

CLAIMS

1. A method for data transmission, applied to a base station, the method comprising:

generating, by the base station, a Radio Resource Control (RRC) signaling, wherein the RRC signaling indicates a Transmission Configuration Indication (TCI) state group, a plurality of TCI states comprised in the TCI state group are divided into at least two TCI state subgroups, and each of at least two panels corresponds to a respective one of the TCI state subgroups;

generating, by the base station, a Medium Access Control (MAC) signaling, wherein the MAC signaling indicates activation of M TCI states in each of the TCI state subgroups;

generating, by the base station, a signaling indicating at least two receiving beams of user equipment, wherein the signaling comprises—~~Transmission Configuration Indication (TCI) states of a plurality of Transport Blocks (TBs), the plurality of TBs are transmitted by the~~ at least two panels, the at least two panels are different panels from the same Transmission Reception Point (TRP) or panels from different TRPs, and the plurality of TBs correspond to the at least two receiving beams of the user equipment; and

transmitting, by the base station, the signaling to the user equipment, such that the user equipment determines a respective receiving beam for receiving each of the plurality of TBs according to the signaling and receives the TB through the determined respective receiving beam.

~~2. The method of claim 1, further comprising:~~

~~generating, by the base station, a Radio Resource Control (RRC) signaling, wherein the RRC signaling indicates a TCI state group, a plurality of TCI states comprised in the TCI state group are divided into at least two TCI state subgroups, and each of the at least two panels corresponds to a respective one of the TCI state subgroups; and~~

~~generating, by the base station, a Medium Access Control (MAC) signaling, wherein the MAC signaling indicates activation of M TCI states in each of the TCI state subgroups.~~

32. The method of claim 21, wherein generating, by the base station, the signaling indicating the at least two receiving beams of the user equipment comprises:

generating, by the base station, a first Downlink Control Information (DCI) signaling that comprises at least two TCI fields;

wherein the plurality of TBs correspond to the at least two TCI fields, and one of the TCI fields indicates TCI states of one or at least two TBs among the plurality of TBs; and

wherein the first DCI signaling indicates one TCI state in every M TCI states.

43. The method of claim 21, wherein generating, by the base station, the signaling indicating the at least two receiving beams of the user equipment comprises:

generating, by the base station, a second Downlink Control Information (DCI) signaling that comprises one TCI field;

wherein the plurality of TBs correspond to the one TCI field, and a part of bits in the one TCI field indicate TCI states of one or at least two TBs among the plurality of TBs; and

wherein the second DCI signaling indicates one TCI state in every M TCI states.

~~5. The method of claim 1, further comprising:~~

~~generating, by the base station, at least two Radio Resource Control (RRC) signalings, wherein each of the at least two RRC signalings indicates a respective one of TCI state groups, each of the TCI state groups comprises a plurality of TCI states, and each of the at least two panels corresponds to a respective one of the TCI state~~

groups; and

~~generating, by the base station, at least two Medium Access Control (MAC) signalings, wherein each of the at least two MAC signalings indicates activation of N TCI states in a respective one of the TCI state groups.~~

~~6. The method of claim 5, wherein generating, by the base station, the signaling indicating the at least two receiving beams of the user equipment comprises:~~

~~generating, by the base station, a first Downlink Control Information (DCI) signaling that comprises at least two TCI fields;~~

~~wherein the plurality of TBs correspond to the at least two TCI fields, and one of the TCI fields indicates TCI states of one or at least two TBs among the plurality of TBs; and~~

~~wherein the first DCI signaling indicates one TCI state in every N TCI states.~~

~~7. The method of claim 5, wherein generating, by the base station, the signaling indicating the at least two receiving beams of the user equipment comprises:~~

~~generating, by the base station, a second Downlink Control Information (DCI) signaling that comprises one TCI field;~~

~~wherein the plurality of TBs correspond to the one TCI field, and a part of bits in the one TCI field indicate TCI states of one or at least two TBs among the plurality of TBs; and~~

~~wherein the second DCI signaling indicates one TCI state in every N TCI states.~~

84. A method for data transmission, applied to user equipment, the method comprising:

receiving, by the user equipment, from a base station, a Radio Resource

Control (RRC) signaling, wherein the RRC signaling indicates a Transmission Configuration Indication (TCI) state group, a plurality of TCI states comprised in the TCI state group are divided into at least two TCI state subgroups, and each of at least two panels corresponds to a respective one of the TCI state subgroups;

receiving, by the user equipment, from the base station, a Medium Access Control (MAC) signaling, wherein the MAC signaling indicates activation of M TCI states in each of the TCI state subgroups;

receiving, by the user equipment, from ~~a~~the base station, a signaling indicating at least two receiving beams of the user equipment, wherein the signaling comprises ~~Transmission Configuration Indication (TCI)~~ states of a plurality of Transport Blocks (TBs), the plurality of TBs are transmitted by the at least two panels, the at least two panels are different panels from the same Transmission Reception Point (TRP) or panels from different TRPs, and the plurality of TBs correspond to the at least two receiving beams of the user equipment; and

determining, by the user equipment, a respective receiving beam for receiving each of the plurality of TBs according to the signaling, and receiving the TB through the determined respective receiving beam.

95. An apparatus for data transmission, for use in a base station, the apparatus comprising a first generation module, a second generation module, a third generation module and a transmitting module, wherein:

the second generation module is configured to generate a Radio Resource Control (RRC) signaling, wherein the RRC signaling indicates a Transmission Configuration Indication (TCI) state group, a plurality of TCI states comprised in the TCI state group are divided into at least two TCI state subgroups, and each of at least two panels corresponds to a respective one of the TCI state subgroups;

the third generation module is configured to generate a Medium Access Control (MAC) signaling, wherein the MAC signaling indicates activation of M TCI states in each of the TCI state subgroups;

~~a~~the first generation module,~~—~~ is configured to generate a signaling indicating at least two receiving beams of user equipment, wherein the signaling comprises ~~Transmission Configuration Indication (TCI) states of a plurality of Transport Blocks (TBs), the plurality of TBs are transmitted by~~ the at least two panels, the at least two panels are different panels from the same Transmission Reception Point (TRP) or panels from different TRPs, and the plurality of TBs correspond to the at least two receiving beams of the user equipment; and

~~a~~the transmitting module,~~—~~ is configured to transmit the signaling to the user equipment, such that the user equipment determines a respective receiving beam for receiving each of the plurality of TBs according to the signaling and receives the TB through the determined respective receiving beam.

~~10. The apparatus of claim 9, further comprising:~~

~~a second generation module, configured to generate a Radio Resource Control (RRC) signaling, wherein the RRC signaling indicates a TCI state group, a plurality of TCI states comprised in the TCI state group are divided into at least two TCI state subgroups, and each of the at least two panels corresponds to a respective one of the TCI state subgroups; and~~

~~a third generation module, configured to generate a Medium Access Control (MAC) signaling, wherein the MAC signaling indicates activation of M TCI states in each of the TCI state subgroups.~~

~~11~~6. The apparatus of claim ~~10~~5, wherein the first generation module is further configured to generate a first Downlink Control Information (DCI) signaling that comprises at least two TCI fields;

wherein the plurality of TBs correspond to the at least two TCI fields, and one of the TCI fields indicates TCI states of one or at least two TBs among the plurality of TBs; and

wherein the first DCI signaling indicates one TCI state in every M TCI states.

127. The apparatus of claim 105, wherein the first generation module is further configured to generate a second Downlink Control Information (DCI) signaling that comprises one TCI field;

wherein the plurality of TBs correspond to the one TCI field, and a part of bits in the one TCI field indicate TCI states of one or at least two TBs among the plurality of TBs; and

wherein the second DCI signaling indicates one TCI state in every M TCI states.

~~13. The apparatus of claim 9, further comprising:~~

~~a second generation module, configured to generate at least two Radio Resource Control (RRC) signalings, wherein each of the at least two RRC signalings indicates a respective one of TCI state groups, each of the TCI state groups comprises a plurality of TCI states, and each of the at least two panels corresponds to a respective one of the TCI state groups; and~~

~~a third generation module, configured to generate at least two Medium Access Control (MAC) signalings, wherein each of the at least two MAC signalings indicates activation of N TCI states in a respective one of the TCI state groups.~~

~~14. The apparatus of claim 13, wherein the first generation module is further configured to generate a first Downlink Control Information (DCI) signaling that comprises at least two TCI fields;~~

~~wherein the plurality of TBs correspond to the at least two TCI fields, and one of the TCI fields indicates TCI states of one or at least two TBs among the plurality of TBs; and~~

~~wherein the first DCI signaling indicates one TCI state in every N TCI states.~~

~~15. The apparatus of claim 13, wherein the first generation module is further configured to generate a second Downlink Control Information (DCI) signaling that comprises one TCI field;~~

~~wherein the plurality of TBs correspond to the one TCI field, and a part of bits in the one TCI field indicate TCI states of one or at least two TBs among the plurality of TBs; and~~

~~wherein the second DCI signaling indicates one TCI state in every N TCI states.~~

168. An apparatus for data transmission, for use in user equipment, the apparatus comprising:

a first receiving module, configured to:

receive, from a base station, a Radio Resource Control (RRC) signaling, wherein the RRC signaling indicates a Transmission Configuration Indication (TCI) state group, a plurality of TCI states comprised in the TCI state group are divided into at least two TCI state subgroups, and each of at least two panels corresponds to a respective one of the TCI state subgroups;

receive, from the base station, a Medium Access Control (MAC) signaling, wherein the MAC signaling indicates activation of M TCI states in each of the TCI state subgroups; and

receive, from ~~a~~ the base station, a signaling indicating at least two receiving beams of the user equipment, wherein the signaling comprises ~~Transmission Configuration Indication (TCI) states of a plurality of Transport Blocks (TBs), the plurality of TBs are transmitted by~~ the at least two panels, the at least two panels are different panels from the same Transmission Reception Point (TRP) or panels from different TRPs, and the plurality of TBs correspond to the at least two receiving beams of the user equipment; and

a second receiving module, configured to determine a respective receiving beam for receiving each of the plurality of TBs according to the signaling and to receive the TB through the determined respective receiving beam.

179. A base station comprising:

a processor; and

a memory for storing instructions executable by the processor;

wherein the processor is configured to:

generate a Radio Resource Control (RRC) signaling, wherein the RRC signaling indicates a Transmission Configuration Indication (TCI) state group, a plurality of TCI states comprised in the TCI state group are divided into at least two TCI state subgroups, and each of at least two panels corresponds to a respective one of the TCI state subgroups;

generate a Medium Access Control (MAC) signaling, wherein the MAC signaling indicates activation of M TCI states in each of the TCI state subgroups;

generate a signaling indicating at least two receiving beams of user equipment, wherein the signaling comprises ~~Transmission Configuration Indication (TCI) states~~ of a plurality of Transport Blocks (TBs), the plurality of TBs are transmitted by the at least two panels, the at least two panels are different panels from the same Transmission Reception Point (TRP) or panels from different TRPs, and the plurality of TBs correspond to the at least two receiving beams of the user equipment; and

transmit the signaling to the user equipment, such that the user equipment determines a respective receiving beam for receiving each of the plurality of TBs according to the signaling, and receives the TB through the determined respective receiving beam.

1810. User equipment, comprising:

a processor;

a memory for storing instructions executable by the processor;

wherein the processor is configured to:

receive, from a base station, a Radio Resource Control (RRC) signaling, wherein the RRC signaling indicates a Transmission Configuration Indication (TCI) state group, a plurality of TCI states comprised in the TCI state group are divided into at least two TCI state subgroups, and each of at least two panels corresponds to a respective one of the TCI state subgroups;

receive, from the base station, a Medium Access Control (MAC) signaling, wherein the MAC signaling indicates activation of M TCI states in each of the TCI state subgroups;

receive, from ~~a~~the base station, a signaling indicating at least two receiving beams of the user equipment, wherein the signaling comprises ~~Transmission Configuration Indication (TCI)~~ states of a plurality of Transport Blocks (TBs), the plurality of TBs are transmitted by the at least two panels, the at least two panels are different panels from the same Transmission Reception Point (TRP) or panels from different TRPs, and the plurality of TBs correspond to the at least two receiving beams of the user equipment; and

determine a respective receiving beam for receiving each of the plurality of TBs according to the signaling, and receive the TB through the determined respective receiving beam.

~~19~~11. A computer-readable storage medium, having stored thereon at least one instruction that, when loaded and executed by a processor, causes the processor to perform the method for data transmission according to any one of claims 1 to ~~7~~3.

~~20~~12. A computer-readable storage medium, having stored thereon at least one instruction that, when loaded and executed by a processor, causes the processor to perform the method for data transmission according to claim ~~8~~4.