CLAIMS

1. A method for controlling a packet data convergence protocol, PDCP, in a communication network defined in the 3rd Generation Partnership Project, 3GPP, standard comprising a transmitter (502) and a receiver (503), the method at the transmitter (502) comprising:

following transmission of one or more PDCP service data units, SDUs, to the receiver (503) and following satisfaction of at least one trigger condition which includes that a PDCP SDU of the one or more transmitted PDCP SDUs has been discarded by the transmitter, transmitting to the receiver a bitmap field to indicate information regarding the discard status of the one or more transmitted PDCP SDUs.

2. The method of claim 1, wherein the bitmap field is sent separately to, or inserted in, a PDCP SDU for transmitting to the receiver.

3. The method of claim 2, wherein the bitmap field is included in a control protocol date unit, PDU.

4. The method of claim 1, wherein the bitmap field is one bit in a PDCP SDU or is an addition to the header of a PDCP SDU.

5. The method of any one of claims 1 to 4, further comprising:

setting a bitmap field to indicate to a PDCP function implemented at the transmitter to:

send the bitmap field when a PDCP SDU which is not discarded is ready to be sent to the receiver, or

discard data units of the application data received from an upper layer of the protocol stack.

6. The method of claim 5, wherein if the received data units of the application data belonging to a same PDU Set as the discarded PDCP SDU have been sent, by the PDCP function, to a lower layer of the protocol stack, the method further comprises notifying the lower layer to discard any on-going transmission of the PDCP SDUs from the same PDU Set.

7. The method of any one of claims 1 to 6, further comprising:

initialising a discard timer upon receiving, at a PDCP function implemented at the transmitter, an SDU from an upper layer,

wherein determining that the PDCP SDU has been discarded by the transmitter comprises determining that the discard timer has expired without receiving acknowledgement of reception of the discarded PDCP SDU from the receiver.

8. The method of claim 7, wherein the discard timer is a PDU Discard timer started when receiving the SDU from the upper layer or a PDU Set Discard timer started when receiving a first SDU of a PDU Set.

9. The method of any one of claims 1 to 6, wherein the determining that the PDCP SDU has been discarded comprises receiving a report from the receiver indicating that the PDU Set to which the discarded PDCP SDU belongs has not been fully received.

10. The method of any one of the preceding claims, further comprising:

determining a PDU Set Integrated Handling Indication, PSIHI, PDU Set QoS parameter for the PDU Set to which the discarded PDCP SDU belongs,

wherein the bitmap field is transmitted to the PDCP receiver only if the value of PSIHI parameter is set to a predetermined value.

11. The method of any one of the preceding claims, wherein the PDU Set sequence number of the PDU Set to which the discarded PDCP SDU belongs is used to identify the discarded PDU.

12. The method of any of the preceding claims, further comprising:

determining if the discarded PDCP SDU is part of an eXtended Reality, XR, PDU Set,

wherein the bitmap field is transmitted to the PDCP receiver only if the discarded PDCP SDU is part of an eXtended Reality, XR, PDU Set.

13. A method for controlling a packet data convergence protocol, PDCP, in a communication network comprising a transmitter (502) and a receiver (503), the method at the receiver (503) comprising:

following receipt of one or more service data units, SDU, from the transmitter (502) and following satisfaction of at least one trigger condition which includes that a PDCP SDU of the one or more transmitted PDCP SDUs has been discarded by the transmitter, receiving from the transmitter (502) a bitmap field which indicates information regarding the discard status of the one or more transmitted PDCP SDUs; and discarding any PDCP SDUs which are indicated by the bitmap field to have been discarded.

14. The method of claim 13, further comprising:
initialising a re-ordering timer when receiving an out of order PDCP SDU, and
resetting the re-ordering timer after receiving the bitmap field.

15. The method of claim 13 or claim 14, wherein the receiving the bitmap field comprises checking a header of the received PDCP SDU for the bitmap field and/or receiving the bitmap field separately to the one or more PDCP SDUs.

16. The method of any one of claims 13 to 15, wherein discarding the PDCP SDU which are indicated by the bitmap field to have been discarded by the transmitter comprises discarding one or more pending PDCP SDUs received before the bitmap field.

17. The method of any one of claims 13 to 16, wherein the method further comprises delivering, by a PDCP function implemented at the receiver, a stored PDCP SDU to an upper layer based on the bitmap field.

18. A non-transitory computer readable medium carrying instructions which, when the program is executed by a transmitter (502), cause the transmitter (502) to carry out the method according to any one of claims 1 to 12, or comprising instructions which, when the program is executed by a receiver (503), cause the receiver (503) to carry out the method according to any one of claims 13 to 17.

19. The method of any one of claims 1 to 12, wherein the transmitter is a User Equipment, UE, defined in the 3GPP standard, or a next generation Node B, gNB, defined in the 3GPP standard.

20. The method of any one of claims 13 to 17, wherein the receiver is a User Equipment, UE, defined in the 3GPP standard, or a next generation Node B, gNB, defined in the 3GPP standard.