[106bis-e][201] NR_ENDC_ RF_FR1_enh2_NWM - Version 0.0.3
RAN4
https://nwm-trial.etsi.org/#/documents/8455

3GPP TSG-RAN WG4 Meeting # 106-bis-e

Electronic Meeting, 17 April– 26 April, 2023

R4-2306149

Agenda item: 5.5.3

Source: Moderator (NTT DOCOMO, INC.)

Document for: Information

1 Introduction

This document includes the discussions in agenda item 5.5.3 RRM performance requirements for Further RF requirements enhancement for NR and EN-DC in frequency range 1. The performance discussion aims to specify RLM test cases to support 8Rx. This document contains the following topic:

- Topic #1: RLM test cases to support 8Rx

For reference, the objective of performance part is copied from latest WID of RP-230753 as follows:

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The objectives of performance part for Rel-18 RF FR1 requirement focus evolution include:

- *Enable 4Tx on a single carrier for CPE/FWA/vehicle/industrial devices*
  - *Specify the BS demodulation performance requirements to support UL 4-layer MIMO UE operation*
- *Enable 8Rx for CPE/FWA/vehicle/industrial devices*
  - ***Specify RLM test cases to support 8Rx***
    - ***Investigate if the existing 4Rx RLM test can be reused or the new test will be specified***
  - *Specify UE demodulation performance and CSI requirements with up to 8 layers to support 8Rx*
    - *Investigate and, if necessary, specify the requirements with up to 8 DL MIMO layers*
  - *Specify the SDR requirements with 8 MIMO layers*
- *Specify release independence requirements in TS 38.307 if needed.*

2 RLM test cases to support 8Rx

2.1 Companies' contributions summary

Table 1: Companies' contributions summary

T-doc number	Company	Proposals / Observations
R4-2305313	Huawei, HiSilicon	***Proposal 1: For RRM test cases, it is suggested to introduce the antenna connection for 8Rx capable UEs, where the following aspects are specified:*** • ***Testing principles for 8Rx capable UEs*** • ***The modified SNR levels for RLM and BFD testing with 8 RX antenna connection***

2.2 Open issues summary

2.2.1 RLM/BFD test cases for 8Rx capable UEs

Issue 1-1-1: RLM/BFD test cases for 8Rx capable UEs

Proposal:

- Option 1: For RRM test cases, it is suggested to introduce the antenna connection for 8Rx capable UEs, where the following aspects are specified:
  - Testing principles for 8Rx capable UEs
  - The modified SNR levels for RLM and BFD testing with 8 RX antenna connection

Recommended WF:

- Based on companies' views in 1st round discussion.

Feedback Form 1: Issue 1-1-1: RLM/BFD test cases for 8Rx capable UEs

1 – Ericsson Japan K.K.

We are generally fine with Option 1, 'modify SNR levels for RLM/BFD tests for 8Rx capable UE'.

On the other hand, in LTE, RAN4 did not change the SNR test points for RLM for 8Rx UE, but apply the same SNR test points defined for 4Rx UE. It is great if Huawei would explain the reason why you propose to modify SNR test points for NR.

2 – Nokia Korea

We share same view with E///.

Besides, we understood it is sufficient to clarify the SNR levels for RLM/BFD TCs for 8Rx capable UE, but not introduce any new RLM/BFD TCs. Is it correct understanding?

3 – QUALCOMM JAPAN LLC.

We should follow the same approach as we did for LTE which was to basically reuse the 2Rx/4Rx tests since it is unlikely that there will be UEs supporting only 8Rx in all the bands they support. WE can revisit this in the future if there will be such UEs that have only 8Rx in all the bands they support.

4 – HiSilicon Technologies Co. Ltd

Our intention is not to introduce new test cases for 8Rx capable UE. 8Rx capable UE may not support 8Rx on all the band. So, the testing principles needs to be introduced for clarifying whether the tests are performed with 8 RX antenna connection or not. The current parameters for RLM/BFD test cases in section A.4.5/A.5.5/A.6.5/A.7.5 are designed based on 2Rx capable UE. Most of the parameters an be reused except some SNR levels derived from the threshold Qout/Qout_LR. As we know, the threshold Qout/Qout_LR will be different bewteen 2Rx and 8Rx. So, these SNR levels need to be updated for 8Rx. For 8Rx, we are also fine to reuse the same SNR values for 4Rx.

5 – Ericsson Japan K.K.

Firstly we agree RAN4 need to add new clause in TS38.133 A.3.6.1 for 8Rx capable UEs, same as LTE TS36.133 A.3.8.2.

Regarding the SNR for RLM/BFD, 4Rx-based SNR values are low enough so we prefer to reuse 4Rx-based SNR values.

2.3 Summary for 1st round

2.3.1 Open issues

2.3.1.1 RLM/BFD test cases for 8Rx capable UEs

3 companies commented that RAN4 should follow same approach as of LTE, i.e. reuse the existing 2Rx/4Rx tests and the intention of the proposal was clarified that no new test cases for 8Rx was needed. Since all companies seem to be on same page, introducing testing principles for 8Rx capable UEs can be agreeable.

Also all companies may have same understanding that SNR value for 4Rx tests can be reused for 8Rx tests.

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Based on this summary, whether following recommended WF is agreeable or not should be discussed in 2nd round.

Reccomended WF

- RAN4 introduce the antenna connection for 8Rx capable UEs in TS 38.133 A.3.6, where the following aspects are specified:
    - Testing principles for 8Rx capable UEs
    - For RLM and BFD testing, reuse SNR levels specified for 4Rx capable UE

2.4 Discussion on 2nd round (if applicable)

3 Recommendations for Tdocs

3.1 1st round

New tdocs

Table 2:

New tdoc number	Title	Source	Comment
	WF on RRM performance requirements for Further RF requirements enhancement for NR and EN-DC in FR1	NTT DOCOMO, INC.	