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Agenda Item: 5

Source: Ericsson

Title: **Report of the RLC e-mail discussion**

Document for: Discussion

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1 Report of the RLC e-mail discussion

Two issues have been discussed on the mail refelector, the RLC toolbox and the EPC mechanism. The discussion was initiated by Ericssson inviting all companies to express their oponion on which functions that should be in the RLC toolbox. The need of the EPC mechanism was also clarified, se section 2 below.

Ericsson opinion:

"We think that all funtions listed in the tables 9-2 to 9-4 in S2.22 should be supported by the UE. In addition, we think that the EPC should be included as well. We believe that if we have these parameters supported, we can set up a large number of ARQ types, adaptive to the radio environment."

The need of all functions in the RLC toolbox was questioned by Alcatel:

"I'd like to comment on your proposal about RLC toolbox. I'm not against the principle of having some of the functions supported by the terminal, but it seems to me unreasonable to have all of them mandatory. I think that if polling mechanism is applied, functions like <Last PU in buffer>, <Adjust transmission window>, <Retransmit AM PUs>, <Reception of poll> and <Detection of missing PUs> can be supported by terminal for evident reasons in an acknowledged transfer mode using polling mechanism. But at this moment nothing justifies having the other functions mandatory in the UE. I think we need further explanation from Ericsson about the usefulness of proposed functions (even as optional)."

Answer given by Ericsson:

"The main goal of the toolbox is to be very flexible with our ARQ scheme in the future. We believe that for different environments a different ARQ scheme is suitable. For example for services where the transmission rate may change all the time, it may be very good to use the EPC. For other services, where the rate is constant, one probably does not use the EPC at all. Unfortunately, we are not able to predict exactly which services are going to be used, and with what radio environments we have to deal with. Therefore it is likely that we are not able to find an ARQ scheme which is suitable for all situations. Therefore we have proposed to specify a number of functions, making it possible for the network to decide which ARQ scheme to be used during a connection. So during one configuration, not all functions are used, but only a subset. However, to be flexible, we believe that all functions should be mandatory in the UE, so that a broad scope of ARQ mechanisms can be set up."

2 The need of EPC mechanism

The reason why we would like the EPC accepted is the following:

We think that there is a fair risk of status reports to get lost (failed transmissions) or that the retransmitted PDUs are not received correctly. Therefore we would like to be able to retransmit status reports if retransmissions are not received within a certain time. A solution could be a timer which is started when a status report is sent. However, it is difficult to set the value of the timer if the transmission rates can change. If the rates change during the time that the timer is ticking, this will basically be impossible. This will result in that the status report will be sent too early or too late. Therefore, instead of using a timer, we believe it is better to

count the PDUs transmitted during each transmission time interval. Thus, during each transmission time interval the number of transmitted PDUs need to be estimated on the receiver side. This can best be done by using the TFI bits. However, if the TFI bits are lost during a transmission time interval, the number can be estimated by means of the TFI of the previous transmission time interval. There is a high probability that this TFI is still valid. If the estimation is not correct, the result will be that a new status report will be sent either too late or too early. Thus in the case where the TFI bits are not received correctly there is a possbility that a status report is sent either too late or too early. Note that this will certainly happen when a timer is used: To set the timer exactly to the value that the retransmitted PDUs should be received is an impossible task, taking into account that the rate can change. Thus the EPC should be seen as a way of determining the time when to retransmit a status report as accurately as possible. A mechanism which we believe is necessary if we have to support high rate services of which the data rates can change rapidly.

So concluding, we think that including the EPC in the list of functions of the toolbox would improve the flexibility of the ARQ mechanisms.