**3GPP TSG RAN Meeting #90-e RP-202887**

**Electronic Meeting, December 7-11, 2020**

**Agenda item:** 9.8.1

**Source:** Moderator (Samsung)

**Title:** Moderator’s summary for email discussion [90E][24][R17\_MIMO\_workflow]

**Document for:** Discussion and Decision

1. Introduction

Per chairman’s instruction, the goal and pertinent contributions for this email discussion is as follows:

* Goal: Generate an agreeable way forward.
* Input contributions covered:  2300 [1]

Table 1 Summary of the identified input contributions

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| **Tdoc** | **Summary of issue and proposals** |
| RP-202300 | Issue: Sending LS to RAN2/4 in the early phase of Rel.17 NR FeMIMO WI:   * RAN4 is occupied with Rel.16 NR\_eMIMO and RAN2 work load is close to critical * RAN2/4 will not start until the last (2) RAN1 meeting(s) before RAN1 freeze with limited TU allocation * Difficult to gauge the required amount of work in RAN2/4 to generate helpful LS response to RAN1 * Inter-WG ping-pong inevitably disrupts RAN1 progress   Proposal: RAN to discuss and (preferably) provide guideline (criteria) for the necessity of LS from RAN1 to RAN2/4 in early phase of Rel.17 NR FeMIMO |

1. Compilation of companies’ inputs: initial round

During the initial round, interested companies are encouraged to share their view on the following:

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| Given the issues with sending LS to RAN2/4 in the early phase of Rel.17 NR FeMIMO WI (e.g. those identified in RP-202300):   * Q1: What general criteria should RAN1 employ to address this problem? * Q2: If an LS is sent by RAN1 to RAN2/4 and the associated amount of required work seems infeasible, how should RAN2/4 respond? |

Table 2 Inputs – initial round

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| **Company** | **View** |
| Samsung | On Q1:   * In general, sending an LS to RAN2/4 in the early phase of FeMIMO is done only when it is extremely necessary. * When a topic involves some RAN2/4 aspects, interested companies can discuss such aspects in RAN1 contributions and consolidate their inputs in RAN1. This also includes gauging the amount of RAN2/4 works involved in providing sufficiently helpful response if an LS is to be sent.   On Q2:   * If the amount of works seems excessive, RAN2/4 may simply respond that at that stage, RAN2/4 cannot provide a response due to the current workload. |
| FUTUREWEI | Q1 and Q2 are simply of normal RAN WG work procedures and the answers to them may not address the issue when RAN2 and RAN4 effort are needed to provide answers to RAN1 questions. The proper solution is to ensure RAN2 and RAN4 enough time with or without TU assigned explicitly to work out the reply to RAN1 LS. |
| Apple | For Q1  RAN1 can be cautious on sending LS to RAN2/4 during the early phase of the FeMIMO.  For Q2  RAN2/4 can reply the LS back to RAN1 indicating the situation that it is exceeding the RAN2/4 bandwidth. Then RAN1 can try to find a solution, or it can be escalated to RAN plenary |
| vivo | In our view, for Q1, it is normal procedure to send LS to relevant WGs based on consensus in RAN1. There are even cases of LS being sent to RAN4 during “study item”.  For Q2, it is up to RAN2/4 how and when to respond. It may have impact on progress of the issue in RAN1 depending on how closely the response(s) from RAN2/4 is related to the specific technique. If the specific issue is not possible to discuss/progress in RAN1 due to lack of input from RAN2/4 then it can be escalated to RAN or it can be discussed in future meetings depending on criticality and completion of WI. |
| ZTE | Q1:  Due to the extremely stressful TU budget in RAN2 and RAN4, and the fact that the start time of RAN2/RAN4 FeMIMO WI is much later than RAN1, an LS out from RAN1 is expected to have large latency in terms of response. Hence we agree with the assessment that RAN1 should send out an LS only when it is extremely necessary, e.g., when it is not possible for RAN1 to find a solution.  Q2:  If so, RAN2/RAN4 should reply that it exceeds the RAN2/RAN4 capacity, and it is encouraged to find a solution in RAN1. |
| OPPO | For Q1:  The information sharing by LS among different WGs are normal work procedures. Meanwhile, RAN1 should carefully consider the workload of RAN2 and RAN4, and try to only send out the “necessary” LS especially in the early phase. For example, without the feedback of the “necessary” LS, RAN1 work cannot move forward.  For Q2:  It is up to the discussion and final decision in RAN2/RAN4 for each LS. For different LS, RAN2/RAN4 may have different actions depending on their evaluation of the corresponding issues. |
| LG | For Q1, we agree with most companies that sending LS from RAN1 to RAN2/4 should be very careful. On the other hand, we see some needs to start RAN2 work as early as possible especially for the support of MTRP BFR, which would require TU allocation for RAN2.  For Q2, RAN2/4 can reply that they cannot provide a response due to the current workload, and may provide the answer later when they have enough TU to discuss that topic. |
| Qualcomm | For Q1: LS should be sent if the continuation of RAN1 work is dependent on information received from other WGs, where providing the information is not in RAN1’s expertise.  For Q2: Other WGs can always respond with stating that immediate response is not possible and stating when response may be provided. |
| CATT | Q1: Sending LS to RAN2/RAN4 should only be considered when an official reply is needed for RAN1 to progress. Otherwise if the purpose is to notify about RAN1 decision or collect non-official information that can addressed internally within each company, LS should be avoided (until RAN2/RAN4 TU/workload frees up).  Q2: RAN2 can always reply that the amount of work is infeasible based on their schedule. |
| Nokia | Q1: RAN should not limit cross-WG communications. Instead sufficient TUs should be allocated to the RAN WGs like RAN2, which need to work with the given WID like feMIMO. In our view feMIMO work should start earlier in RAN2 and RAN4 and needed TUs should be added to RAN2 and RAN4 so that they can provide needed answers to RAN1 and also start their work sufficiently early. In Rel-16 RAN2 work on eMIMO was started far too late, which created lots of challenges for stable specification finalization.  Q2: If a work item is approved in 3GPP RAN, it is necessary that all RAN WGs have TUs to address questions and issues in their areas. No new items or objectives should be considered before it is ensured that there are sufficient amount of TUs for the existing items and objectives. |
| Huawei | Q1: It is fully up to RAN1 to decide whether a LS is needed for RAN2/4 to seek RAN2/RAN4 guidance, if extra RAN2/RAN4 information is considered to be necessary for further RAN1 design/discussion. There is no restriction about whether/when RAN1 can send a LS to other WGs, from RAN perspective. RAN1 can continue as usual.  Q2: It is fully up to RAN2/4 to consider whether associated amount work for replying LS is feasible without dedicated TU. If RAN1 has concerns about RAN2/RAN4 workload of replying LS, related question can be asked in that LS and trigger RAN2/4 TU discussion/update for FeMIMO in RAN as soon as possible. |
| Ericsson | We share the same view as Qualcomm and Nokia.  However, understanding the issues that caused this discussion, some improvements in FeMIMO with respect to LS would help the efficiency of the work (although it is nothing different than business as usual and does not need a RAN plenary conclusion or guidance to enforce.)  Examples could be that for an issue in hand, first each company internally seeks the status across different working groups. Then the LS from RAN1, if needed, should be specific and clear on questions such that the response, would help the progress across different WGs. |
| RAN2 Chairman | The sending group need to determine the need for requesting information from another group, and the sender do not need to take into account the state in the other group. For R17 LSes sent to RAN2, RAN2 will handle these LSes with high priority to not stall work in other groups, regardless if TUs are allocated or not, within reasonable limits. If the LSes in fact represent work that RAN2 anyway need to do, sooner or later, it is not wasteful to do this work sooner if needed by other group. RP TU budget principles allows some flexibility for the chairman to do such prioritization on need basis.  For eMIMO, RAN2 likely can support clear decisions on changes in signaling (RRC config, RRC UE caps, MAC CE) without extensive need for discussion. However, MAC is the most controversial TS in R2 so any change to BFD/BFR on procedure level may require discussion. Changes related to Acquisitions of Common channels, measurements and mobility, if any, may also require some time for convergence in R2. |

1. Compilation of companies’ inputs: intermediate-1 round

During the initial round, interested companies are encouraged to share their view on the proposed way forward (after the initial round), cf. section 4:

Table 3 Inputs – intermediate-1 round

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| **Company** | **View** |
| Comments on WF 1 | |
| vivo | The proposed way forward is reasonable, in our view, this is the normal process. We don’t see necessity for additional measure in RAN1 since whether is LS to other WGs is agreed based on consensus in all WIs. For additional TU is RAN2/4 can be discussed separately in TU budget discussion which is in discretion of relevant chairpersons.  [Moderator] The sub-bullet of bullet 1 has been removed. |
| Xiaomi | The WF is fine with us. We think it should be fully up to RAN1 if guidance from other WGs is needed for RAN1 discussion/decision which is not RAN1’s expertise. And we don’t see the need to add additional restrictions to RAN1 procedures for sending LS to other WGs.  Besides, the early startup of RAN2/RAN4 TU would be helpful for the current RAN1 MIMO discussions.  [Moderator] The sub-bullet of bullet 1 has been removed. |
| Qualcomm | We agree with the first two main bullets of the Way Forward, although somewhat puzzled why an endorsement of this is needed.  Would like to add that as part of normal operating procedures, LS can be also sent simply to inform other groups about progress or decisions; however, typically this is infrequent in the early phase of a WI, so it is ok not to mention this here specifically.  As for the last bullet point of the proposed Way Forward, cannot really connect it to any of the initial round of discussions or comments. This looks like requiring a bit more discussion.  [Moderator] The last bullet point is to address initial comments from, e.g. LG, Nokia, and intermediate comments from, e.g. Xiaomi, Samsung. Please also see the comment for Intel below. |
| Intel | We don’t think any formal conclusion is needed on this issue. RAN1 has enough expertise to decide when and which LS should be sent to other WGs.  [Moderator] Given the somewhat growing tendency to propose sending LS to RAN2/4 (at least observable from the previous 2 RAN1 meetings), some conclusion (albeit its generic nature) can be beneficial at least to raise some awareness on the issue.  In addition, possible discussion on TU adjustment should be made as part of SR for WID based on the progress in WGs. No need to have conclusion on this neither since overall progress is good at this point.  [Moderator] The proposal is to discuss in RAN#91, not to agree on any extension. As pointed out by LG and, to some extent, the RAN2 chairman, an agreement on mTRP beam management involving MAC CE may require an early start in RAN2. Nokia also argued for starting RAN2/4 work earlier based on the experience in Rel.16. So the proposal for discussing this matter in RAN#91 is reasonable and proper. |
| Nokia | In our view RAN does not need or even should decide any new procedures for LS sending or LS responding. All working groups involved with a given work item like FeMIMO should have enough TUs and sufficiently early requested by the rapporteur and then hopefully also added to the given RAN WG like RAN4 and RAN2. Therefore, in our view the WF requires further discussion.  [Moderator] The sub-bullet of bullet 1 has been removed. |
| LG | On the need for additional measure, we think that it can be controlled by RAN1 chairman so seems not needed to be defined. The chairman can determine whether the LS is necessary or not.  On the TU allocation for RAN2/4, regardless whether or not this can be discussed/decided in this thread, we support starting RAN2/4 work earlier for timely completion of Rel-17 specification. As noted by RAN2 chairman, MTRP BFR to be introduced in Rel-17 would need some time for RAN2. |
| Samsung | We also see some benefit in starting the Core work earlier at least in RAN2. This can be discussed in RAN#91 as suggested by the moderator. In addition, whether some additional TUs are needed in RAN2/4 to start the Core work earlier can be discussed in RAN#91. |
| Intel2 | On the first two bullets. We still don’t see necessity of the formal conclusion on this topic as it looks micromanagement from RANP.  [Moderator] The two bullets are intended to foster discipline by reminding the group of the (otherwise) common working procedure regarding when to send an LS to avoid repeating unnecessary discussion.  Regarding TU discussion in third bullet. This should be handled using normal procedures using SR report based on the actual progress in other WGs. This is a common practice in RAN1 and it is not clear why feMIMO should be exception. |
| OPPO | We are fine with the first two bullets, which are just an echo of normal 3GPP procedure. Regarding the 3rd bullet, we are ok with the 1st sub-bullet, but suggest to remove the 2nd sub-bullet as below. Since the work of feMIMO has not been started in RAN2 and RAN4, it is premature to discuss whether the TU originally scheduled before is sufficient or not.  ~~Whether to increase TU allocation in RAN2/4~~ |
| ZTE | We are generally okay with the first two main bullets. For the third one, we think it can be discussed together with general TU allocation for RAN2/4 in next RAN plenary following normal procedure for all items. There seems no need to explicitly mention this as a conclusion for FeMIMO. |
| Ericsson | On the first and second bullets, we are puzzled what additionally can be communicated to WG except to respect the common working procedures.  [Moderator] The two bullets are intended to foster discipline by reminding the group of the (otherwise) common working procedure regarding when to send an LS to avoid repeating unnecessary discussion.  On the third bullet, we think it is not necessary. RAN2/RAN4 have already allocated TUs. Of course, if refinement is needed, companies can raise issue in RAN#91. But we don’t think it is mature based on this discussion, to have a commitment as a group for this discussion. |
| Huawei | In general, we don’t need new explicit rules in agreement from RAN about how to handle LS since it is up to corresponding WGs and there are already good practices on sending and handling LS in WGs. So the first two bullets are not needed and should not be approved.  [Moderator] The two bullets are intended to foster discipline by reminding the group of the (otherwise) common working procedure regarding when to send an LS to avoid repeating unnecessary discussion.  We are open to the third bullet which can be discussed in RAN meetings as usual.  [Moderator] Since several companies voiced some concern on this bullet, it has been removed. This matter can be discussed in RAN#91 regardless. |
| Comments on WF 2 | |
| Qualcomm2 | Thank you for the explanation above. We think it is better not to set a goal of TU or schedule adjustments right now. Consequently, we prefer Way Forward 2 and we are ok with it. |
| Intel3 | Regarding updated wording for WF#2:  We are wondering whether RAN1 could also send LS that would be required to complete work in other WGs? Current wording seems only mentions issues related to RAN1 work, but not other WGs.  [Moderator] Correct. The WF proposal is not intended to address the LS (or LS reply) sent by RAN1 to inform works needed in RAN1, or works needed in RAN2/4 as an outcome of RAN1 agreements. This is not an issue, at least from the perspective of RP-202300, since it does not involve any additional work in RAN2/4 in generating an LS response to RAN1 which necessitates RAN1 having to halt any work before RAN2/4 responds.  Note that the WF proposal is not intended to preclude every such instance. It is simply to foster discipline so that during the *early phase* of the WI, such LS is sent (from RAN1 to RAN2/4) only when necessary. |

1. Summary and moderator proposals

During the initial round, based on the collected inputs in section 2, the following **observation** can be made:

On sending LS to RAN2/4 in the early phase of Rel.17 NR FeMIMO WI:

* From RAN1 side, most companies opined that RAN1 send an LS to RAN2/4 only when it is necessary to further/complete the work in RAN1. Whether this is the case is to be (fully) decided by RAN1 itself.
  + Among these companies, several companies explicitly mentioned that additional measures can be beneficial, e.g. first, each company internally seeks the status across different working groups and, later, consolidate their inputs in RAN1 to see if an LS needs to be composed.
* From RAN2/4 side, whether to respond to the LS(s) from RAN1 on this matter is to be (fully) decided by RAN2/4 themselves.
  + For a given LS, RAN2/4 always have an option to state that an immediate response is infeasible and, in addition, indicate when such response can be made.
  + Note: RAN2 chairman indicated that RAN2 would treat LS(s) received from RAN1 “with high priority to not stall work in [RAN1], regardless if TUs are allocated or not, within reasonable limits”
* Several companies mentioned the possibility of starting RAN2/4 work considerably earlier – not only to facilitate RAN2/4 to respond to potential LS(s) from RAN1, but also to start the needed RAN2/4 work on RAN1 agreement(s)
  + This implies that additional TU allocation for RAN2/4 may be needed.

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| **Proposed way forward 1 (after the initial round)**:  On sending LS to RAN2/4 in the early phase of Rel.17 NR FeMIMO WI:   * From RAN1 side, most companies opined that RAN1 send an LS to RAN2/4 only when it is necessary to further/complete the work in RAN1. Whether this is the case is to be (fully) decided by RAN1 itself   + Further discuss if additional measures in RAN1 can be employed * From RAN2/4 side, whether *or how* to respond to the LS(s) from RAN1 on this matter is to be (fully) decided by RAN2/4 themselves * Further discuss and decide in RAN#91 whether to start RAN2/4 work considerably earlier, with the possibility to increase TU allocation in RAN2/4 for Rel.17 NR\_FeMIMO WI |

After the intermediate-1 round, based on the collected inputs in section 3 on the proposed way forward 1, the proposed way forward is revised as follows:

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| **Proposed way forward 2 (after the intermediate-1 round)**:  On sending LS to RAN2/4 in the early phase of Rel.17 NR FeMIMO WI:   * From RAN1 side, sending an LS to RAN2/4 is done only when it is necessary to further/complete the work in RAN1. Whether this is the case is to be (fully) decided by RAN1 itself. * From RAN2/4 side, whether or how to respond to the LS(s) from RAN1 on this matter is to be (fully) decided by RAN2/4 themselves. |

After the intermediate-2 and final rounds, based on the collected inputs in section 3 and email discussion on the proposed way forward 2, the proposed way forward is revised as follows (now termed ‘proposed recommendation’):

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| **Proposed recommendation**:  For Rel.17 NR FeMIMO WI, in order to improve the work flow among different working groups, companies are encouraged to increase attention to exercise according to the common underlying principles when exchanging LSs – that is, to properly investigate the necessity of sending an LS as well as, if an LS is sent, to provide the corresponding content carefully.   * Consequently, from RAN1 side, sending an LS to RAN2/4 for the purpose fo soliciting feedback is done when it is necessary to further/complete the work in RAN1. Whether this is the case is to be (fully) decided by RAN1 itself. |

# References

1. RP-202300 On workflow for further enhancements on MIMO for NR Samsung
2. RP-202024 Revised WID: Further enhancements on MIMO for NR Samsung