

Agenda Item: 9.1
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RLC Elementary Procedures

1 Introduction

This document proposes elementary procedures for the RLC protocol. The proposed procedures may not be complete, e.g. error cases have not been considered.

2 Elementary procedures

2.1 Transparent mode data transfer procedure

The transparent mode data transfer procedure is used for transferring of data between two RLC peer entities, which are operating in transparent mode. The procedure may be initiated either by the UE or by the UTRAN. Figure 1 below illustrates the elementary procedure for transparent mode data transfer.

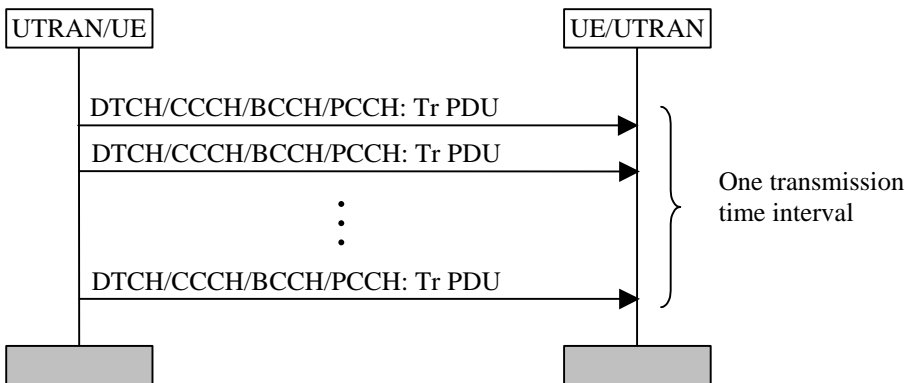


Figure 1. Transparent mode data transfer procedure.

The UTRAN/UE sends one or several Tr PDUs in one transmission time interval on one of the logical channels DTCH, CCCH, BCCH or PCCH to the UE/UTRAN. The number of Tr PDUs depends on the rate of the logical channel and the type of logical channel depends on if the RLC entity is located in the user plane (DTCH) or in the control plane (CCCH/BCCH/PCCH). The Tr PDU includes a complete or a segment of a higher layer PDU.

[Note: There is no PDU specified for transparent mode data transfer in section 9 in 25.322 [1]]

2.2 Unacknowledged mode data transfer procedure

The unacknowledged mode data transfer procedure is used for transferring of data between two RLC peer entities, which are operating in unacknowledged mode. The procedure may be initiated either by the UE or by the UTRAN. Figure 2 below illustrates the elementary procedure for unacknowledged mode data transfer.

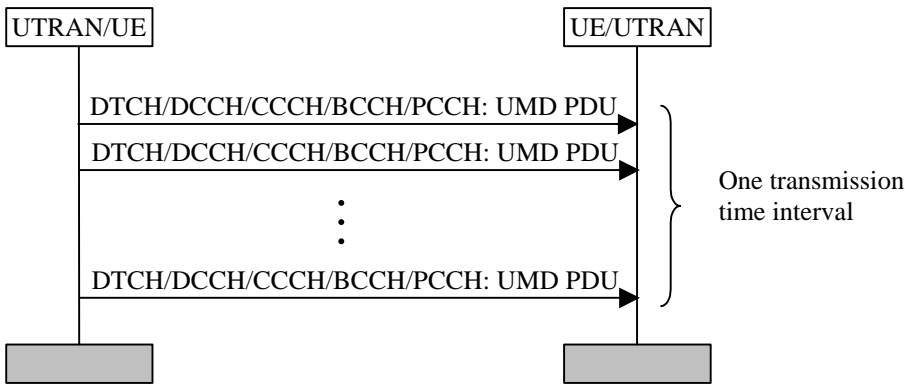


Figure 2. Unacknowledged mode data transfer procedure.

The UTRAN/UE sends one or several UMD PDUs in one transmission time interval on one of the logical channels DTCH, DCCH, CCCH, BCCH or PCCH to the UTRAN/UE. The number of UMD PDUs depends on the rate of the logical channel and the type of logical channel depends on if the RLC entity is located in the user plane (DTCH) or in the control plane (DCCH/CCCH/BCCH/PCCH). The UMD PDU includes a segment of one or several higher layer PDUs. It also includes a sequence number and one or several length indicator fields.

2.3 Acknowledged mode data transfer procedure

The acknowledged mode data transfer procedure is used for transferring of data between two RLC peer entities, which are operating in acknowledged mode. The procedure may be initiated either by the UE or by the UTRAN. Figure 3 below illustrates the elementary procedure for acknowledged mode data transfer.

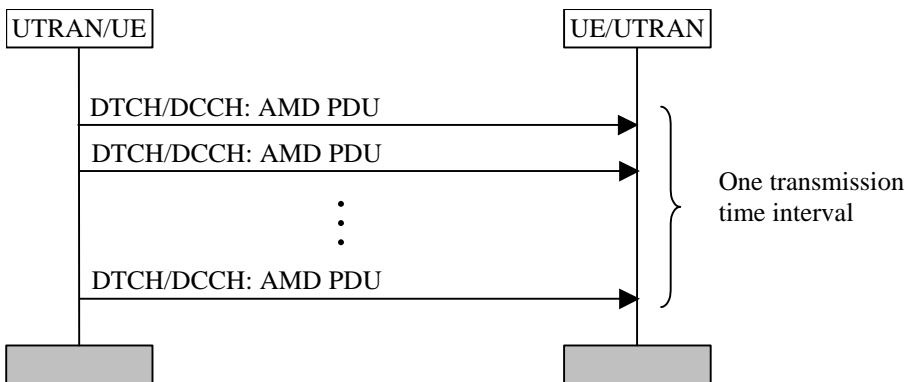


Figure 3. Acknowledged mode data transfer procedure.

The UTRAN/UE sends one or several AMD PDUs in one transmission time interval on either the DTCH or the DCCH logical channel to the receiver UE/UTRAN. The number of AMD PDUs depends on the rate of the logical channel and the type of logical channel depends on if the RLC entity is located in the user plane (DTCH) or in the control plane (DCCH). The AMD PDU includes a segment of one or several higher layer PDUs. It also includes a D/C field (which indicates that it is data PDU), a sequence number, polling bit, header extension bit and one or several length indicator fields.

2.4 RLC reset procedure

The RLC reset procedure is used to reset two RLC peer entities, which are operating in acknowledged mode. It is triggered when a protocol error occurs in RLC and it may be initiated either by the UE or by the UTRAN. Figure 4 below illustrates the elementary procedure for a RLC reset.



Figure 4. RLC reset procedure.

The UTRAN/UE sends a RESET PDU on a DTCH or a DCCH logical channel to the receiver UE/UTRAN. The type of logical channel depends on if the RLC entity is located in the user plane (DTCH) or in the control plane (DCCH). The RESET PDU includes the RLC parameters needed to perform the reset.

Upon reception of the RESET PDU, the receiver responds with a RESET ACK PDU.

2.5 STATUS PDU transfer procedure

The STATUS PDU transfer procedure is used for transferring of status information between two RLC peer entities, which are operating in acknowledged mode. The procedure may be initiated either by the UE or by the UTRAN. Figure 5 below illustrates the elementary procedure for acknowledged mode data transfer.



Figure 5. STATUS PDU transfer procedure.

The procedure is triggered when e.g. a missing AMD PDU is detected or a poll has been received. The originator UTRAN/UE sends STATUS PDUs on either the DTCH or the DCCH logical channel to the receiver UE/UTRAN. The type of logical channel depends on if the RLC entity is located in the user plane (DTCH) or in the control plane (DCCH). The STATUS PDU includes D/C field, PDU type field and information about received data PDUs. This procedure may trigger retransmission of lost PU.

2.6 Poll procedure

The poll procedure is used by an acknowledged mode RLC entity for requesting status information from its peer entity. The procedure may be initiated either by the UE or by the UTRAN. Figure 6 below illustrates the elementary procedure for polling.

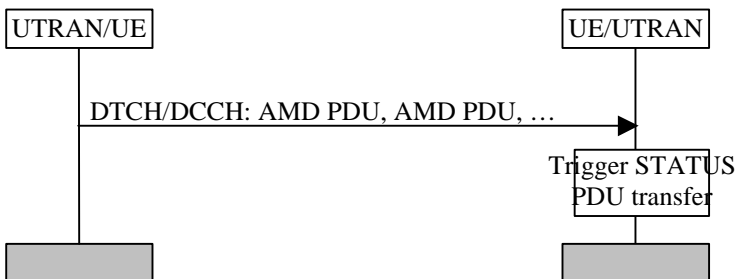


Figure 6. Poll procedure.

The procedure is triggered when e.g. the last PU in the transmission buffer is transmitted. The UTRAN/UE sends one or several AMD PDUs in one transmission time interval on either the DTCH or the DCCH logical channel to the receiver UE/UTRAN. The number of PDUs depends on the rate of the logical channel and the type of logical channel depends on if the RLC entity is located in the user plane (DTCH) or in the control plane (DCCH). The poll bit is set in all PDUs transmitted in the same transmission time interval.

Upon reception of the polls, the receiver triggers a STATUS PDU transfer procedure.

3 Proposal

It is proposed that all the elementary RLC procedures described in section 2 are included in section 11 in 25.322 [1].

4 References

[1] TS 25.322, "Specification of the RLC protocol", v. 1.0.0.