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Variant of [98e-16-R18-MIMO] NR MIMO evolution for downlink and uplink Version 0.0.3

RAN

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3GPP TSG RAN Meeting #98-e RP-223456

Electronic Meeting, December 12-16, 2022

Agenda item: 9.3.1.4

Source: Samsung

Title: Moderator's summary for discussion [98e-16-R18-MIMO]

Document for: Discussion and Decision

1 Introduction

Four contributions on the December scope and progress assessment have been submitted:

- 2837 (Samsung/rapporteur):
  - Each objective and the overall WID are on track despite a few progress-challenged and behind-schedule sub-objectives (note: other topics are on schedule or ahead of schedule):
    - In objective 1: TRS-based TD channel property reporting
    - In objective 4: SRS for TDD CJT
    - In objective 5: Codebooks for partial/non-coherent and full power modes, details on 2-CW transmission
    - In objective 7: UL PC for S-DCI
  - No WID refinement/down-scoping is needed in RAN#98
- 2980 (Intel):
  - Similar observation and proposal (no WID refinement/down-scoping is needed in RAN#98) to 2837, also pointing out a few progress-challenged and behind-schedule sub-objectives:
    - In objective 2: unified TCI extension for CJT
    - In objective 4: SRS for TDD CJT

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- 3166 (NTT DOCOMO):
  - Similar observation and proposal (no WID refinement/down-scoping is needed in RAN#98) to 2837, also pointing out one progress-challenged and behind-schedule sub-objective:
    - In objective 4: SRS for TDD CJT
- 3240 (MediaTek):
  - Pointing out a few progress-challenged and behind-schedule sub-objectives:
    - In objective 1: TRS-based TD channel property reporting
    - In objective 5: Codebooks details and full power modes, details on 2-CW transmission, SRS for 8Tx capacity enhancement
  - Propose to:
    - Objective 1: Revisit status of sub-objective "TRS-based TD channel property reporting" in RAN#99 (after RAN1#112) and, if no RAN1 progress, amend objective 1 by removing this sub-objective
    - Objective 5: Revisit the entire objective and consider down-scoping in RAN#98

Summary:

- Three contributions, while recognizing that some sub-objectives are behind in progress, perceive that most sub-objectives are on track (good progress, on schedule). Therefore, the overall WI is on track and no WID refinement/down-scoping (which requires RAN-level action) is needed in RAN#98.
- One contribution (focusing on only two out of four sub-objectives pointed out in 2837) proposes two RAN-level actions: 1) down-scoping objective 5 in RAN#98, 2) add a second checkpoint for a sub-objective in objective 1 for RAN#99.

2 Initial round

Question 2.1: Regarding the Rel-18 NR MIMO Evolution for DL/UL Work Item, please share your view on the following:

1. Whether the overall progress (or any specific sub-objective) is on track or not
2. Whether any RAN-level action (e.g., WID refinement/down-scoping) is needed in RAN#98

Feedback Form 1: Answer to Question 2.1

1 – Samsung Research America

[Samsung's perspective]

RE Q1:

Having reviewed the other three contributions (from Intel, NTT DOCOMO, and MediaTek – much appreciated), the other three companies second the observation in 2837 that *while the overall WI is on track, a small number of sub-objectives are progress-challenged and behind*. Each points out a subset of the sub-objectives mentioned in 2837. Two companies (Intel and NTT DOCOMO) second the proposal in 2837 while one company (MediaTek), despite comparable observation, proposes to down-scope objective 5 in RAN#98 and introduce another checkpoint in RAN#99 for a sub-objective of objective 1.

RE Q2:

Our response to MediaTek is as follows:

o Re proposal 2 (on objective 1), it was agreed in RAN1#111 that (only) one reporting type will be selected in RAN1#112. If RAN1 fails the selection, this sub-objective will be naturally down-scoped as a part of RAN1 process – just as it is customary to do so.

o Re proposal 1 (on objective 5), MediaTek's analysis is well-acknowledged. But at this point, there are a few WG-level ways forward that can be taken to circumvent the progress issues. For example, most of the identified agreements encourage reusing components from the current/legacy specifications. Lastly, if no consensus can be reached, the sub-objectives will also be naturally down-scoped as a part of RAN1 process – just as it is customary to do so.

Therefore, we maintain that *no RAN-level action is needed in RAN#98, i.e., no WID refinement/down-scoping is needed in RAN#98.*

o Likewise, there is *no need for introducing another checkpoint in the WID for RAN#99*. It is understood that if serious lack of progress is still a lingering issue for any sub-objective (not limited to the two singled out by MediaTek – out of the four mentioned in 2837) in RAN1, some discussion will naturally take place in RAN#99.

2 – vivo Communication Technology

Regarding Q1, thanks moderator and companies bringing up the issues. We acknowledge that some of sub-objectives are slow in progress, however these issues can be handled in WG level. As mentioned by moderator, there are set of agreements in RAN1 which lay building blocks for the design, and we believe it can be resolved in next quarter.

Regarding Q2, we don't see necessity of RAN intervention in this meeting.

3 – Google Inc.

Q1: Yes. In our view, some objectives are ahead of schedule, while the progress for some others, e.g., 8Tx, UL PC for STxMP and unified TCI extension, could be a bit slow. But the overall progress is still on track.

Q2: No. In our view, no action is needed in this meeting.

4 – ZTE Corporation.

Q1: Thanks so much for moderator and companies' summary of progress of Rel-18 DL and UL MIMO. From ZTE perspective, we believe that the whole WI objective is well on track, although some more efforts

on 8-TX and TDCP-CSI may need to be paid in WG level. As usual, we may refine/slim-down the details of those sub-objective, if really needed, in RAN1 level rather than RAN.

Q2: No, we do NOT identify clear necessity of RAN intervention in this meeting.

5 – Guangdong OPPO Mobile Telecom.

Q1: Yes. Although the progress of some topics may not achieve the expectation (e.g., no agreement/consensus on various alternatives), the progress of most topics are quite good and some of them are ahead of schedule. Thus, in our view, the overall progress of R18 MIMO is on track.

Q2: RAN-level action is NOT needed in the current stage. RAN WG(s) will continue the discussion, and the alternative(s)/feature(s) that cannot be agreed in WG(s) will be down-scoped automatically.

6 – Futurewei Technologies

Q1: Yes. We share the opinion with other companies that the overall progress is on track.

Q2: No. No RAN intervention is needed and the WGs can continue their work as usual.

7 – Apple GmbH

Q1: Overall progress is on track

Q2: RAN-level action is not needed in RAN#98

8 – Ericsson LM

Q1: Varying progress on the objectives in a work item is not that unusual. We think the working groups can continue their work according to plan.

Q2: No need for any RAN intervention at this point.

9 – Lenovo (Beijing) Ltd

Q1: From Lenovo point of view, the overall WI is on track while a small number of sub-objectives are progress-challenged:

- Objective 1: In our opinion, the progress on this sub-objective is slightly off track due to lack of consensus on the proposed alternatives for TDCP reporting. However, companies have agreed on additional evaluation methodology that can facilitate an agreement in RAN1#112.

- Objective 4: The type-2 codebook for CJT is on track. The progress of SRS for CJT is slow and behind schedule.

- Objective 5: The support of full power modes for 8Tx UE may be progress-challenged since the PA architectures, codebook for all coherent UE and the corresponding capabilities are still open after RAN1#111.

Q2:

- Objective 1: Given the significant progress in the remainder of the sub-objectives of RAN WG1 agenda 9.1.2, the work on this sub-objective can be completed in time provided an agreement is reached in RAN1#112 on a small set of alternatives for TDCP reporting. As such, a checkpoint on the progress would be useful in RAN#99.

- Objective 4: In RAN1#111, it was already concluded to limit the scope by dropping flexible SRS transmission. The details can be handled at the WG level. In our opinion, no RAN-level action is needed in RAN#98.

- Objective 5: If down-selection on the supported PA architectures and the supported full power mode, e.g., only full power mode 0 is supported in Rel-18, can be performed in the next RAN1 meeting, the progress will be in track. Further, if no consensus can be reached on the support of full power modes, the corresponding objectives are naturally down-scoped. Therefore, at least for objective 5, we agree with rapporteur that RAN level WID down-scoping is not needed in RAN#98.

10 – Qualcomm Incorporated

Q1: Yes. We share the opinion that overall progress is ok.

Q2: No. So far, our assessment is that RAN decision is not needed at this Plenary.

11 – Nokia Corporation

Q1: Yes, as typically progress is not really uniform across all items in a WI anyway.

Q2: No need for RAN decision at this Plenary.

12 – Spark NZ Ltd

we share the same view as Nokia and Qualcomm and that progress is on track and no further RAN decision is required at this plenary.

13 – InterDigital

Q1: Yes it is on track from our perspective

Q2: No, we don't need RAN guidance at this point

14 – NTT DOCOMO INC.

Q1: Yes. In our view, overall progress of Rel.18 MIMO is good and on track.

Q2: RAN-level action is NOT needed. Even if progress will be not good in future, RAN1 will decide potential down scoping considering the remaining TUs, and there is no need to introduce another checkpoint in RAN#99.

We believe 8Tx is important feature in Rel.18 MIMO to improve UL performance, which is important for operators. We prefer no down scoping anything for 8Tx and to complete all of Rel.18 MIMO features.

15 – SHARP Corporation

Q1: Yes, the overall progress is on track from our perspective.

Q2: No action is needed in RAN#98.

16 – CATT

Q1: Yes, the overall progress of the work item is on track.

Q2: No RAN action is needed in this meeting.

17 – Spreadtrum Communications

Q1: Yse, the overall progress is on track.

Q2: No RAN-level action is needed in RAN#98.

18 – KDDI Corporation

Q1: There are differences in progress from agenda to agenda, but we perceive that they are overall on track.

Q2: We do not believe that any kind of RAN-level action is necessary in RAN#98.

19 – New H3C Technologies Co.

Q1: Yes. We think overall progress is ok.

Q2: No. RAN guidance is not required at this Plenary.

20 – Fujitsu Limited

Q1: Although there are variations on the progresses of different agenda items, the overall progress is on track.

Q2: RAN-level action is not needed at this stage.

21 – HUAWEI TECHNOLOGIES Co. Ltd.

In our understanding, the overall progress of MIMO is on track, where we have finished the study phase of the sub-topics and agreed to specify them. Although there are a few sub-topics still with a lot open issues, such as TDCP for mobility, STxMP, and UL coherent codebook design etc. But, these issues could be addressed in WG level discussion. So,

For Q1: Yes, the progress of MIMO is on track.

For Q2: No, we don't think RAN-level action is needed in this meeting. Further discussion on the open issues could be handed in WG level as usual.

22 – Intel Technology India Pvt Ltd

Q1: yes, we believe that overall progress is on track (while acknowledging that some items have significant scope to be addressed going forward)

Q2: No, we don't think RAN guidance is needed at this point

23 – Meta Ireland

Q1: same with other companies. the different agenda have different progress. but it can be controlled in WGs.

Q2: No necessity of RAN guidance in this phase

24 – AT&T Q1: Yes, overall progress is on track. Some items are behind schedule, but issues can be handled at the WG level Q2: No RAN-level action is needed at this stage.
25 – Verizon UK Ltd Q1: Yes. overall we think the progress is OK Q2: no need for RAN-level action at this plenary
26 – LG Electronics France We don't see a major problem in current progress and any discussion as well as potential down-selection can be up to WG's discretion as usual
27 – NEC Corporation Q1: We share similar view as majority companies that some objectives are a little behind schedule, while we think final targets can be achieved, so the overall progress is on track. Q2: No, we think there is no need of RAN-level action.
28 – Fraunhofer IIS Q1: The overall progress is good. Q2: No need for RAN-level action at this plenary.
29 – VODAFONE Group Plc Q1: The progress of the work is good in our view Q2: No need for RAN-level intervention
30 – MediaTek Inc. Q1: Our views are provided in the document that raised this issue. Q2: We are ok to review the situation as usual at the next RAN plenary, and hope further progress can be made on those items we flagged as behind schedule in the meantime.

Observation: 30 companies provided inputs on the above question 2.1:

- Q1: 30 companies opine that despite the slower progress on a few sub-objectives, the overall WI is on track
- Q2: 30 companies opine (or are fine) that no RAN-level action is needed at RAN#98.

In light of the above discussion and observation, the following moderator conclusion is made.

Initial round conclusion: *On the scope/workload issue on Rel-18 NR MIMO evolution for downlink and uplink WI, no RAN-level action is needed at RAN#98*

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