

Claims

1. A method for data transmission, comprising:

transmitting, by User Equipment (UE), data to a network device by using a first uplink transmission waveform on a first beam;

5 receiving, by the UE, a first indication message transmitted by the network device, wherein the first indication message is used for indicating an uplink transmission waveform corresponding to at least one beam; and

transmitting, by the UE, data to the network device by using a second uplink transmission waveform on a second beam of the at least one beam, wherein the second uplink transmission waveform is an uplink transmission waveform corresponding to the second beam indicated in the first indication message.

2. The method of claim 1, wherein the first uplink transmission beam is a default/fallback uplink transmission waveform configured by the UE, and when related configuration information of a system is not received, the UE uses the default/fallback uplink transmission waveform for uplink transmission.

3. The method of claim 2, wherein the default/fallback uplink transmission waveform is set by the UE according to system information of the network device.

4. The method of any one of claims 1-3, wherein the at least one beam does not comprise the first beam, and transmitting, by the UE, data to the network device by using the second uplink transmission waveform on the second beam of the at least one beam comprises:

transmitting, by the UE, data to the network device by using the second uplink transmission waveform on the second beam when the first beam is blocked.

5. The method of any one of claims 1-4, wherein the method further comprises:

receiving, by the UE, a second indication message transmitted by the network device, wherein the second indication message is used for indicating an uplink transmission waveform corresponding to the at least one beam; and

transmitting, by the UE, data to the network device by using a third uplink transmission

waveform on a third beam of the at least one beam, wherein the third uplink transmission waveform is an uplink transmission waveform corresponding to the third beam indicated in the second indication message.

5 6. The method of claim 5, wherein the uplink transmission waveform corresponding to the at least one beam indicated by the second indication message is different from the uplink transmission waveform corresponding to the at least one beam indicated by the first indication message.

7. The method of any one of claims 1-6, wherein the first indication message is high level signaling or Downlink Control Information (DCI).

10 8. The method of any one of claims 1-7, wherein the uplink transmission waveform comprises a waveform determined by using Discrete Fourier Transform-Spread-Orthogonal Frequency Division Multiplexing (DFT-S-OFDM) technology, or a waveform determined by using Cyclic Prefix-Orthogonal Frequency Division Multiplexing (CP-OFDM) technology.

15 9. A method for data transmission, comprising:
receiving, by a network device, data transmitted by User Equipment (UE) by using a first uplink transmission waveform on a first beam;

determining, by the network device, an uplink transmission waveform corresponding to at least one beam; and

20 transmitting, by the network device, a first indication message to the UE, wherein the first indication message is used for indicating the uplink transmission waveform corresponding to the at least one beam.

25 10. The method of claim 9, wherein the first uplink transmission beam is a default/fallback uplink transmission waveform configured by the UE, and when related configuration information of a system is not received, the UE uses the default/fallback uplink transmission waveform for uplink transmission.

11. The method of claim 10, wherein the default/fallback uplink transmission waveform is set by the UE according to system information of the network device.

12. The method of any one of claims 9-11, wherein the method further comprises:

re-determining, by the network device, an uplink transmission waveform corresponding to the at least one beam; and

transmitting, by the network device, a second indication message to the UE, wherein the second indication message is used for indicating the re-determined uplink transmission waveform corresponding to the at least one beam.

13. The method of claim 12, wherein the re-determined uplink transmission waveform corresponding to the at least one beam is different from an uplink transmission waveform corresponding to the at least one beam determined at a previous time.

14. The method of any one of claims 9-13, wherein the first indication message is high level signaling or Downlink Control Information (DCI).

15. The method of any one of claims 9-14, wherein the uplink transmission waveform comprises a waveform determined by using Discrete Fourier Transform-Spread-Orthogonal Frequency Division Multiplexing (DFT-S-OFDM) technology, or a waveform determined by using Cyclic Prefix-Orthogonal Frequency Division Multiplexing (CP-OFDM) technology.

16. User Equipment (UE), comprising:

a transmitting module used for transmitting data to a network device by using a first uplink transmission waveform on a first beam; and

a receiving module used for receiving a first indication message transmitted by the network device, wherein the first indication message is used for indicating an uplink transmission waveform corresponding to at least one beam;

wherein the transmitting module is further used for transmitting data to the network device by using a second uplink transmission waveform on a second beam of the at least one beam, the second uplink transmission waveform is an uplink transmission waveform corresponding to the second beam indicated in the first indication message. 17. The UE of claim 16, wherein the first uplink transmission beam is a default/fallback uplink transmission waveform configured by the UE, and when related configuration information of a system is not

received, the UE uses the default/fallback uplink transmission waveform for uplink transmission.

18. The UE of claim 17, wherein the default/fallback uplink transmission waveform is set by the UE according to system information of the network device. 19. The UE of any one of
5 claims 16-18, wherein the at least one beam does not comprise the first beam, and the transmitting module is further used for transmitting data to the network device by using the second uplink transmission waveform on the second beam when the first beam is blocked.

20. The UE of any one of claims 16-19, wherein the receiving module is further used for receiving a second indication message transmitted by the network device, the second indication
10 message is used for indicating an uplink transmission waveform corresponding to the at least one beam;

the transmitting module is further used for transmitting data to the network device by using a third uplink transmission waveform on a third beam of the at least one beam, the third uplink transmission waveform is an uplink transmission waveform corresponding to the third
15 beam indicated in the second indication message.

21. The UE of claim 20, wherein the uplink transmission waveform corresponding to the at least one beam indicated by the second indication message is different from the uplink transmission waveform corresponding to the at least one beam indicated by the first indication message.

20 22. The UE of any one of claims 19-21, wherein the first indication message is high level signaling or Downlink Control Information (DCI).

23. The UE of any one of claims 19-22, wherein the uplink transmission waveform comprises a waveform determined by using Discrete Fourier Transform-Spread-Orthogonal Frequency Division Multiplexing (DFT-S-OFDM) technology or a waveform determined by
25 using Cyclic Prefix-Orthogonal Frequency Division Multiplexing (CP-OFDM) technology.

24. A network device, comprising:

a receiving module used for receiving data transmitted by User Equipment (UE) by using a first uplink transmission waveform on a first beam;

a determining module used for determining an uplink transmission waveform corresponding to at least one beam; and

a transmitting module used for transmitting a first indication message to the UE, wherein the first indication message is used for indicating the uplink transmission waveform
5 corresponding to the at least one beam.

25. The network device of claim 24, wherein the first uplink transmission beam is a default/fallback uplink transmission waveform configured by the UE, and when related configuration information of a system is not received, the UE uses the default/fallback uplink transmission waveform for uplink transmission.

10 26. The network device of claim 25, wherein the default/fallback uplink transmission waveform is set by the UE according to system information of the network device.

27. The network device of any one of claims 24-26, wherein the determining module is further used for re-determining an uplink transmission waveform corresponding to the at least one beam;

15 the transmitting module is further used for transmitting a second indication message to the UE, the second indication message is used for indicating the re-determined uplink transmission waveform corresponding to the at least one beam.

28. The network device of claim 27, wherein the re-determined uplink transmission waveform corresponding to the at least one beam is different from an uplink transmission
20 waveform corresponding to the at least one beam determined at a previous time.

29. The network device of any one of claims 24-28, wherein the first indication message is high level signaling or Downlink Control Information (DCI).

30. The network device of any one of claims 24-29, wherein the uplink transmission waveform comprises a waveform determined by using Discrete Fourier
25 Transform-Spread-Orthogonal Frequency Division Multiplexing (DFT-S-OFDM) technology, or a waveform determined by using Cyclic Prefix-Orthogonal Frequency Division Multiplexing (CP-OFDM) technology.