Claims

1. A method performed by a receiving device operating in a wireless communication system, the method comprising:

determining that a Packet Data Convergence Protocol (PDCP) re-establishment has been triggered; and

based on the PDCP re-establishment being triggered:

stopping and resetting a reordering timer that is associated with delivering PDCP Service Data Units (SDUs) to an upper layer of the receiving; and

delivering all stored PDCP SDUs to the upper layer in ascending order of COUNT values that are associated with the PDCP SDUs.

2. The method according to claim 1, wherein the PDCP re-establishment comprises re-establishment of a PDCP entity of the receiving device, and

wherein the PDCP entity is below the upper layer of the receiving device.

3. The method according to claim 2, further comprising:

setting, by the PDCP entity, values of state variables of the PDCP entity to initial values during the re-establishment of the PDCP entity.

4. The method according to claim 1, wherein delivering the all stored PDCP SDUs comprises:

delivering the all stored PDCP SDUs after performing PDCP header decompression.

5. The method according to claim 2, wherein the PDCP entity is associated with an Unacknowledged mode (UM) Radio Link Control (RLC) entity.

6. The method according to claim 2, further comprising:

starting the reordering timer based on the PDCP entity receiving, from a lower layer of the receiving device, a PDCP Protocol Data Unit (PDU) that has a COUNT value greater than a status variable,

wherein the status variable indicates a COUNT value of a first PDCP SDU, among the all stored SDUs, that was received by the PDCP entity from the lower layer at an earliest time among the all stored SDUs.

7. The method according to claim 1, wherein the PDCP re-establishment is triggered based on receiving, from the upper layer, a request for the PDCP re-establishment.

8. A receiving device operating in a wireless communication system, the receiving device comprising:

a Radio Frequency (RF) module;

at least one processor; and

at least one computer memory operably connectable to the at least one processor and storing instructions that, when executed, cause the at least one processor to perform operations comprising:

determining that a Packet Data Convergence Protocol (PDCP) re-establishment has been triggered; and

based on the PDCP re-establishment being triggered:

stopping and resetting a reordering timer that is associated with delivering PDCP Service Data Units (SDUs) to an upper layer of the receiving; and

delivering all stored PDCP SDUs to the upper layer in ascending order of COUNT values that are associated with the PDCP SDUs.

9. The receiving device according to claim 8, wherein the PDCP re-establishment comprises re-establishment of a PDCP entity of the receiving device, and

wherein the PDCP entity is below the upper layer of the receiving device.

10. The receiving device according to claim 9, wherein the operations further comprise:

setting, by the PDCP entity, values of state variables of the PDCP entity to initial values during the re-establishment of the PDCP entity.

11. The receiving device according to claim 8, wherein delivering the all stored PDCP SDUs comprises:

delivering the all stored PDCP SDUs after performing PDCP header decompression.

12. The receiving device according to claim 9, wherein the PDCP entity is associated with an Unacknowledged mode (UM) Radio Link Control (RLC) entity.

13. The receiving device according to claim 9, wherein the operations further comprise:

starting the reordering timer based on the PDCP entity receiving, from a lower layer of the receiving device, a PDCP Protocol Data Unit (PDU) that has a COUNT value greater than a status variable,

wherein the status variable indicates a COUNT value of a first PDCP SDU, among the all stored SDUs, that was received by the PDCP entity from the lower layer at an earliest time among the all stored SDUs.

14. The receiving device according to claim 8, wherein the PDCP re-establishment is triggered based on receiving, from the upper layer, a request for the PDCP re-establishment.

15. The method according to claim 1, wherein stopping and resetting the reordering timer comprises:

stopping and resetting the reordering timer in a state in which the reordering timer is running.

16. The method according to claim 1, wherein delivering the all stored PDCP SDUs to the upper layer comprises:

delivering the all stored PDCP SDUs to the upper layer based on stopping and resetting the reordering timer.

17. The method according to claim 2, wherein delivering the all stored PDCP SDUs to the upper layer comprises:

delivering, to the upper layer, all PDCP SDUs that were received by the PDCP entity from a lower layer of the receiving device and that remain stored in a PDCP reordering buffer without having been delivered to the upper layer.

18. The receiving device according to claim 8, wherein stopping and resetting the reordering timer comprises:

stopping and resetting the reordering timer in a state in which the reordering timer is running.

19. The receiving device according to claim 8, wherein delivering the all stored PDCP SDUs to the upper layer comprises:

delivering the all stored PDCP SDUs to the upper layer based on stopping and resetting the reordering timer.

20. The receiving device according to claim 9, wherein delivering the all stored PDCP SDUs to the upper layer comprises:

delivering, to the upper layer, all PDCP SDUs that were received by the PDCP entity from a lower layer of the receiving device and that remain stored in a PDCP reordering buffer without having been delivered to the upper layer.