3GPP TSG-RAN WG2 Meeting #125bis Tdoc R2-24xxxxx

Changsha, China, April 15th – April 19th, 2024

Source: Ericsson (rapporteur)

Title: [POST125bis][016][XR] PDCP SN gap reporting

Agenda item: 7.5.3.2

Document for: Discussion, Decision

# 1 Introduction

This contribution intends to provide a report for the post meeting discussion as below:

* [POST125bis][016][XR] PDCP SN gap reporting (Ericsson)

Intended outcome: Review and address concerns with PDCP TP, including question on the need of additional condition in [R2-2403361](file:///C:\Users\panidx\OneDrive%20-%20InterDigital%20Communications,%20Inc\Documents\3GPP%20RAN\TSGR2_125bis\Docs\R2-2403361.zip)

Deadline: two weeks

The questionnaire below is for companies to provide their view on the additional condition in R2-2403361 and like last time, the TP is provided for further perusal and comments. Please provide your comments to the TP in the form of word comment bubbles and refrain from changing the text directly.

The deadline for providing company views and comments on the TP is May 3rd, 10 UTC.

# 2 Triggering of the PDCP SN gap report

The following agreement was made in the last meeting regarding the triggering condition for the PDCP SN gap report [1].

PDCP Tx entity triggers the PDCP SN gap report when there is a buffered SDU associated with an SN higher than the SN of the discarded SDU(s) (due to expiry of the discard timer) and these SDU(s) have not been submitted by RLC to lower layers.

With the current agreement, the PDCP SN gap report is triggered when the higher SN(s) than the SN of the discarded SDU(s) is buffered in the queue and that these SDU(s) have not been submitted by RLC to lower layers i.e., not been transmitted yet. However, [2] cites an example where the last SDU of a previous burst is transmitted by the PDCP/RLC but is not successfully delivered thereby unecessarily delaying the delivery of the next burst to upper layers. The proposal is to trigger the PDCP SN gap report when the discard timer expires for the most recent PDCP SDU after it has been submitted to lower layers (but is not ACKed). Hence, we would like to check if companies believe the trigger condition for the PDCP SN gap report should be expanded.

**Should the PDCP SN gap report be triggered when the discard timer expires for the most recent PDCP SDU after it has been submitted to lower layers (but is not ACKed)?**

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| --- | --- | --- |
| Company | Yes/No | Comments |
| LGE | No | For RLC AM, the RLC will keep retransmitting the PDCP SDU until it is successfully received by the receiver. So, there is no need to trigger SN gap reporting for RLC AM.  For RLC UM, the transmitter does not know whether the transmitted PDCP SDU is successfully received by the receiver. So, there is no need to trigger SN gap reporting for RLC UM as well. |
| Nokia | Yes but align the lower-layer consideration with the above agreement. | Taking into account the above agreement:  PDCP SN gap report is triggered when discard timer expires for the most recent PDCP SDU after it has been submitted by RLC to lower layers (but is not ACKed).  In response to LG:  1. The successful delivery of the PDCP SDU can take very long, and the gap report may reach the receiving PDCP before the SDU (because RLC does not re-order), resulting in reordering-delay reduction.  2. For the very same reason (the transmitter does not know), there is a need to trigger the report: for all the transmitter knows, the PDCP SDU may be lost, and the report provides reordering-delay reduction. |
| Xiaomi | Comments | Some clarification is needed regarding "but is not ACKed". Does ACK refer to HARQ ACK or ARQ ACK? Our understanding is that it refers to ARQ ACK since in general, there is no explicit HARQ ACK sent by gNB.  With the assumption that ACK is ARQ ACK, we understand that the proposal is for RLC AM only. In NR up to Rel-18, RLC AM operates in lossless mode, i.e. a RLC SDU submitted to MAC will be eventually delivered even if there is PDCP discard indication. Therefore it is not clear why SN gap report should be triggered for the corresponding PDCP SDU. Note that triggering a PDCP SN gap report will move the receiver PDCP window (RX\_DELIV), which will result in discard of the corresonding PDCP SDU which will be eventually received.  It seems that the proposal is more related to Rel-19 XR RLC enhancement direction of avoiding unnecessary retransmissions. |
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# 4 References

1. Chair notes, RAN2#125bis, Changsha, China, April 2024.
2. R2-2403361, Triggering of PDCP SN gap report, RAN2#125bis, Changsha, China, April 2024.