

CLAIMS

1. A method for receiving downlink data, comprising:

receiving, by a terminal, first downlink control information (DCI) that is carried on a first physical downlink control channel (PDCCH) and sent by a base station through n antenna panels, wherein the first DCI is used for scheduling m antenna panels of the base station to send downlink data to the terminal respectively, m is an integer greater than 1, and n is a positive integer;

determining, by the terminal according to the first DCI, at least one target receiving beam used for receiving the downlink data; and

receiving, by the terminal, the downlink data by using the least one target receiving beam,

wherein a number of CORESETs that are used for sending PDCCHs and are preconfigured by the base station for the terminal is k , and PDCCHs sent by at least two of the k CORESETs are configured to be sent by using different antenna panels, k being an integer greater than 1,

wherein the method further comprises:

receiving, by the terminal, CORESET configuration information sent by the base station, wherein the CORESET configuration information comprises identification information of antenna panels for sending PDCCH by using CORESET.

2. The method of claim 1, wherein determining, by the terminal according to the first DCI, the at least one target receiving beam used for receiving the downlink data comprises:

determining, by the terminal according to a plurality of transmission configuration indication (TCI) states carried in the first DCI, a plurality receiving beams corresponding to the plurality of TCI states as the at least one target receiving beam.

3. The method of claim 1, further comprising:

in response to the terminal being not able to determine the at least one target receiving beam according to the first DCI, receiving, by the terminal, the downlink data by using at

least one default receiving beam.

4. The method of claim 3, wherein a number of the at least one default receiving beam is one or more.

5. The method of claim 3, wherein the at least one default receiving beam is at least one receiving beam used by the terminal to receive a second PDCCH, wherein the second PDCCH is a PDCCH, in a latest scheduling unit that receives a PDCCH which is from a same antenna panel as the first PDCCH from, sent by a Control Resource Set (CORESET) with a minimum number in at least one CORESET sent by the same antenna panel.

6. The method of claim 3, wherein the at least one default receiving beam is at least one receiving beam used by the terminal to receive the first PDCCH.

7. A method for sending downlink data, comprising:

sending, by a base station, first downlink control information (DCI) carried on a first physical downlink control channel (PDCCH) to a terminal through n antenna panels, wherein the first DCI is used for scheduling m antenna panels of the base station to send downlink data to the terminal respectively, m is an integer greater than 1, and n is a positive integer; and

sending, by the base station, the downlink data to the terminal through the m antenna panels respectively,

wherein a number of CORESETs that are used for sending PDCCHs and are preconfigured by the base station for the terminal is k , and k is an integer greater than 1,

wherein PDCCHs sent by the k CORESETs are configured to be sent by using a same antenna panel; or

PDCCHs sent by at least two of the k CORESETs are configured to be sent by using different antenna panels.

8. The method of claim 7, wherein a plurality of transmission configuration indication (TCI)

states are carried in the first DCI, and the plurality of TCI states are used for indicating a plurality of receiving beams that correspond to the plurality of TCI states and are used by the terminal for receiving the downlink data.

9. The method of claim 7, further comprising:

sending, by the base station, CORESET configuration information to the terminal, wherein the CORESET configuration information comprises identification information of antenna panels for sending PDCCH by using CORESET.

10. The method of any one of claims 7 to 9, further comprising:

sending, by the base station, a medium access control (MAC) signaling to the terminal, wherein the MAC signaling is used for activating a target TCI state, and the target TCI state is used for indicating a receiving beam used by the terminal for receiving the first PDCCH.

11. An apparatus for receiving downlink data, applied in a terminal, comprising:

a control information receiving module, configured to receive first downlink control information (DCI) that is carried on a first physical downlink control channel (PDCCH) and sent by a base station through n antenna panels, wherein the first DCI is used for scheduling m antenna panels of the base station to send downlink data to the terminal respectively, m is an integer greater than 1, and n is a positive integer;

a receiving beam determining module, configured to determine, according to the first DCI, at least one target receiving beam used for receiving the downlink data; and

a downlink data receiving module, configured to receive the downlink data by using the at least one target receiving beam,

wherein a number of CORESETs that are used for sending PDCCHs and are preconfigured by the base station for the terminal is k , and PDCCHs sent by at least two of the k CORESETs are configured to be sent by using different antenna panels, k being an integer greater than 1,

wherein the apparatus further comprises:

a configuration information receiving module, configured to receive CORESET

configuration information sent by the base station, wherein the CORESET configuration information comprises identification information of antenna panels for sending PDCCH by using CORESET.

12. The apparatus of claim 11, wherein the receiving beam determining module is further configured to:

determine, according to a plurality of transmission configuration indication (TCI) states carried in the first DCI, receiving beams corresponding to one of the plurality of TCI states as the at least one target receiving beam.

13. The apparatus of claim 11, wherein the downlink data receiving module is further configured to:

in response to the terminal being not able to determine the at least one target receiving beam according to the first DCI, receive the downlink data by using at least one default receiving beam.

14. The apparatus of claim 13, wherein a number of the at least one default receiving beam is one or more.

15. The apparatus of claim 13, wherein the at least one default receiving beam is at least one receiving beam used by the terminal to receive a second PDCCH, wherein the second PDCCH is a PDCCH, in a latest scheduling unit that receives a PDCCH which is from a same antenna panel as the first PDCCH from, sent by a Control Resource Set (CORESET) with a minimum number in at least one CORESET sent by the same antenna panel.

16. The apparatus of claim 13, wherein the at least one default receiving beam is at least one receiving beam used by the terminal to receive the first PDCCH.

17. An apparatus for sending downlink data, applied in a base station, comprising:

a control information sending module, configured to send first downlink control

information (DCI) carried on a first physical downlink control channel (PDCCH) to a terminal through n antenna panels, wherein the first DCI is used for scheduling m antenna panels of the base station to send downlink data to the terminal respectively, m is an integer greater than 1, and n is a positive integer; and

a downlink data sending module, configured to send the downlink data to the terminal through the m antenna panels respectively,

wherein a number of CORESETs that are used for sending PDCCHs and are preconfigured by the base station for the terminal is k , and k is an integer greater than 1,

wherein PDCCHs sent by the k CORESETs are configured to be sent by using a same antenna panel; or

PDCCHs sent by at least two of the k CORESETs are configured to be sent by using different antenna panels.

18. The apparatus of claim 17, wherein a plurality of transmission configuration indication (TCI) states are carried in the first DCI, and the plurality of TCI states are used for indicating a plurality of receiving beams that correspond to the plurality of TCI states and are used by the terminal for receiving the downlink data.

19. The apparatus of claim 17, further comprising:

a configuration information sending module, configured to send CORESET configuration information to the terminal, wherein the CORESET configuration information comprises identification information of antenna panels for sending PDCCH by using CORESET.

20. The apparatus of any one of claims 17 to 19, further comprising:

an activation signaling sending module, configured to send a medium access control (MAC) signaling to the terminal, wherein the MAC signaling is used for activating a target TCI state and the target TCI state is used for indicating a receiving beam used by the terminal for receiving the first PDCCH.