

CLAIMS

1. A method for transmitting uplink data, comprising:
 - receiving, by a terminal device, Downlink Control Information (DCI) sent by a network device;
 - determining, by the terminal device, an uplink multiple access manner for the terminal device according to a DCI format of the DCI or determining an uplink multiple access manner for the terminal device according to parameter indication information carried in the DCI; and
 - transmitting, by the terminal device, uplink data according to the uplink multiple access manner.
2. The method of claim 1, wherein determining, by the terminal device, the uplink multiple access manner for the terminal device according to the DCI format of the DCI comprises:
 - determining, by the terminal device, the uplink multiple access manner for the terminal device according to the DCI format of the DCI and correspondences between DCI formats and uplink multiple access manners;
 - or determining, by the terminal device, the uplink multiple access manner for the terminal device according to the parameter indication information carried in the DCI comprises:
 - determining, by the terminal device, transmission information of the terminal device according to the parameter indication information, the transmission information comprising at least one of a total number of transmission layers or a physical resource configuration manner for the terminal device; and
 - determining, by the terminal device, the uplink multiple access manner for the terminal device according to the transmission information.
3. The method of claim 2, wherein under the case that the terminal device determines transmission information of the terminal device according to the parameter indication information,
 - the transmission information comprises the total number of transmission layers

for the terminal device, and

determining, by the terminal device, the uplink multiple access manner for the terminal device according to the transmission information comprises:

responsive to it is determined by the terminal device that the total number of transmission layers is 1, determining, by the terminal device, the uplink multiple access manner for the terminal device according to information carried in the DCI;

or,

the transmission information comprises the total number of transmission layers for the terminal device, and

determining, by the terminal device, the uplink multiple access manner for the terminal device according to the transmission information comprises:

responsive to it is determined by the terminal device that the total number of transmission layers is greater than 1, determining, by the terminal device, that the uplink multiple access manner is an uplink multiple access manner that is predetermined by both the terminal device and the network device,

or,

the transmission information comprises the physical resource configuration manner for the terminal device, and

determining, by the terminal device, the uplink multiple access manner for the terminal device according to the transmission information comprises:

determining, by the terminal device, the uplink multiple access manner according to the physical resource configuration manner and correspondences between physical resource configuration manners and uplink multiple access manners.

4. The method of any one of claims 1-3, wherein the uplink multiple access manner comprises one of:

Discrete Fourier Transformation Spread Orthogonal Frequency Division Multiplexing (DFT-S-OFDM), Cyclic Prefix Orthogonal Frequency Division Multiplexing (CP-OFDM), Single-Carrier Frequency-Division Multiple Access (SC-FDMA), or Orthogonal Frequency Division Multiple Access (OFDMA).

5. The method of any one of claims 1-4, wherein transmitting, by the terminal device, the uplink data according to the uplink multiple access manner comprises:

responsive to it is determined by the terminal device that the uplink multiple access manner is DFT-S-OFDM or SC-FDMA, performing, by the terminal device, a Discrete Fourier Transformation (DFT) on the uplink data and transmitting in an uplink data channel the uplink data on which the DFT has been performed.

6. The method of any one of claims 1-5, wherein transmitting, by the terminal device, the uplink data according to the uplink multiple access manner comprises:

responsive to it is determined by the terminal device that the uplink multiple access manner is CP-OFDM or OFDMA, forbidding, by the terminal device, performing a DFT on the uplink data and transmitting in an uplink data channel the uplink data on which no DFT has been performed.

7. The method of any one of claims 1-6, wherein transmitting, by the terminal device, the uplink data according to the uplink multiple access manner comprises:

determining, by the terminal device, a target uplink data channel structure according to the uplink multiple access manner and correspondences between uplink multiple access manners and uplink data channel structures; and

transmitting, by the terminal device, the uplink data according to the target uplink data channel structure.

8. The method of claim 7, wherein the uplink data channel structure comprises at least one of:

a resource location of DMRS for the uplink data channel, a DMRS sequence for the uplink data channel, a transmission manner for the uplink data in the uplink data channel, a time-domain resource occupied by the uplink data channel, or a frequency-domain resource occupied by the uplink data channel.

9. A method for transmitting uplink data, comprising:

sending, by a network device, Downlink Control Information (DCI) to a terminal device, so that the terminal device determines an uplink multiple access manner for the terminal device according to a DCI format of the DCI or parameter indication information carried in the DCI; and

receiving, by the network device, uplink data transmitted by the terminal

device according to the uplink multiple access manner.

10. The method of claim 9, wherein the uplink multiple access manner comprises one of:

Discrete Fourier Transformation Spread Orthogonal Frequency Division Multiplexing (DFT-S-OFDM), Cyclic Prefix Orthogonal Frequency Division Multiplexing (CP-OFDM), Single-Carrier Frequency-Division Multiple Access (SC-FDMA), or Orthogonal Frequency Division Multiple Access (OFDMA).

11. The method of claim 9 or 10, wherein receiving, by the network device, the uplink data transmitted by the terminal device according to the uplink multiple access manner comprises:

receiving, by the network device, the uplink data transmitted by terminal device according to a target uplink data channel structure, the target uplink data channel structure being determined by the terminal device according to the uplink multiple access manner and correspondences between uplink multiple access manners and uplink data channel structures.

12. The method of claim 11, wherein the uplink data channel structure comprises at least one of:

a resource location of DMRS for the uplink data channel, a DMRS sequence for the uplink data channel, a transmission manner for the uplink data in the uplink data channel, a time-domain resource occupied by the uplink data channel, or a frequency-domain resource occupied by the uplink data channel.

13. A terminal device, comprising:

a receiving unit, configured to receive Downlink Control Information (DCI) sent by a network device;

a determination unit, configured to determine an uplink multiple access manner for the terminal device according to a DCI format of the DCI received by the receiving unit or determine an uplink multiple access manner for the terminal device according to parameter indication information carried in the DCI; and

a sending unit, configured to transmit uplink data according to the uplink

multiple access manner determined by the determination unit.

14. The terminal device of claim 13, wherein the determination unit is specifically configured to:

determine the uplink multiple access manner for the terminal device according to the DCI format of the DCI and correspondences between DCI formats and uplink multiple access manners;

or, the determination unit is specifically configured to:

determine transmission information of the terminal device according to the parameter indication information, the transmission information comprising at least one of a total number of transmission layers or a physical resource configuration manner for the terminal device; and

determine the uplink multiple access manner for the terminal device according to the transmission information determined by the determination unit.

15. The terminal device of claim 14, wherein under the case that the terminal device determines transmission information of the terminal device according to the parameter indication information, the transmission information comprises the total number of transmission layers for the terminal device, and

the determination unit is specifically configured to, responsive to it is determined that the total number of transmission layers is 1, determine the uplink multiple access manner for the terminal device according to information carried in the DCI.

16. The terminal device of claim 15, wherein the determination unit is specifically configured to:

determine the uplink multiple access manner according to DMRS configuration indication information carried in the DCI, the DMRS configuration indication information being obtained by jointly coding information on a DMRS configuration and information on the uplink multiple access manner; or

determine the uplink multiple access manner according to a value of a New Data Indicator, NDI, bit, which is carried in the DCI, of a disabled codeword; or

determine the uplink multiple access manner according to Modulation and

Coding Scheme, MCS, indication information, which is carried in the DCI, of the disabled codeword; or

determine the uplink multiple access manner according to Rank Indicator, RI, information carried in the DCI, the RI information being obtained by jointly coding a value of an RI and information on the uplink multiple access manner; or

determine the uplink multiple access manner according to a value of a padding bit carried in the DCI; or

determine the uplink multiple access manner according to the physical resource configuration manner indication information carried in the DCI.

17. The terminal device of any one of claims 13-16, wherein the uplink multiple access manner comprises one of:

Discrete Fourier Transformation Spread Orthogonal Frequency Division Multiplexing (DFT-S-OFDM), Cyclic Prefix Orthogonal Frequency Division Multiplexing (CP-OFDM), Single-Carrier Frequency-Division Multiple Access (SC-FDMA), or Orthogonal Frequency Division Multiple Access (OFDMA).

18. The terminal device of any one of claims 13-17, wherein the sending unit is specifically configured to:

responsive to it is determined that the uplink multiple access manner is DFT-S-OFDM or SC-FDMA, perform a Discrete Fourier Transformation (DFT) on the uplink data and transmit in an uplink data channel the uplink data on which the DFT has been performed.

19. The terminal device of any one of claims 13-17, wherein the sending unit is specifically configured to:

responsive to it is determined that the uplink multiple access manner is CP-OFDM or OFDMA, forbid performing a DFT on the uplink data and transmit in an uplink data channel the uplink data on which no DFT has been performed.

20. The terminal device of any one of claims 13-19, wherein the sending unit is specifically configured to:

determine a target uplink data channel structure according to the uplink

multiple access manner and correspondences between uplink multiple access manners and uplink data channel structures; and

transmit the uplink data according to the target uplink data channel structure.

21. The terminal device of claim 20, wherein the uplink data channel structure comprises at least one of:

a resource location of DMRS for the uplink data channel, a DMRS sequence for the uplink data channel, a transmission manner for the uplink data in the uplink data channel, a time-domain resource occupied by the uplink data channel, or a frequency-domain resource occupied by the uplink data channel.

22. A network device, comprising:

a sending unit, configured to send Downlink Control Information (DCI) to a terminal device, so that the terminal device determines an uplink multiple access manner for the terminal device according to a DCI format of the DCI or parameter indication information carried in the DCI; and

a receiving unit, configured to receive uplink data transmitted by the terminal device according to the uplink multiple access manner.

23. The network device of any one of claim 22, wherein the uplink multiple access manner comprises one of:

Discrete Fourier Transformation Spread Orthogonal Frequency Division Multiplexing (DFT-S-OFDM), Cyclic Prefix Orthogonal Frequency Division Multiplexing (CP-OFDM), Single-Carrier Frequency-Division Multiple Access (SC-FDMA), or Orthogonal Frequency Division Multiple Access (OFDMA).

24. The network device of claim 22 or 23, wherein the receiving unit is specifically configured to:

receive the uplink data transmitted by terminal device according to a target uplink data channel structure, the target uplink data channel structure being determined by the terminal device according to the uplink multiple access manner and correspondences between uplink multiple access manners and uplink data channel structures.

25. The network device of claim 24, wherein the uplink data channel structure comprises at least one of:

a resource location of DMRS for the uplink data channel, a DMRS sequence for the uplink data channel, a transmission manner for the uplink data in the uplink data channel, a time-domain resource occupied by the uplink data channel, or a frequency-domain resource occupied by the uplink data channel.