**3GPP TSG-RAN WG2 Meeting #131 R2-250xxxx**

**Bangalore, India, 25th – 29th Aug. 2025**

**Source: vivo**

**Title: Discussion summary and list of RLC open issue for R19 XR**

**Agenda Item: 8.7.1**

**Document for: Discussion and Decision**

1. Introduction

This document summarizes the discussion of the following email discussion and collects the RLC open issues for XR Enhancements according to the following email discussion.

* [POST130][508][XR] RLC running CR and open issues (vivo)

 Scope:

* Update and review the CR
* List open issues related to the CR

 Intended outcome:

* Running CR for endorsement in the next meeting
* List of open issues for discussion at the next meeting

 Deadline: Long

Companies are invited to provide comments/additional open issues in the below table by 31st July, 2025.

# Contact information

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# Discussion

* 1. Open issue list

**Rapporteur provides the list of open issues as below, and the corresponding suggestions on how to address them. Some of them could be further discussed based on contributions or resoved based on further progress. Companies are invited to provide comments on whether it is open issue and whether the suggestions from reapporteur is accuracy enough.**

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| **Company** | **Comments, if any** |
| Apple | For RLC-11, we think the open issue can have a sub-question for companies to consider:FFS how to handle the case “ if there are only SDUs buffered whose transmissions have been stopped due to discard indication from PDCP, there is no SDU to retransmit the poll with”* Whether/If the UE needs to continue to run *t-PollRetransmit* when it already knows the status of all RLC SDUs (either positively/negatively acknowledged, or discarded) up to POLL\_SN.

**[Rapp] OK. This is also one possible option, e.g. stopping *t-PollRetransmit*. This issue can be used as a reference for companies when preparing contributions.** |
| Nokia | RAN2 agreement was: * **(RLC-6) There is no specification impact foreseen for RLF triggering due to RLC maximum retransmission.**

Reading and considering this rigorously, we do not think this warrants the closing of the below open issue RLC-6 yet.  |
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### Closed open issues

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| **Index** | **Issue description** | **Status** |
| RLC-1 | **Terminology for avoiding unnecessary retransmission, e.g. “obsolete”, or “outdated”, or “discard”** | **Closed** |
| RLC-2 | **whether further changes are needed for SR triggered by t-RxDiscard expires.** | **Closed** |
| RLC-3 | **whether use the terminology of “autonomous retransmission” or others.** | **Closed** |
| RLC-4 | **whether merge the autonomous retransmission procedure in clause 5.x into 5.3.2 or capture it separately.** | **Closed** |
| RLC-5 | Editor’s Note: Same as PDCP open issue: it is FFS which delay-reporting RLC data volume shall consider RLC data PDUs to be retransmitted.Editor’s Note: It is FFS which delay-reporting RLC data volume shall consider STATUS PDU to be transmitted. | **Closed** |
| RLC-6 | Editor’s Note: FFS whether there are any RLF detection impacts when avoiding unnecessary retransmissions is introduced.  | **Closed** |
| RLC-7 | Editor’s Note: It is still open how Autonomous Retransmission coexists with ARQ procedures, i.e. whether/how to increment the RETX\_COUNT for Autonomous Retransmission. | **Closed** |
| RLC-8 | Editor’s Note: It is still open on how to avoid excessive polling for the polling enhancement, e.g. only one polling or multiple.  | **Closed** |
| RLC-9 | Editor’s Note: FFS whether/what additional conditions are needed to prevent too early and/or unnecessary retransmission due to polling enhancement. | **Closed** |

### DSR enhancements

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| **Index** | **Issue description** | **Rapporteur suggestion** |
| RLC-13 | Whether the delay-reporting or non-delay-reporting information is visible or not to RLC?**[Rapp]: This is related to how to capture DSR in RLC.**  | **Issue Type:** Not essential not important**How to address it:** discuss in next round of running CR review.  |

### Avoid unnecessary RLC retransmissions

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| **Index** | **Issue description** | **Rapporteur suggestion** |
| RLC-10 | Whether/How to introduce any limitations or associations for the configuration of stopReTxObsoleteSDU and DL t-RxDiscard.* As raised by ZTE below
 | **Issue Type:** Not essential not important**How to address it:** based on companies’ contribution |
| RLC-11 | FFS how to handle the case “ if there are only SDUs buffered whose transmissions have been stopped due to discard indication from PDCP, there is no SDU to retransmit the poll with”* As raised by Nokia and Apple below

RAN2 agreement in #130 meeting:* Working assumption: (RLC-11) No need to address window stalling issue with polling retransmission (TBC next meeting)
* Assumption from companies is that this should not happen due to SR triggering from Rx side, but it needs to be checked whether this will always work
 | **Issue Type:** Not essential but important**How to address it:** based on companies’ contribution |
| RLC-14 | If *stopReTxDiscardedSDU* is configured, when indicated from upper layer to discard a particular RLC SDU, whether the transmitting side of an AM RLC entity shall discard the corresponding RLC SDU or RLC SDU segment(s) if the RLC SDU or the RLC SDU segment(s) thereof has been submitted to lower layers. As raised by NEC below | **Issue Type:** Not essential not important**How to address it:** based on companies’ contribution |

### Ensure timely RLC retransmissions

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| **Index** | **Issue description** | **Rapporteur suggestion** |
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### Rel-18 leftovers

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| **Index** | **Issue description** | **Rapporteur suggestion** |
| RLC-12 | FFS how to handle PDCP SN gap report handling during UE mobility* As raised by Qualcomm below. The corresponding Rel-18 agreement is:
* RAN2 can discuss in the context of Rel-19 whether this problem is a critical problem to solve due to RLC enhancements. If it is a problem further discussions are needed on the alternatives.
 | **Issue Type:** Not essential not important?**How to address it:** based on companies’ contribution |

* 1. Others, please specify

Companies are invited to describe any other identified open issues not currently included within this document.

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| **Company** | **Other identified open issues? (please describe) or other comments** |
| Sharp | Whether the delay-reporting or non-delay-reporting information can be invisible to RLC?As we commented in the RLC running CR, it is benifical to not distinguish delay-reporting RLC SDU and non-delay-reporting RLC SDU in RLC spec. RLC can rely on current delay reporting indication from PDCP to evaluate RLC data volume. For example, if dsr-ReportNonDelayCriticalData is configured, PDCP indicates both delay-reporting PDCP SDUs and non-delay reporting PDCP PDUs as the delay-reporting RLC SDUs associated with the i-th dsr-ReportingThreshold. Otherwise, PDCP only indicates the delay-reporting PDCP SDUs as the delay-reporting RLC SDUs associated with the i-th dsr-ReportingThreshold. We see that the delay-reporting or non-delay-reporting information can be invisible to RLC, and all the description related to non-delay reporting RLC SDU can be removed. **[Rapp] A new open issue is added, i.e. RLC-13, to check companies’ views.**  |
| Sony | How to speed up the time-critical status report (SR) at Rx side seems an open issue.From Rx side, when polling information is received, the speed of the status report (SR) depends on number of parameters: t-Reassembly, t-StatusProhibit timers. We think after Rx side receives polling information for the time-critical SDU(s), the Rx side should bypass/ignore the t-Reassembly timer for any SDU or segments of SDU if the t-Reassembly timer is running when generating status report.**[Rapp] This issue was raised by several (3?) companies in last RAN2 meeting. Rapporteur suggests companies to propose it in their contributions.**  |
| Huawei, HiSilicon | Unnecessary retransmission avoidance:The running CR should consider the case that when the discard indication is received after the associated RLC SDU (segment) has been pending for retransmission. According to ccurent running CR, the RLC SDU (segment) pending for retransmission will be counted in BSR/DSR reporting.**[Rapp] According to the current running CR. When the discard indication is received after the associated RLC SDU (segment) has been pending for retransmission, the RLC SDU/SDU segment(s) are not considered for tx or retx as specified in 5.2.3.1.1 as below:***when indicated from upper layer to discard a particular RLC SDU (see TS 38.323 [4]) , the transmitting side of an AM RLC entity shall not consider the corresponding RLC SDU or RLC SDU segment (s) for transmission or retransmission.* **While in BSR/DSR data volume calculation, only the data PDU pending for tx or retx will be counted into.****I assume the current running CR already considered this case. Otherwise, further comments are welcome.** [HW] Thanks for response. “consider for retransmission” and “pending for retransmission” are 2 stages: packet is firstly identified as need for retransmission (i.e., consider for retransmission), then be processed and get ready for retransmission (i.e., pending for retransmission). Above text you meantioned is unclear enough to us, it seems only cover the statement for “consider” stage, we are wondering how to handle the data at “pending” stage. For this we would like to see a clearer clarification as:If *stopReTxDiscardedSDU* is configured, when indicated from upper layer to discard a particular RLC SDU (see TS 38.323 [4]), the transmitting side of an AM RLC entity shall not consider the corresponding RLC SDU or RLC SDU segment(s) which are considered or pending for transmission or retransmission.**[Rapp2] The running CR is updated based on Ofinno’s comment. Suppose it is clear enough.**  |
| Huawei, HiSilicon | Polling triggering:The remaining time based polling triggering in current running CR relies on the prerequisite that there is AMD PDU to transmit. The case that the remaining time based polling triggering indication is received and there is no available AMD PDU to transmit should also be considered.**[Rapp] This was discussed online, and it was addressed in the running CR (same response on the running CR comments).** [HW]: 5.3.3.4 is for “Expiry of *t-PollRetransmit”*, we don’t think “Expiry of *t-PollRetransmit”* clause can cover the remaining time based polling but no AMD PDU for transmission case **[Rapp2] Please find the response in the running CR.** |
| NEC | **Propose to discuss:** Whether we should discard SDUs whose (re)transmission has stopped (even though their transmissions were attempted).According to Section 5.4 on SDU discard procedures, RLC SDUs that have been submitted to the lower layer cannot be discarded. However, with RLC AM enhancement, when their transmissions are stopped:* There is no need to buffer them, and
* It is neither necessary nor possible to avoid an RLC SN gap.

*When indicated from upper layer (e.g. PDCP) to discard a particular RLC SDU, the transmitting side of an AM RLC entity or the transmitting UM RLC entity shall discard the indicated RLC SDU, if neither the RLC SDU nor a segment thereof has been submitted to the lower layers. The transmitting side of an AM RLC entity shall not introduce an RLC SN gap when discarding an RLC SDU.***[Rapp2] Considering this issue has not been explicitly discussed, one more open issue is added, i.e. RLC-14** |
| NEC | **Propose to discuss:**Should RLC SDUs or RLC SDU segments that have been NACKed (in addition to those ACKed) be excluded from triggering remaining-time-based RLC polling?The condition check for triggering remaining-time-based RLC polling is currently specified in the PDCP layer. ACKed PDCP PDUs (i.e., those confirmed to have been successfully delivered) are excluded from triggering polling. We believe that NACKed PDUs should also be excluded.If both ACKed and NACKed PDUs are excluded, this condition check might need to be moved to the RLC specification, as only the RLC layer has knowledge of the NACKed status.*For the purpose of remaining-time-based RLC polling, if the remaining time till discardTimer expiry becomes less than the remainingTimeBasedPollingThreshold for the PDCP SDU for which the corresponding PDCP Data PDU has already been submitted to lower layers* *but for which successful delivery has not been confirmed by lower layers, the transmitting PDCP entity shall:**- indicate to lower layers that the condition for remaining-time-based RLC polling is met for the corresponding PDCP Data PDU.***[Rapp2] As RAN2 has agreed to determine the triggering in PDCP, I assume there is no problem, even there is polling triggered for NACKed SDU/Segment.**  |
| Nokia | * **FFS how to minimize timer-based retransmissions by enabling more frequent provisioning of ACKs without the cost of premature NACKs.**
* **FFS whether/how timer-based retransmissions are reported in BSR.**
* **FFS how the transmitting PDCP reliably knows how high-numbered PDCP SDUs it can proceed to transmit, when RLC ACK no longer necessarily indicates successful deliver**
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# Conclusion

In this contribution, we collect the open issues for XR enhancements in RLC. Based on the discussion, the following proposals have been achieved:

**Other open issues:**

**Proposal 1: RAN2 to consider the above open issues related to RLC for XR: RLC-10 to RLC-14.**

# References

1. R2-25xxxx, RLC running CR for R19 XR, vivo