

Agenda Item: 6

Source: Ericsson

Title: Report of the RLC email discussion

Document for: Discussion

1 Introduction

Two issues have been discussed on the mail reflector: the RLC model and the EPC. Below a list of questions and answers discussed on the reflector is given.

2 RLC Model and PDU formats

A few questions were raised about the model which was accepted during the last WG2 meeting.

Q1: Why are the transparent mode RLC entity and the unacknowledged mode entity unidirectional, while the acknowledged mode RLC entity was bidirectional.

A1: The reason is that there exist services which are unidirectional and thus there is no need to set up a bidirectional RLC entity. At the same time it is easy to support bidirectional services by setting up two RLC entities. The acknowledged mode entity is bidirectional due to the fact that the feedback messages need to be sent on the reverse link.

Q2: In the definition of the Length indicator, should the 'length' not rather be called 'end' in 'end of last segment'?

A2: If one indicates the end then the exact boundary between two segments is indicated. If one indicates the length, the boundary between two segments needs to be calculated. Ericsson prefers the first.

Q3: Compared to previous input papers by Ericsson, the Padding field, indicating that there is padding in the PDU is no longer present. How is it possible to differentiate between the following two scenarios:

a) A higher layer SDU or the last segment of it fits entirely into the RLC PDU and the rest of the PDU is filled with padding bits.

b) A higher layer SDU or the last segment of it fits entirely into the RLC PDU and the rest of the PDU is filled with the next higher layer SDU or a segment thereof.

A3: In the scenario a) two length indicators are necessary. The first one indicates the end of the SDU segment, the second length indicator field is filled with only ones, indicating that padding takes place. In scenario b) only 1 length indicator is needed, indicating the boundary between the two segments.

Q4: How is the differentiation between the RESET and RESET ACK supposed to work, with only 1 R/S bit.

A4: The proposal was to have an R/S bit to differentiate between the Status PDUs and the other control PDUs. If the PDU would be a status report the next field would be a status report specific field. If the PDU would be an other control PDU the next field would be a type field, necessary to distinguish between different control PDUs. It should be mentioned that a good option would be to remove the R/S field and use a type field instead, i.e. not first differentiating between status PDUs and other control PDUs.

Finally there was a concern by Siemens whether the model would be in accordance with the SDL diagrams in the current S2.22. As a response to this, Ericsson mentioned that the model does not contradict the SDL diagrams, which are still FFS, and even may make them somewhat simpler.

Furthermore there was a comment that the current model was specific in some cases whereas in other cases details were missing. Specifically the comment concerned the purpose of the control unit box. Finally Siemens commented that the multiplexing box in the RLC model was necessary, enabling the AM data and the UM data to be multiplexed onto the same data flow. However, Ericsson had removed this function from the previous model as a result of the discussions in January at the WG2#1. The response to the comment was also that the multiplexing of AM data and UM data is still possible, but is done on either MAC level or on the Physical layer.

3 Estimated PDU Counter

Q1: *Is the EPC applicable on common channels?*

A1: The EPC mechanism is most likely not applicable on common channels, but a simple solution to that problem is to adopt a "normal" retransmission timer, which does not adapt to the transmission rate, for the common channels.

Q2: *What happen if the TFI gets lost for one or more transmission time intervals?*

A2: Two possible solutions to this problem are:

* either to estimate an value on the TFI for those transmission time intervals (based on e.g. previous TFI values),

* or to not update the EPC at all for those transmission time intervals. To not update the EPC could lead to an extra delay before the STAT PDU is retransmitted (if it needs to be retransmitted).

Q3: *Is the EPC applicable when using MAC multiplexing of logical channels?*

A3: It is possible to use the EPC mechanism when MAC multiplexing is applied, since MAC can indicate the number of received transport blocks belonging each RLC entity (instead of TFI). The problem occurs when one or several transport blocks get lost and MAC does not know which RLC entity the lost transport block belongs to. This could be solved in a similiar way as when the TFI gets lost:

* either by estimating the number of RLC SDUs that should have been delivered to each RLC entity for each transmission time interval,

* or to not update the EPC at all for the erroneous transport block. To not update the EPC could lead to an extra delay before the STAT PDU is retransmitted (if it needs to be retransmitted).