

RLC is set to an unacknowledged mode and further contains a D/C, P, and HE field if it is set to an acknowledged mode. The sizes of SN PDUs in FIG. 5 and FIG. 6 are one and two octets, respectively. The LI+PU PDU has a PAD field in order to maintain its size since the number of the LI and the length of data can vary.

[0031] According to the present invention, an error rate in transmitting a part of a RLC PDU including its sequence number can be reduced by dividing the RLC PDU in a split mode and separately transmitting the part including the SN in a different channel. In other words, the part including the SN can be transmitted in a low rate in order to reduce its error rate, and the data portions can be transmitted in a higher rate to increase the data processing rate. Additionally, it is possible to reduce the size of the buffer and to have an efficient error/flow control in the receiving system if the receiving system can receive the sequence numbers of data in advance. The present invention may well be applied to the method of hybrid automatic repeat request (APQ) for future packet data transmissions.

[0032] The forgoing embodiments are merely exemplary and are not to be construed as limiting the present invention. The present teachings can be readily applied to other types of apparatuses. The description of the present invention is intended to be illustrative, and not to limit the scope of the claims. Many alternatives, modifications, and variations will be apparent to those skilled in the art.

What is claimed is:

1. A method of generating protocol data units (PDU) in a radio link control layer (RLC), the method comprising the steps of:

- (a) producing a payload unit by segmenting or concatenating one or more service data units received from a higher layer;
- (b) generating a first PDU which includes a sequence number corresponding to said payload unit and a second PDU which includes said payload unit; and
- (c) transmitting said first and second PDUs to a lower layer.

2. The method of claim 1, wherein said lower layer is a media access control layer.

3. The method of claim 1, wherein said second PDU further includes at least one pair of a length indicator and an extension field.

4. The method of claim 1, wherein said first PDU further includes an extension field if said RLC layer is set to an unacknowledged mode and further includes a data/control field, a polling field, and an extension header field if said RLC layer is set to an acknowledged mode.

5. The method of claim 1, wherein said first PDU has a fixed length, and said second PDU has a variable length.

6. The method of claim 1, wherein in (c), said first and second PDUs are transmitted separately through first and second logical channels.

7. The method of claim 6, wherein said second PDU is transmitted through said second logical channel when a predetermined time period is elapsed after said first PDU is transmitted through said first logical channel.

8. The method of claim 6, wherein a switching function is used when said first and second PDUs are separately transmitted through said first and second channels.

9. A method of generating protocol data units (PDU) in a system having a radio link control (RLC) layer, a media access control (MAC) layer, and a physical (PHY) layer, the method comprising the steps of:

- (a) producing a payload unit by segmenting or concatenating one or more service data units transmitted from a higher layer;
- (b) generating a first PDU which includes a sequence number corresponding to said payload unit and a second PDU which includes said payload unit;
- (c) transmitting said first and second PDUs to said MAC layer;
- (d) generating a first transport block by attaching a MAC header to said first PDU and a second transport block by attaching said MAC header to said second PDU;
- (e) transmitting said first and second transport blocks to said PHY layer; and
- (g) transmitting said first and second transport blocks to a receiving system after attaching a cyclic redundancy check to each of said first and second transport blocks.

10. The method of claim 9, wherein said second PDU further includes at least one pair of a length indicator and an extension field.

11. The method of claim 9, wherein said first PDU further includes an extension field if said RLC layer is set to an unacknowledged mode and further includes a data/control field, a polling field, and an extension header field if said RLC layer is set to an acknowledged mode.

12. The method of claim 9, wherein said first PDU has a fixed length, and said second PDU has a variable length.

13. The method of claim 9, wherein in (c), said first and second PDUs are transmitted separately through first and second logical channels.

14. The method of claim 13, wherein said second PDU is transmitted through said second logical channel when a predetermined time period is elapsed after said first PDU is transmitted through said first logical channel.

15. The method of claim 13, wherein a switching function is used when said first and second PDUs are separately transmitted through said first and second logical channels.

16. The method of claim 9, wherein in (e), said first and second transport blocks are transmitted separately through first and second transport channels.

17. The method of claim 16, wherein said second transport block is transmitted through said second transport channel when a predetermined time period is elapsed after said first transport block is transmitted through said first transport channel.

18. The method of claim 16, wherein a switching function is used when said first and second transport blocks are separately transmitted through said first and second transport channels.

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