3GPP TSG-RAN WG2 #130 R2-250xxxx

**St. Julians, Malta, May 19 – May 23, 2025**

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

**Source:** LG Electronics

**Title:** Discussion of [POST129bis][504][XR] PDCP running CR (LGE)

**Document for:** Report

# 1. Introduction

This document summarizes the discussion of the following offline discussion.

* [POST129bis][504][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: April 29, 10:00 UTC

# 2. Contact information

|  |  |  |
| --- | --- | --- |
| Company | Name  | E-mail |
| LG Electronics | SeungJune Yi  | seungjune.yi@lge.com |
| OPPO | Zhe Fu | fuzhe@OPPO.com |
| Huawei, HiSilicon | Seau Sian Lim | seau.sian.lim@huawei.com |
| ZTE | Eswar Kalyan Vutukuri | eswar.vutukuri@zte.com.cn |
| Futurewei | Yunsong Yang | yyang1@futurewei.com |
| vivo | Chenli | Chenli5g@vivo.com |
| Nokia | Sunyoung Lee | sunyoung.lee@nokia.com |
| Xiaomi | Yanhua Li | Liyanhua1@xiaomi.com |
| Sharp | Sangkyu Baek | baek@sharplabs.com |
| Apple | Ping-Heng Wallace Kuo | pingheng\_kuo@apple.com |
| Fujitsu | Sue Yi | yisu@fujitsu.com |
| Samsung | Weiping Sun | wp.son@samsung.com |

# 3. Comments to the PDCP running CR v01

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 |
| OPPO001 | 3.1 | We understand that the Rapporteur intends to resolve the COUNT issue mentioned by companies in the last meeting. However, we think the following text somehow depends on when the UE assigns SN. Note that the non-delay-reporting data ahead of delay-reporting data can include both the data with low importance associated with the same channel and the data associated with other channel with higher LCH priority.**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 the PDCP SDU with the largest COUNT value among the delay-reporting PDCP SDUs associated with the i:th *dsr-ReportingThreshold*.Thus, we suggest the text below for a more generic description of Non-delay-reporting PDCP SDU:**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 one of the delay-reporting PDCP SDUs associated with the i:th *dsr-ReportingThreshold*. | Okay. The suggestion is incoorporated into v02. |
| HW001 | 3.1 | Similar comment to Opp001. We are just wondering whether we need to keep the ‘largest COUNT’ since we are not comparing with another COUNT value of the PDCP SDU in the previous version. We think we can simplifiy it as follow :**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 each of ~~the PDCP SDU~~ ~~with the largest COUNT value among~~ the delay-reporting PDCP SDUs associated with the i:th *dsr-ReportingThreshold*.Oppo suggestion is also fine with us. | The text is changed based on OPPO001. |
| HW002 | 5.x | On the Editor’s Note, we think this is not needed as we think that it does not impact the triggering on PDCP, as only RLC knows whether all PDUs within the PDU set has been transmitted. Basically, Tx PDCP entity can indicate the SDU that requires auto-retx or polling. But whether to perform the auto-retx or polling can be left to RLC layer to decide, including whether to handle PDU-set based processing if pduSet-Discard is enabled. Hence the Editor’s Note here can be removed and will comment | Okay. The text is updated in v02 based on HW002, FW001, FW002, N001 and N002.The Editor’s Note is remained with the changes from “PDCP entity” to “UE”. |
| Z001 | 5.16.1 | When *stopReTxObsoleteSDU* is set to enabled, and indicated from upper layer (e.g. PDCP) to discard a particular RLC SDU, the RLC SDU or SDU segment will not be transmitted or retransmitted, and the peer PDCP entity cannot receive the PDCP SDU. In this case, the discarded PDCP SDU should be included in the PDCP SN gap report. So, suggest to make the following change: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:- the 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- *stopReTxObsoleteSDU* is not set and the discarded PDCP SDU(s) have not been submitted by RLC to lower layers, or *stopReTxObsoleteSDU* is set to enabled. | I think this suggestion is further optimization, and needs more discussion. I also think it is not a good idea to make PDCP behave based on RLC parameter. |
| FW001 | 5.x  | Theoretically speaking, for both auto retx and polling, the “if” condition should include that the corresponding PDCP Data PDU has already been submitted to lower layers, as below:if a PDCP SDU for which the remaining time till *discardTimer* expiry becomes less than the [AutoRetxThresshold] and the corresponding PDCP Data PDU has already been submitted to lower layers:if a PDCP SDU for which the remaining time till *discardTimer* expiry becomes less than the [AutoRetxThresshold] and the corresponding PDCP Data PDU has already been submitted to lower layers: | Okay. The text is updated in v02 based on HW002, FW001, FW002, N001 and N002. |
| FW002 | 5.x | There are two issues in “indicate the trigger of RLC autonomous retransmission for the corresponding PDCP Data PDU to the associated RLC entity(-ies).”* + - 1. PDCP entity merely indicates that condition for remaining-time-based RLC autonomous retransmission has been met. It is up to the RLC entity to decide whether to trigger the RLC autonomous retransmission.
			2. If “associated RLC entity(-ies)” means RLC entity(-ies) associated with the particular PDCP Data PDU, it is fine. However, if “associated RLC entity(-ies)” means the RLC entities associated with the PDCP entity, they may not have all received the PDCP Data PDU from the PDCP entity, e.g. in the cases of split bearer or DAPS bearer. There is no need in the specification to mandate the PDCP entity to indicate to all associated RLC entities. Implementation can choose to indicate to all RLC entities associated with the PDCP entity or only to those that the corresponding PDCP Data PDU had previously been submitted to (in the former case, each associated RLC entity ignores the indication if the PDCP SN is not recognized). Besides, in the case of SL, the PDCP entity is directly associated with SRAP entity. So, the indication may be indicated to the SRAP entity and through it to the RLC entity. Suggest using similar language as the discard indication, i.e., “indicate to lower layers”, to avoid all these problems.

Therefore, suggest the following changes:indicate to lower layers that condition for remaining-time-based RLC autonomous retransmission has been met .Similar issues for polling. Hence, suggest the following changes:indicate to lower layers that condition for remaining-time-based RLC polling has been met . | Okay. The text is updated in v02 based on HW002, FW001, FW002, N001 and N002. |
| FW003 | 5.x | We agree with HW002 that the Editor’s Note is not needed. | The Editor’s Note is remained with the changes from “PDCP entity” to “UE”. |
| V001 | 5.15 | Consider to change “are not considered as delay-reporting PDCP data volume…” to “have not been considered as delay-reporting PDCP data volume..” in several places in 5.15 | The text “are not considered” is intentionally used to consider the data again in the next round of data volume calculation. If we use “have not been”, it may be misunderstood that once a data is considered in a certain round of data volume calculation, it would not be considered again in other data volume calculation. |
| V002 | 5.15 | In the note, the current wording means when the the delay-reporting PDCP SDU changes its associated *dsr-ReportingThreshold*, the PDCP will provide a delay reporting indication. But the truth is the indication should be an update. Suggest to change it as:“The transmitting PDCP entity provides an updated delay-reporting indication for the PDCP Data PDU to lower layers when the delay-reporting PDCP SDU changes its associated *dsr-ReportingThreshold*.” | Okay. The suggestion is incoorporated into v02. |
| V003 | 5.x | Similar comment as HW002. The Editor’s Note can be removed, because PDCP SDU for which remaining time less than the threshold will be indicated to RLC, and the RLC will decide whether to perform auto retransmission or polling enh., no matter whether *pdu-SetDiscard* is configured or not. | The Editor’s Note is remained with the changes from “PDCP entity” to “UE”. |
| N001 | 5.x | In the trigging conditions, ‘if’ sentence has only the subject and is missing a verb, while the prerequisite that the corresponding PDCP Data PDU has been delivered to the lower layer appears to be missing from the condition. It would be good to align the writing style with that used for specifying the existing delay-critical indication. Our suggestion is, for instance:For the purpose of RLC autonomous retransmission, for the PDCP Data PDU already submitted to lower layers, the transmitting PDCP entity shall indicate [the trigger of RLC autonomous retransmission] to the associated RLC entity(-ies) when:- for the corresponding PDCP SDU, the remaining time till *discardTimer* expiry becomes less than the [AutoRetxThreshold]. | Okay. The text is updated in v02 based on HW002, FW001, FW002, N001 and N002. |
| N002 | 5.x | Regarding FW002, we also recognize that indicating whether the triggering condition is met in PDCP would be sufficient. | Okay. The text is updated in v02 based on HW002, FW001, FW002, N001 and N002. |
| **Put your comments in the next section** |

# 4. Comments to the PDCP running CR v02

|  |  |  |  |
| --- | --- | --- | --- |
| Comment identifier | Section | Comments and/or change suggestions | Rapporteur resolution |
| Xiaomi001 | 3.1 | Similar as the definition of delay critical data, the packets of PSI of low importance should not be counted into it.**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 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).  | I don’t understand your comments. The definition of PDU Set remaining time already includes "till discardTimer expiry". |
| Xiaomi002 | 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*.Another question is our original intention is to capture the non-delay critical data that are ahead of delay critical data in the buffer:**“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.To avoid the over specifying, let us just capture the agreement:**Non-delay-reporting PDCP SDU**: a non-delay-reporting PDCP SDU associated with the i:th *dsr-ReportingThreshold* is a PDCP SDU that ahead of ~~will be transmitted prior to~~ any of the delay-reporting PDCP SDUs associated with the i:th *dsr-ReportingThreshold* in the buffer. | Your suggested text "ahead of.. in the buffer" is not suitable for stage-3 specification. |
| Xiaomi003 | 5.15 | We have agreed that:**Do not specify explicitly an update of delay-reporting indication in the PDCP. FFS (when discussing the CR) whether some explanation/note can be added to clarify that the UE should ensure the indicated data volume is up to date.**We think the editor’s note can be removed. Since for Rel-18 DSR, we do not explicitly specify the update of indication in PDCP, we do not see much need for this. | The update behavior is specified in a NOTE, and this is aligned with the agreement. |
| Sharp001 | 5.15 | Similar comment with Xiaomi003. One reason why we agree not to specify explicitly is that PDCP entity providing the updated indication is not the only implementation and we should not mandate a particular implementation. That means the text captured in the current CR does not need to be implemented. So, we think the NOTE needs to be removed. |  |
| Sharp002 | 3.1 | Similar to the definition of delay-reporting PDCP SDU, the wording in red showed below needs to be added:**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 will be transmitted after all the delay-reporting PDCP SDUs associated with the i-1:th *dsr-ReportingThreshold*. |  |
| Apple01 | 5.15 | If the NOTE is needed, we think it can be made simpler and more generalized. We suggest the following text:NOTE: It is up to UE implementation to ensure the association between a PDCP SDU and *dsr-ReportingThreshold* is up to date. |  |
| FJ001 | 5.15 | In several places, to be more accurate, “if i > 1” should be added, for example:- the 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, if i > 1; |  |
| FJ002 | 5.15 | Similar view as Xiaomi003, Sharp001, and Apple01. We should not specify that PDCP entity provides an updated delay-reporting indication to the lower layers when the PDCP SDU changes its associated dsr-ReportingThreshold. The lower layers may update the association based on the timing of the first indication and the reporting threshold by implementation.We propose an updated NOTE based on Apple01’s version:NOTE: It is up to UE implementation to ensure the association between a PDCP Data PDU ~~SDU~~ and *dsr-ReportingThreshold* is up to date at lower layers. |  |
| Samsung01 | 3.1 | The expression “will be transmitted prior to” is rather vague and incurs more questions on how to interpret it --- not clear whether it should be interpreted from PUSCH transmission time or MAC PDU assembly points of view. I understand the intention is to not over-specify, but we should also avoid using expression vulnerable to over-interpretation. Also, since this feature directly assists UL grant size determination, UE behavior should be unified across different UE vendors for fairness purpose. With such consideration, we still think COUNT-based modelling is better than the other options. |  |
| Samsung02 | 5.x | The terms “remaining-time based RLC autonomous retransmission” and “remaining-time based RLC polling” seem to be tentative now, as the terms face further RLC CR discussion for finalization; recommend to emphasize that, e.g., put them under square brackets. |  |

# 5. Comments to the PDCP running CR v03

|  |  |  |  |
| --- | --- | --- | --- |
| Comment identifier | Section | Comments and/or change suggestions | Rapporteur resolution |
|  |  |  |  |
|  |  |  |  |
|  |  |  |  |
|  |  |  |  |
|  |  |  |  |

# 6. Open issues

The following editor’s NOTE have been kept in the current running CR

* Issue 1: It is FFS which delay-reporting PDCP data volume shall consider PDCP Control PDUs, the PDCP SDUs to be retransmitted, and the PDCP Data PDUs to be retransmitted.
* Issue 2: It is FFS for which PDCP SDU the transmitting PDCP entity shall trigger RLC autonomous retransmission and polling, if *pdu-SetDiscard* is configured.

In addition, following open issues are identified during e-mail discussion.

…