG-RAN WG4 Meeting #102-e R4-2206747

e-Meeting, 21st Feb –3rd Mar 2022

Agenda item: 5.1.2.1

Source: Moderator (Samsung)

Title: Email discussion summary for [102-e][204] Maintenance_NR_eMIMO_NWM
(<https://nwm-trial.etsi.org/#/documents/7540>)

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 RAN4#97e, 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 RAN4#99e meeting, some maintenance issues was discussed following the WF R4-2104068. In RAN4#100e, two remaining issues in WF R4-2108225 as well as some spec corrections was discussed. In RAN4#100e, WF R4-2115299 documents two outstanding issues that MRTD requirement and PL RS test case, of which the former one has been solved in RAN4#101e. And for this meeting (RAN4#102e), an outstanding issue in WF R4-2120264, i.e., PL RS test case, and other cat F CR, will be discussed.

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, reach the consensus and complete outstanding issues.

1 Topic #1: Core Requirement Maintenance

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

1.1 Companies' contributions summary

Table 1:

T-doc number	Company	Proposals / Observations
R4-2205317	Huawei, HiSilicon	<p>Observation 1: When a SSB resource indicated as PL-RS is also configured for L1-RSRP measurements, UE needs to perform beam sweeping on the SSB resource for both PL-RS measurements and L1-RSRP measurements.</p> <p>Proposal 1: For PL-RS switching in FR2, the target PL-RS is always considered as unknown if the target PL-RS is SSB.</p>

1.2 Open issues summary

Before e-Meeting, moderators shall summarize list of open issues, candidate options and possible WF (if applicable) based on companies' contributions.

1.2.1 Sub-topic 1-1

PL-RS switching

Open issues and candidate options before e-meeting:

Issue 1-1-1: SSB-based PL-RS switching in FR2

- Proposal: For PL-RS switching in FR2, the target PL-RS is always considered as unknown if the target PL-RS is SSB.

- Option 1: Support
 - Option 2: Do not support
- Recommended WF
- Based on companies' views in 1st round discussion.

Feedback Form 1:

1 – ZTE Corporation

Don't think the CR is needed, especially it only suggests to add a note. Not technically essential.

2 – HiSilicon Technologies Co. Ltd

We support option 1, otherwise SSB-based PL-RS switching delay requirements cannot be met in FR2.

To ZTE: the current PL-RS switching delay requirements can be met only when UE does not perform Rx beam sweeping on this PL-RS. In FR2, when SSB configured as PL-RS is also used for L1-RSRP measurements, this SSB based PL-RS is considered to be known according to the known condition requirements. In FR2, Rx beam sweeping is always assumed for SSB based L1-RSRP measurements. So, UE could not meet both L1-RSRP measurements and PL-RS switching delay requirements. Hence, we suggest that SSB-based PL-RS is always considered as unknown in FR2, which allow longer switching delay for Rx beam sweeping.

3 – Apple GmbH

We support option 1. Since we always include beam sweeping for SSB based measurement, we should also include that for PL-RS if its SSB based.

4 – BEIJING SAMSUNG TELECOM R&D

We are not convinced by Huawei's analysis. In Huawei's paper,

"Since R15, beam sweeping is always assumed for L1-RSRP measurements measured on SSB resource in FR2. Therefore, beam sweeping shall also be assumed for PL-RS measurements measured on SSB resource in FR2."

But from our understanding, we think that "SSB as L1-RSRP RS" and "SSB as Pathloss RS" are totally different things. Thus the same assumption cannot be reused. Currently the known condition of PL-RS implies that if the RS is measured as L1 measurement RS before configured as PL-RS, the RS is known. Since it is known, no need to beam sweeping. Hence current known condition is logically consistent.

To sum up, the logic is "PL-RS is measured before configure" -> "PL-RS is known" -> "need to beam sweep". So we do not think the proposal is valid.

1.3 Companies views' collection for 1st round

1.3.1 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.

Table 2:

No.	CR/TP	Company	Comments
#1	R4-2204694	Samsung	Moderator: Correction on R16 L1-SINR spec to align with R17 version. No technical issue.
#2	R4-2204695	Samsung	Moderator: Correction on R17 L1-SINR spec to specify the clause number. No technical issue.
#3	R4-2205318	Huawei	Moderator: a company CR for Issue 1-1-1

Feedback Form 2:

<p>1 – ZTE Corporation</p> <p>R4-2205318: Don't think the CR is needed, especially it only suggests to add a note. Not technically essential.</p>
<p>2 – QUALCOMM JAPAN LLC.</p> <p>R4-2205318: Not clear why this Note would be needed.</p>
<p>3 – HiSilicon Technologies Co. Ltd</p> <p>To ZTE and QC:</p> <p>The existing PL-RS switching delay requirements can be met only when UE does not perform Rx beam sweeping on this PL-RS. In FR2, Rx beam sweeping shall be always assumed for SSB based measurements. Hence, we suggest that SSB-based PL-RS is always considered as unknown in FR2, which allow longer switching delay for Rx beam sweeping.</p>
<p>4 – Apple GmbH</p> <p>We agree with the changes in the CR.</p>

5 – BEIJING SAMSUNG TELECOM R&D

Same comments as Issue 1-1-1. need further feedback from proponents.

1.4 Summary for 1st round

1.4.1 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.

Issue 1-1-1: SSB-based PL-RS switching in FR2

Recommendations for 2nd round: Continue discussion in the 2nd round

1.5 Discussion on 2nd round (if applicable)

2 Topic #2: Performance Requirement Maintenance

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

2.1 Companies' contributions summary

Table 3:

Tdoc Number	Company	Proposals / Observations
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R4-2203573	Anritsu Corporation	<p>Observation 1: <i>As factors for PHR measurement accuracy requirement, RSRP accuracy and output level uncertainty of the test equipment should be taken into consideration.</i></p> <p>Proposal 1: <i>Utilize the existing RSRP accuracy requirement and output level uncertainty of the test equipment for the alternative of the PHR measurement accuracy requirement.</i></p> <p>Proposal 2: <i>To secure the PHR is triggered by PL-RS switching in the test case, the threshold of PL-RS difference should be at least 5 dB, derived based on the relative SS-RSRP requirement and AWGN absolute power MU.</i></p> <p>Proposal 3: <i>The difference of Tx power level between SSBs is set as 10 dB.</i></p>
R4-2205411	ZTE Corporation	<p>Observation 1: With the suggested test method proposed in our campaign CR [6], calculated pathloss changes before and after PL RS switching to trigger PHR and no conditions of triggering PHR are meet other than calculated PL changing.</p> <p>Proposal 1: Test cases for MAC-CE based pathloss RS activation delay shall be defined in TS 38.133..</p> <p>Observation 2: L3 filtering can be disabled by setting the Filter coefficient to 0 and it's common in RRM test cases to do so.</p> <p>Proposal 2: Disable L3 filtering in the test by configuring the Filter coefficient to 0.</p> <p>Proposal 3: Agree on the campaign CR [6].</p> <p>Proposal 4: Define test cases for both FR1 and FR2.</p>

2.2 Open issues summary

Before e-Meeting, moderators shall summarize list of open issues, candidate options and possible WF (if applicable) based on companies' contributions.

2.2.1 Sub-topic 2-1

Define Test case for Pathloss RS Switching

Open issues and candidate options before e-meeting:

Issue 2-1-1: PHR measurement accuracy

- Proposals: Utilize the existing RSRP accuracy requirement and output level uncertainty of the test equipment for the alternative of the PHR measurement accuracy requirement.
 - o Option 1: Support
 - o Option 2: Do not support

- Recommended WF
 - o Based on the 1st round discussion.

Feedback Form 3:

<p>1 – ZTE Corporation</p> <p>Support. Suggest to check the CR R4-2205412 directly since the CR was prepared according to these proposals.</p>
<p>2 – QUALCOMM JAPAN LLC.</p> <p>What is the overall uncertainty that would be introduced for such a test? this test will be complicated and the level of uncertainty will be so high that the test itself will be pointless. We do not think such a test is meaningful</p>
<p>3 – ZTE Corporation</p> <p>To QC: Thanks for the comments. In our view the test is not complicated as we already give the test configurations and setup in the draft CR, and we think it is totally feasible (especially after checking and confirming with TE vendors). Why is the test not meaningful? We have a core requirement and it is very natural to introduce corresponding test cases.</p>
<p>4 – HiSilicon Technologies Co. Ltd</p> <p>In RAN4#100-e meeting, except RSRP accuracy related issues, there also have other issues which need to be solved.</p>

5 – Apple GmbH

We are repeating our concerns and comments for a few meetings now. We are introducing the test case just for the purpose of introducing the test case, without a complete and sound setup. We don't have PHR accuracy requirements and they are not part of the requirement, so we can create a setup where there is no PL-RS (SSB) transmission and the test will still pass. We always have accuracy and delay requirements tested together, but in this case accuracy cannot be verified.

6 – BEIJING SAMSUNG TELECOM R&D

Let us continue discussion the test case in 2nd round as more inputs are need. But we may have to make conclusion in this meeting regarding whether the test case will be defined.

Issue 2-1-2: The threshold of PL-RS difference

- Proposals: To secure the PHR is triggered by PL-RS switching in the test case, the threshold of PL-RS difference should be at least 5 dB (RSRP accuracy + output level uncertainty), derived based on the relative SS-RSRP requirement and AWGN absolute power MU.
 - Option 1: Support
 - Option 2: Do not support
- Recommended WF
 - Based on the 1st round discussion.

Feedback Form 4:

1 – ZTE Corporation

Support. Suggest to check the CR R4-2205412 directly since the CR was prepared according to these proposals.

Issue 2-1-3: The difference of levels of Tx power between two SSBs

- Proposals: The difference of Tx power level between SSBs is set as 10 dB.
 - Option 1: Support
 - Option 2: Do not support
- Recommended WF
 - Based on the 1st round discussion.

Feedback Form 5:

1 – ZTE Corporation

Support. Suggest to check the CR R4-2205412 directly since the CR was prepared according to these proposals.

2.3 Companies views' collection for 1st round**2.3.1 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.

Table 4:

No.	CR/TP	Company	Note
#1	R4-2205412	ZTE Corporation, Anritsu Corporation	Moderator: dCR for Pathloss RS activation Test case.
#2	R4-2205320	Huawei	Moderator: Corrections on details in BFR and L1-SINR test cases.

Feedback Form 6:

1 – HiSilicon Technologies Co. Ltd

For R4-2205412, only the test setup should be described in clause A.6.5.x.1.1. The expected UE behavior should be captured in clause A.6.5.x.1.2, not in clause A.6.5.x.1.1. For this CR, PL-RS is configured as SSB. The wording "the target pathloss reference signal which would be SSB or NZP CSI-RS" is not proper and needs to be revised. Beside, the exact value for the expected delay should be calculated and provided in the test.

2 – Apple GmbH

We dont agree to introduce performance requirements.

3 – BEIJING SAMSUNG TELECOM R&D

Let us continue discussing the test case in 2nd round as more inputs are need, especially for TE vendors. But we may have to make conclusion in this meeting regarding whether the test case will be defined.

2.4 Summary for 1st round

2.4.1 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.

Issue 2-1-1: PHR measurement accuracy

Recommendations for 2nd round: Continue collecting views from companies in the 2nd round.

Issue 2-1-2: The threshold of PL-RS difference

Recommendations for 2nd round: Continue collecting views from companies in the 2nd round.

Issue 2-1-3: The difference of levels of Tx power between two SSBs

Recommendations for 2nd round: Continue collecting views from companies in the 2nd round.

2.5 Discussion on 2nd round (if applicable)

3 Recommendations for Tdocs

3.1 1st round

New tdocs

Table 5:

Title	Source	Comments
WF on eMIMO RRM Maintenance	Samsung	Capture agreements and WF during the meeting

Existing tdocs

Table 6:

Tdoc number	Title	Source	Recommendation	Comments
R4-2204694	Draft CR to TS38.133 Corrections on L1-SINR requirement (Rel-16)	Samsung	Agreeable	
R4-2204695	Draft CR to TS38.133 Corrections on L1-SINR requirement (Rel-17)	Samsung	Agreeable	
R4-2205318	DraftCR on maintaining PL-RS switching delay requirements R16	Huawei	Return to	Continue discussion in 2nd round
R4-2205412	[dCR] Test cases for applicable timing for PL RS activated by MAC-CE	ZTE	Return to	More views are needed from companies in 2nd round.
R4-2205320	DraftCR on correction to L1-SINR and SCell BFR tests R16	Huawei	Agreeable	

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:
 - a) CRs/TPs: Agreeable, Revised, Merged, Postponed, Not Pursued
 - b) 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

3.2 2nd round

Table 7:

Tdoc number	Title	Source	Recommendation	Comments
R4-210xxxx	CR on ...	XXX	Agreeable, Re-vised, Merged, Postponed, Not Pursued	
R4-210xxxx	WF on ...	YYY	Agreeable, Re-vised, Noted	
R4-210xxxx	LS on ...	ZZZ	Agreeable, Re-vised, Noted	

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:

a) CRs/TPs: Agreeable, Revised, Merged, Postponed, Not Pursued

b) Other documents: Agreeable, Revised, Noted

3. Do not include hyper-links in the documents