3GPP TSG-RAN WG2#59 **R2-073534**
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Agenda item: **5.2.2**

Source: **Motorola**

Title: **RLC AM header structure with PDCP SN re-use**

Document for: **Discussion and Approval**

1 Introduction

There has been considerable discussion on the issue of PDCP SN re-use, including during the conference call hosted by NTT DoCoMo. It has been recognized that the issue of RLC SN definition needs to be quickly resolved in order to make progress on other issues. This contribution addresses the header structure to be used in case of PDCP SN re-use.

2 Discussion

As already captured in RLC Stage 3 TS (36.322), If the RLC PDU or RLC PDU segment to be retransmitted does not fit into the new TB size selected by lower layer at the particular transmission opportunity, the AM RLC entity can re-segment the RLC PDU or RLC PDU segment to be retransmitted into RLC PDU segments, as many times as needed for reliable transmission of the PDU. Details of the procedures of RLC PDU-segment generation at the transmitter and reassembly at the receiver are still open in the RLC stage 3 TS 36.322.

Two issues that are pending and need quick resolution to ensure progress on RLC are the re-use of PDCP SN for RLC and whether the re-segmentation should happen over the entire PDU (including RLC header) or just on the PDU payload.

R2-073533 submitted to the RLC conference call provided an overview of the pros and cons of PDCP SN re-use for RLC. This section addresses the header structure that would be applicable in case of PDCP SN re-use hopefully making it clear why this approach has advantages over the other approaches.

Figure 1 below shows the resulting header structure for AM PDU. Note that with PDCP SN re-use there is no need to differentiate between RLC PDU and RLC PDU segment. SO would provide the necessary functionality for both cases.

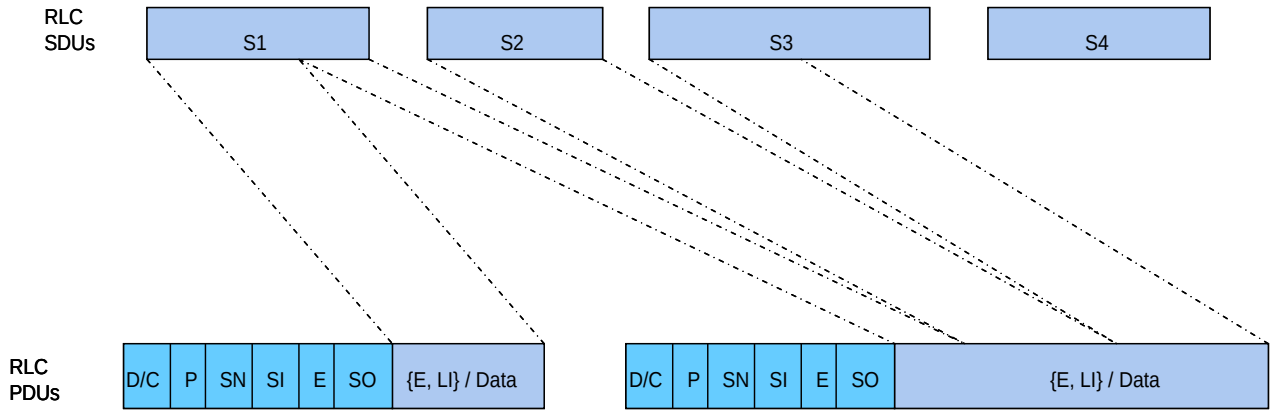

Figure 2.1: RLC AM header structure with PDCP SN re-use

The header as captured above has the following characteristics:

1. PDCP SN is re-used for RLC PDU. There is no need to distinguish between PDUs and PDU segments and no need for a separate re-segmentation procedure. Processing and implementation is therefore straightforward and clean.
2. There is no need to distinguish between PDUs and PDU segments in the retransmit queue. Handling can be on SDU level always.
3. SO is needed for the first SDU segment if the PDU does not start at the SDU boundary as indicated by SI.
4. There is no need for LSF; SI is used instead.
5. Status reporting can be simplified.
6. Header is built/re-built in an identical manner.
7. At the receiver, reassembly can be simplified.
8. Handling of complete SDUs is simplified and does not rely on reception of other segments.

As shown in R2-073533, both from a protocol simplicity and implementation perspective it is seen that PDCP SN re-use for RLC provides significant advantages. This contribution demonstrates in a graphical manner the simplicity provided through PDCPSN re-use. One of the key interests in defining RLC for LTE was protocol simplification. Adoption of PDCP SN re-use is one significant step towards that goal.

3 Conclusions

It is proposed to adopt PDCP SN re-use for RLC SN. The header structure in this contribution is proposed to serve as a baseline header structure for RLC AM.

References

[1] R2-073533, “RLC PDU SN : To re-use PDCP SN or not?”, Motorola