CLAIMS

What is claimed is:

1. A data transmission method, applied to a sender communications device, wherein the sender communications device is one of a terminal or a network device, and the method comprises:

generating a plurality of radio resource control RRC segments by using an RRC segmentation function of an RRC layer entity of the sender communications device or an RRC segmentation function of a second protocol layer entity other than the RRC layer entity~~a new protocol layer entity~~, wherein each of the plurality of RRC segments carries partial data content of an RRC message generated by the sender communications device; and

sending the plurality of RRC segments to a receiver communications device,

wherein when the sender communications device is a terminal, the method comprises:

receiving activation signaling or deactivation signaling for the RRC segmentation function from a network device; and

activating the RRC segmentation function according to the activation signaling, or deactivating the RRC segmentation function according to the deactivation signaling.

2. The method according to claim 1, wherein when the sender communications device is a terminal, the ~~new protocol layer entity~~second protocol layer entity is one of the following cases:

per-signaling radio bearer SRB, per-data radio bearer DRB, per-terminal, and per-cell group; or

when the sender communications device is a network device, the ~~new protocol layer entity~~second protocol layer entity is one of the following cases:

per-SRB, per-DRB, and per-cell group.

3. The method according to claim 2, wherein when the sender communications device is a terminal, and the ~~new protocol layer entity~~second protocol layer entity is per-cell group, the method further comprises:

receiving cell group configuration information from a network device, wherein the cell group configuration information comprises configuration-related information of the ~~new protocol layer entity~~second protocol layer entity; and

when the ~~new protocol layer entity~~second protocol layer entity has not been established, establishing, based on the configuration-related information of the ~~new protocol layer~~

~~entity~~second protocol layer entity, a ~~new protocol layer entity~~second protocol layer entity corresponding to a master cell group MCG and/or a secondary cell group SCG; or

when the ~~new protocol layer entity~~second protocol layer entity has been established, resetting, releasing, or initiating a reconfiguration procedure for the ~~new protocol layer entity~~second protocol layer entity based on the configuration-related information of the ~~new protocol layer entity~~second protocol layer entity.

or

when the sender communications device is a network device, and the ~~new protocol layer entity~~second protocol layer entity is per-cell group, the method further comprises:

obtaining cell group configuration information, wherein the cell group configuration information comprises configuration-related information of the ~~new protocol layer entity~~second protocol layer entity; and

when the ~~new protocol layer entity~~second protocol layer entity has not been established, establishing, based on the configuration-related information of the ~~new protocol layer entity~~second protocol layer entity, a ~~new protocol layer entity~~second protocol layer entity corresponding to an MCG and/or an SCG; or

when the ~~new protocol layer entity~~second protocol layer entity has been established, resetting, releasing, or reconfiguring the ~~new protocol layer entity~~second protocol layer entity based on the configuration-related information of the ~~new protocol layer entity~~second protocol layer entity.

4. The method according to claim 2, wherein when the sender communications device is a terminal, and the ~~new protocol layer entity~~second protocol layer entity is per-SRB or per-DRB, the method further comprises:

receiving SRB configuration information or DRB configuration information from a network device; and

establishing and/or releasing, based on the SRB configuration information, a ~~new protocol layer entity~~second protocol layer entity corresponding to a related SRB; or establishing and/or releasing, based on the DRB configuration information, a ~~new protocol layer entity~~second protocol layer entity corresponding to a related DRB;

or

when the sender communications device is a network device, and the ~~new protocol layer entity~~second protocol layer entity is per-SRB or per-DRB, the method further comprises:

obtaining SRB configuration information or DRB configuration information; and

establishing and/or releasing, based on the SRB configuration information, a ~~new protocol layer entity~~second protocol layer entity corresponding to a related SRB; or establishing and/or releasing, based on the DRB configuration information, a ~~new protocol layer entity~~second protocol layer entity corresponding to a related DRB.

~~5. The method according to claim 1, wherein when the sender communications device is a terminal, the method further comprises:~~ segmentation function is at least one of the following:

~~receiving activation signaling or deactivation signaling for the RRC segmentation function from a network device; and~~

~~activating the RRC segmentation function according to the activation signaling, or deactivating the RRC segmentation function according to the deactivation signaling.~~

5~~6~~. The method according to claim ~~5~~1, wherein an activation condition for the RRC segmentation function is at least one of the following:

the network device receives partial capability information reported by the terminal;

the network device receives capability-related information sent by the terminal, wherein the capability-related information indicates that capability information of the terminal exceeds a maximum size of a packet data convergence protocol PDCP service data unit SDU;

the network device receives auxiliary information sent by the terminal, wherein the assistance information indicates that capability information of the terminal exceeds a maximum size of a PDCP SDU; or

the network device receives an RRC segmentation function activation request message sent by the terminal.

6~~7~~. The method according to claim ~~5~~1, wherein a deactivation condition for the RRC segmentation function is at least one of the following:

the network device has not received, within a preset time, partial capability information reported by the terminal;

the network device has not received, within a preset time, capability-related information sent by the terminal, wherein the capability-related information indicates that capability information of the terminal exceeds a maximum size of a PDCP SDU;

sizes of all RRC messages received by the network device from the terminal within a preset time are less than a first preset threshold.

78. The method according to claim 51, wherein the activation signaling is in at least one of the following forms:

a media access control MAC control element CE, downlink control information DCI, and an RRC message; and

the deactivation signaling is in at least one of the following forms:

a MAC CE, DCI, and an RRC message.

89. The method according to claim 51, wherein when the RRC layer entity or the new protocol layer entitysecond protocol layer entity that carries the RRC segmentation function is per-SRB, the activation signaling comprises activation indication information for a related SRB, and the deactivation signaling comprises deactivation indication information for a related SRB; or

when the RRC layer entity or the new protocol layer entitysecond protocol layer entity that carries the RRC segmentation function is per-DRB, the activation signaling comprises activation indication information for a related DRB, and the deactivation signaling comprises deactivation indication information for a related DRB; or

when the RRC layer entity or the new protocol layer entitysecond protocol layer entity that carries the RRC segmentation function is per-cell group, the activation signaling comprises activation indication information for a corresponding MCG and/or SCG, and the deactivation signaling comprises deactivation indication information for a corresponding MCG and/or SCG; or

when the RRC segmentation function takes effect for a preset RRC message, the activation signaling comprises indication information used to indicate an RRC message to which the activation signaling is specific, and the deactivation signaling comprises indication information used to indicate an RRC message to which the deactivation signaling is specific.

109. The method according to claim 1, wherein when the sender communications device is a terminal, the RRC segmentation function is specific to at least one of the following RRC messages:

an RRC message that carries a data portion with a size greater than a second preset threshold; or

an RRC message used to report a terminal capability;

or

when the sender communications device is a network device, the RRC segmentation function is specific to at least one of the following RRC messages:

an RRC message that carries a data portion with a size greater than a third preset threshold;

an RRC reconfiguration message;

an RRC message that carries channel state information-reference signal CSI-RS related measurement configuration information; or

an RRC message that carries random access channel RACH configuration information.

~~11~~10. A data transmission method, applied to a receiver communications device, wherein the receiver communications device is one of a terminal or a network device, and the method comprises:

receiving a plurality of RRC segments from a sender communications device, wherein each of the plurality of RRC segments carries partial data content of an RRC message generated by the sender communications device; and

reassembling the plurality of RRC segments by using an RRC reassembly function of an RRC layer entity of the receiver communications device or an RRC reassembly function of ~~a new protocol layer entity~~a second protocol layer entity other than the RRC layer entity, to obtain the complete RRC message,

wherein when the receiver communications device is a network device, the method comprises:

sending activation signaling or deactivation signaling to a terminal, wherein

the activation signaling is used to indicate to activate an RRC segmentation function of an RRC layer entity of the terminal or an RRC segmentation function of a second protocol layer entity; and

the deactivation signaling is used to indicate to deactivate the RRC segmentation function of the RRC layer entity of the terminal or the RRC segmentation function of the second protocol layer entity.

~~12~~11. The method according to claim ~~11~~10, wherein when the receiver communications device is a terminal, the ~~new protocol layer entity~~second protocol layer entity is one of the following cases:

per-SRB, per-DRB, per-terminal, and per-cell group; or

when the receiver communications device is a network device, the ~~new protocol layer entity~~second protocol layer entity is one of the following cases:

per-SRB, per-DRB, and per-cell group.

~~13~~12. The method according to claim ~~11~~10, wherein when the receiver communications device is a terminal, and the ~~new protocol layer entity~~second protocol layer entity is per-cell group, the method further comprises:

receiving cell group configuration information from a network device, wherein the cell group configuration information comprises configuration-related information of the ~~new protocol layer entity~~second protocol layer entity; and

when the ~~new protocol layer entity~~second protocol layer entity has not been established, establishing, based on the configuration-related information of the ~~new protocol layer entity~~second protocol layer entity, a ~~new protocol layer entity~~second protocol layer entity corresponding to an MCG and/or an SCG; or

when the ~~new protocol layer entity~~second protocol layer entity has been established, resetting, releasing, or initiating a reconfiguration procedure for the ~~new protocol layer entity~~second protocol layer entity based on the configuration-related information of the ~~new protocol layer entity~~second protocol layer entity.

or

when the receiver communications device is a network device, and the ~~new protocol layer entity~~second protocol layer entity is per-cell group, the method further comprises:

obtaining cell group configuration information, wherein the cell group configuration information comprises configuration-related information of the ~~new protocol layer entity~~second protocol layer entity; and

when the ~~new protocol layer entity~~second protocol layer entity has not been established, establishing, based on the configuration-related information of the ~~new protocol layer entity~~second protocol layer entity, a ~~new protocol layer entity~~second protocol layer entity corresponding to an MCG and/or an SCG; or

when the ~~new protocol layer entity~~second protocol layer entity has been established, resetting, releasing, or reconfiguring the ~~new protocol layer entity~~second protocol layer entity

based on the configuration-related information of the ~~new protocol layer entity~~second protocol layer entity.

~~14~~13. The method according to claim ~~13~~12, wherein when the receiver communications device is a terminal, and the ~~new protocol layer entity~~second protocol layer entity is per-SRB or per-DRB, the method further comprises:

receiving SRB configuration information or DRB configuration information from a network device; and

establishing and/or releasing, based on the SRB configuration information, a ~~new protocol layer entity~~second protocol layer entity corresponding to a related SRB; or establishing and/or releasing, based on the DRB configuration information, a ~~new protocol layer entity~~second protocol layer entity corresponding to a related DRB;

or

when the receiver communications device is a network device, and the ~~new protocol layer entity~~second protocol layer entity is per-SRB or per-DRB, the method further comprises:

obtaining SRB configuration information or DRB configuration information; and

establishing and/or releasing, based on the SRB configuration information, a ~~new protocol layer entity~~second protocol layer entity corresponding to a related SRB; or establishing and/or releasing, based on the DRB configuration information, a ~~new protocol layer entity~~second protocol layer entity corresponding to a related DRB.

~~15~~14. The method according to claim ~~11~~10, wherein when the receiver communications device is a terminal, the method further comprises:

receiving activation signaling or deactivation signaling for the RRC reassembly function from a network device; and

activating the RRC reassembly function according to the activation signaling, or deactivating the RRC reassembly function according to the deactivation signaling.

~~16~~15. The method according to claim ~~15~~14, wherein when the RRC layer entity or the ~~new protocol layer entity~~second protocol layer entity that carries the RRC reassembly function is per-SRB, the activation signaling comprises activation indication information for a related SRB, and the deactivation signaling comprises deactivation indication information for a related SRB; or

when the RRC layer entity or the ~~new protocol layer entity~~second protocol layer entity that carries the RRC reassembly function is per-DRB, the activation signaling comprises activation indication information for a related DRB, and the deactivation signaling comprises deactivation indication information for a related DRB; or

when the RRC layer entity or the ~~new protocol layer entity~~second protocol layer entity that carries the RRC reassembly function is per-cell group, the activation signaling comprises activation indication information for a corresponding MCG and/or SCG, and the deactivation signaling comprises deactivation indication information for a corresponding MCG and/or SCG.

~~17. The method according to claim 11, wherein when the receiver communications device is a network device, the method further comprises:~~

~~sending activation signaling or deactivation signaling to a terminal, wherein~~

~~the activation signaling is used to indicate to activate an RRC segmentation function of an RRC layer entity of the terminal or an RRC segmentation function of a new protocol layer entity; and~~

~~the deactivation signaling is used to indicate to deactivate the RRC segmentation function of the RRC layer entity of the terminal or the RRC segmentation function of the new protocol layer entity.~~

~~18~~16. The method according to claim ~~17~~10, wherein an activation condition for the RRC segmentation function is at least one of the following:

the network device receives partial capability information reported by the terminal;

the network device receives capability-related information sent by the terminal, wherein the capability-related information indicates that capability information of the terminal exceeds a maximum size of a PDCP SDU;

the network device receives assistance information sent by the terminal, wherein the assistance information indicates that capability information of the terminal exceeds a maximum size of a PDCP SDU; or

the network device receives an RRC segmentation function activation request message sent by the terminal.

17~~9~~. A communications device, wherein the communications device is a sender, the communications device is one of a terminal or a network device, and the communications device comprises:

a generation module, configured to generate a plurality of RRC segments by using an RRC segmentation function of an RRC layer entity of the communications device or an RRC segmentation function of ~~a new protocol layer entity~~a second protocol layer entity other than the RRC layer entity, wherein each of the plurality of RRC segments carries partial data content of an RRC message generated by the communications device; and

a sending module, configured to send the plurality of RRC segments to a receiver communications device,

wherein when the communications device is a terminal, the communications device comprises:

a receiving module, configured to receive activation signaling or deactivation signaling for the RRC segmentation function from a network device; and

a processing module, configured to activate the RRC segmentation function according to the activation signaling, or deactivating the RRC segmentation function according to the deactivation signaling.

~~20~~18. A communications device, wherein the communications device is a receiver, the communications device is one of a terminal or a network device, and the communications device comprises:

a fourth receiving module, configured to receive a plurality of RRC segments from a sender communications device, wherein each of the plurality of RRC segments carries partial data content of an RRC message generated by the sender communications device; and

a reassembly module, configured to reassemble the plurality of RRC segments by using an RRC reassembly function of an RRC layer entity of the communications device or an RRC reassembly function of ~~a new protocol layer entity~~a second protocol layer entity other than the RRC layer entity, to obtain the complete RRC message,

wherein when the communications device is a network device, the communications device comprises:

a second sending module, configured to send activation signaling or deactivation signaling to a terminal, wherein

the activation signaling is used to indicate to activate an RRC segmentation function of an RRC layer entity of the terminal or an RRC segmentation function of a second protocol layer entity; and

the deactivation signaling is used to indicate to deactivate the RRC segmentation function of the RRC layer entity of the terminal or the RRC segmentation function of the second protocol layer entity.