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

**Bengaluru, India, August 25, – August 29, 2025**

**Agenda item:**8.7.1 (NR\_XR\_Ph3-Core)

**Source:** LG Electronics

**Title:** Discussion of [POST130][507][XR] PDCP running CR and open issues (LGE)

**Document for:** Report

# 1. Introduction

This document summarizes the discussion of the following offline discussion.

* [POST130][507][XR] PDCP running CR and open issues (LGE)

 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

# 2. Contact information

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# 3. Comments to the PDCP running CR v00

Companies are invited to list their comments on v01, using comment identifier (company ID and number), e.g. LGE001. The rapporteur will provide update based on the comments in proper time.

|  |  |  |  |
| --- | --- | --- | --- |
| Comment identifier | Section | Comments and/or change suggestions | Rapporteur resolution |
| CATT001 | 3.1 | **PDU Set remaining time**: the shortest remaining time till *discardTimer* expiry among the PDCP SDUs belonging to the PDU Set.We think the description on “ A among B “, A and B should be the objects in the same level. Similar description in TS 38.3223 is as below. Hence it is suggested to revised it as :**PDU Set remaining time**: the shortest remaining time till *discardTimer* expiry among the **remaining time of** PDCP SDUs belonging to the PDU Set.------------------------------------------------------------------------------ compile a PDCP SN gap report as indicated below by:- setting the FDC field to the smallest COUNT value among the COUNT values associated with the discarded PDCP SDU(s); | Thanks. Included in v01. |
| FW001 | 5.x | In both paragraphs, “if the remaining time till *discardTimer* expiry becomes less than the [xxx] for the PDCP SDU for which the corresponding PDCP Data PDU has already been submitted to lower layers”, between the time that the PDU is submitted to lower layers and the moment that the “if” condition is satisfied, it is possible that the PDU has been delivered successfully by lower layers and the successful delivery has been confirmed by lower layers (e.g., by indication). The question is for such PDU whether we still want to the PDCP entity to indicate to lower layers that the condition for remaining-time-based auto-retx or polling is met. If not, maybe we can change the above highlighted text to the following:for which the corresponding PDCP Data PDU has already been submitted to lower layers and for which successful delivery has not been confirmed by lower layers | Thanks. Included in v01 with slight modification (and 🡪 but). |
| V001 | 5.15 | For the purpose of single entry MAC delay status reporting, the transmitting PDCP entity shall consider the following as delay-critical PDCP data volume:…For the purpose of multiple entry MAC delay status reporting, the transmitting PDCP entity shall evaluate the delay-reporting PDCP data volume in ascending order of *dsr-ReportingThreshold*, and consider the following as delay-reporting PDCP data volume associated with the i:th *dsr-ReportingThreshold*: | Thanks. Included in v01. |
| **Put your comments in the next section** |

# 4. Comments to the PDCP running CR v01

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| --- | --- | --- | --- |
| Comment identifier | Section | Comments and/or change suggestions | Rapporteur resolution |
| OF001 | 5.x | To be consistent between two conditions:…* indicate to lower layers that the condition for remaining-time-based RLC polling is met for the corresponding PDCP Data PDU.
 | Thanks. Included in v02. |
| SS001 | 3.1, 5.15 | As in present definition of non-delay-reporting PDCP SDU, it is not uniquely associated with i:th *dsr-ReportingThreshold* and therefore, it is suggested to append as below to make it distinct and definite.**Non-delay-reporting PDCP SDU**: a non-delay-reporting PDCP SDU associated with the i:th *dsr-ReportingThreshold* is a PDCP SDU that will be transmitted prior to any of the delay-reporting PDCP SDUs associated with the i:th *dsr-ReportingThreshold* but not prior to any of the delay-reporting PDCP SDUs associated with the i-1:th *dsr-ReportingThreshold*.Further, if definition for non-delay-reporting PDCP SDU is specified as above, the procedural part can be simplified (yellow highlighted text can be omitted)If *dsr-ReportNonDelayCriticalData* is configured, the transmitting PDCP entity shall further consider the following as delay-reporting PDCP data volume associated with the i:th *dsr-ReportingThreshold*:- the non-delay-reporting PDCP SDUs associated with the i:th *dsr-ReportingThreshold* for which no PDCP Data PDUs have been constructed, and are not considered as delay-reporting PDCP data volume associated with any of the k:th *dsr-ReportingThreshold* where k < i;- the PDCP Data PDUs that contain the non-delay-reporting PDCP SDUs associated with the i:th *dsr-ReportingThreshold* and have not been submitted to lower layers, and are not considered as delay-reporting PDCP data volume associated with any of the k:th *dsr-ReportingThreshold* where k < i.[Xiaomi] Have some sympathy for that.We can move the highlighted part to the definition part to solve Samsung’s concern.**Non-delay-reporting PDCP SDU**: a non-delay-reporting PDCP SDU associated with the i:th *dsr-ReportingThreshold* is a PDCP SDU that will be transmitted prior to any of the delay-reporting PDCP SDUs associated with the i:th *dsr-ReportingThreshold* and are not considered as delay-reporting PDCP data volume associated with any of the k:th *dsr-ReportingThreshold* where k < i; | The text ‘and are not considered as delay-reporting PDCP data volume associated with any of the k:th *dsr-ReportingThreshold* where k < i’ is also present in delay-reporting PDCP SDU. Thus, if the text in non-delay-reporting PDCP SDU is moved to the definition section, the text in delay-reporting PDCP SDU also needs to be moved to the definition section. Then, following change is also needed.**Delay-reporting PDCP SDU**: if *pdu-SetDiscard* is not configured, a delay-reporting PDCP SDU associated with the i:th *dsr-ReportingThreshold* is a PDCP SDU for which the remaining time till *discardTimer* expiry is less than the i:th *dsr-ReportingThreshold* and larger than or equal to the i-1:th *dsr-ReportingThreshold* (if i>1) or larger than zero (if i=1). If *pdu-SetDiscard* is configured, a delay-reporting PDCP SDU associated with the i:th *dsr-ReportingThreshold* is a PDCP SDU belonging to a PDU Set of which the PDU Set remaining time is less than the i:th *dsr-ReportingThreshold* and larger than or equal to the i-1:th *dsr-ReportingThreshold* (if i>1) or larger than zero (if i=1), and is not considered as delay-reporting PDCP data volume associated with any of the k:th *dsr-ReportingThreshold* where k < i. However, at this moment, I’m not 100% sure there is no functional change.So, let’s keep it for now, and discuss as an open issue at the next meeting.  |
| N001 | 5.x | [Editorial] In the last bullet point, ‘the’ is missing :- indicate to lower layers that the condition for remaining-time-based RLC polling is met for the corresponding PDCP Data PDU. | Resolved by OF001. |
| N002 | 5.15 | Regarding "For the purpose of MAC delay status reporting,", it would be good to clarify if it is for single entry or multiple entry, similar to RLC running CR ? One in the first paragraph: For the purpose of MAC single entry delay status reportingOne in the third paragraph: For the purpose of MAC multiple entry delay status reporting | Already implemented in v01. |
| N003 | 3.1 | On definition of Non-delay-reporting PDCP SDU: a non-delay-reporting PDCP SDU associated with the i:th *dsr-ReportingThreshold* is a PDCP SDU that will be transmitted prior to any of the delay-reporting PDCP SDUs associated with the i:th *dsr-ReportingThreshold*I believe the use of the word 'any of' in the definition is intended to clarify that a non-delay-reporting PDCP SDU does not include any of the delay-reporting PDCP SDU associated with the same threshold. However, a PDCP SDU itself does not explicitly exclude SDUs that are themselves a delay-reporting PDCP SDU associated with the i-th threshold. So, the delay-reporting PDCP SDU might also be considered as the non-delay-reporting PDCP SDU.For example, if SDU 5, 6, 7 are delay-reporting PDCP SDUs of i-th threshold, 5 could also be considered as non-delay-reporting PDCP SDU since SDU 5 is prior to SDU 6 and 7. Our suggestion is to add ‘and is not a delay-reporting PDCP SDU associated with the i:th *dsr-ReportingThreshold*’ at the end of the definition.[Xiaomi] Agree with the intension.Or maybe we can change to:On definition of Non-delay-reporting PDCP SDU: a non-delay-reporting PDCP SDU associated with the i:th *dsr-ReportingThreshold* is a PDCP SDU that will be transmitted prior to ~~any~~ the first of the delay-reporting PDCP SDUs associated with the i:th *dsr-ReportingThreshold*[Nokia] Replacing ‘any’ by ‘the first’ would not work, as an SDU can be a non-delay reporting only if it will be transmitted prior to all delay-reporting PDCP SDUs associated with the same reporting threshold. For example, assume we have 4 SDUs - 1, 2, 3, and 4; where 2 and 4 are delay-reporting PDCP SDUs. Using ‘the first’ will exclude 3 from non-delay-reporting PDCP SDU as it is not prior to SDU 2, which is incorrect. | Thanks. I added a simplified text in v02 at the end of the definition, ‘and that is not a delay-reporting PDCP SDU’. |
| Sharp001 | 3.1, 5.15 | Same as SS001 and we share Samsung’s view. | See the comments to SS001. |
| Xiaomi001 | 3.1 | **Non-delay-reporting PDCP SDU**: a non-delay-reporting PDCP SDU associated with the i:th *dsr-ReportingThreshold* is a PDCP SDU that will be transmitted prior to any of the delay-reporting PDCP SDUs associated with the i:th *dsr-ReportingThreshold*Back to previous discussion, our original intention is to avoid the over specifying and capture the non-delay critical data that are ahead of delay critical data in the buffer as agreed.**“The UE may also support including non-delay critical data ahead of delay critical data in the buffer size calculation for DSR, which is a capability indicated to the NW.”**It does not mean that the non-delay critical data will be transmitted first.If we do this way, then the UE shall assign resource for the non-delay critical data first which is contradict with what we have agreed that we will not consider intra-LCH Prioritization.Suggested change to:**Non-delay-reporting PDCP SDU**: a non-delay-reporting PDCP SDU associated with the i:th *dsr-ReportingThreshold* is a PDCP SDU that ~~will~~ might be transmitted prior to any of the delay-reporting PDCP SDUs associated with the i:th *dsr-ReportingThreshold* | I don’t agree with your comments. The non-delay-reporting PDCP SDUs are considered as delay-reporting PDCP data volume if *dsr-ReportNonDelayCriticalData* is configured. In this case, the non-delay-reporting PDCP SDUs will be transmitted prior to the delay reporting PDCP SDUs. |
| (Open Issue)-SS001  | 5.16.1 | 5.16.1 Transmit operationFor UM DRBs and AM DRBs configured by upper layers to send a PDCP SN gap report in the uplink (*sn-GapReport* in TS 38.331 [3]), the transmitting PDCP entity shall trigger a PDCP SN gap report when:- PDCP SDU(s) are discarded as specified in clause 5.3; and- there is at least one stored PDCP SDU(s) which is associated with a COUNT value larger than the COUNT value associated to the discarded PDCP SDU(s); and- the discarded PDCP SDU(s) have not been submitted by any RLC entity to lower layers.In legacy R18, upon receiving a discard indication for a RLC SDU from PDCP, a RLC SDU is either fully submitted to lower layer, or fully discarded at RLC (when no segment is submitted to lower layer).With R19 AM RLC enhancements (i.e. *stopReTxDiscardedSDU*), we can have a new scenario where an RLC SDU has been incompletely submitted (in the form of SDU segment) to the lower layer, when becomes obsolete upon receiving the discard indication from PDCP. Such SDUs will never be delivered to the receiving PDCP entity, and end up with being discarded at the receiving side of AM RLC entity after *t-RxDiscard* expiry. However, based on the legacy triggering conditions of PDCP SN gap report, there will be no report triggered for such SDUs, and hence, the receiving PDCP entity has no chance to know about the discard status for such incompletely submitted SDUs. This causes the reoderering delays to creep in. Therefore, with R19 AM RLC enhancements in place, we have an issue about the highlighted legacy phrase “the discarded PDCP SDU(s)” in the third condition as it does not address the new scenario. More precisely, for R19 specifications, the third condition should be enhanced to “**at least one byte for the discarded PDCP SDU(s) have not been submitted by any RLC entity to lower layers**” while triggering a PDCP SN gap report. The benefit is that the PDCP SN gap report can early and accurately notify more discard information to the peer receiving PDCP entity and it will prevent unnecessary re-ordering delay. In our view, it is worthwhile that this issue is considered an open issue and companies can discuss in next meeting. | I move it to open issue. |

# 5. Open issues

Based on the discussion, following open issues are identified.

**PDCP-1 (Editorial)**

Whether the text “and are not considered as delay-reporting PDCP data volume associated with any of the k:th *dsr-ReportingThreshold* where k < i” needs to be moved to the definition section for both delay-reporting PDCP SDU and non-delay-reporting PDCP SDU.

**PDCP-2**

Whether the PDCP triggers a PDCP SN gap report when at least one byte for the discarded PDCP SDU(s) have been submitted by any RLC entity to lower layers.