CLAIMS

What is claimed is:

1. A communication method, characterized in that the method is applied to a communication apparatus, comprising:

obtaining first capability information, wherein the first capability information indicates a quantity of multiple-input multiple-output, MIMO, layers supported on a first carrier and a quantity of MIMO layers supported on a second carrier when uplink transmission is performed on the first carrier and the second carrier in time division multiplexing mode;

obtaining inter-carrier switching period information, wherein the inter-carrier switching period information indicates a switching period between the first carrier and the second carrier;

sending the first capability information and the inter-carrier switching period information to a network device;

receiving indication formation from the network device, wherein the indication information indicates performing uplink transmission on the first carrier and the second carrier in time division multiplexing mode.

2. The method according to claim 1, characterized in that the method further comprises:

performing uplink transmission with the network device on the first carrier and the second carrier in time division multiplexing mode based on the indication formation.

3. The method according to claim 1 or 2, characterized in that the indication information further indicates a quantity of MIMO layers used on the first carrier and a quantity of MIMO layers used on the second carrier when uplink transmission is performed on the first carrier and the second carrier in time division multiplexing mode.

4. The method according to claim 3, characterized in that when uplink transmission is performed on the first carrier and the second carrier in time division multiplexing mode, the quantity of MIMO layers used on the first carrier is less than or equal to the quantity of MIMO layers supported on the first carrier, and the quantity of MIMO layers used on the second carrier is less than or equal to the quantity of MIMO layers supported on the second carrier.

5. The method according to any one of claims 1 to 4, characterized in that data is scheduled on the first carrier and the second carrier for uplink transmission in time division multiplexing mode.

6. The method according to claim 5, characterized in that the data is Physical Uplink Shared Channel (PUSCH) data and/or Physical Uplink Control Channel (PUCCH) data.

7. The method according to claim 1, characterized in that a quantity of MIMO layers used on the first carrier is 2 and a quantity of MIMO layers used on the second carrier is 1 when uplink transmission is performed on the first carrier and the second carrier in time division multiplexing mode.

8. The method according to claim 1, characterized in that a quantity of MIMO layers used on the first carrier is 2 and a quantity of MIMO layers used on the second carrier is 2 when uplink transmission is performed on the first carrier and the second carrier in time division multiplexing mode.

9. The method according to any one of claims 1 to 8, characterized in that when uplink transmission is performed on the first carrier and the second carrier in time division multiplexing mode, the first carrier and the second carrier share one or more radio frequency channels.

10. The method according to any one of claims 1 to 8, characterized in that a message carrying the first capability information further carries second capability information, wherein the method further comprises:

obtaining second capability information, and the second capability information indicates a quantity of MIMO layers supported on the first carrier and a quantity of MIMO layers supported on the second carrier when the uplink transmission is performed on the first carrier and the second carrier in simultaneous transmission mode.

11. The method according to claim 10, characterized in that a quantity of MIMO layers supported on the first carrier when uplink transmission is performed on the first carrier and the second carrier in time division multiplexing mode is greater than a quantity of MIMO layers supported on the first carrier when uplink transmission is performed on the first carrier and the second carrier in simultaneous transmission mode.

12. The method according to claim 2, characterized in that performing uplink transmission with the network device on the first carrier and the second carrier in time division multiplexing mode based on the indication formation comprises:

performing transmission on a uplink transmission time domain resource of the first carrier;

switching from the first carrier to the second carrier within duration of a silent time domain resource, wherein a preceding symbol adjacent to the silent time domain resource belongs to the

uplink transmission time domain resource of the first carrier, and a subsequent symbol adjacent to the silent time domain resource belongs to a uplink transmission time domain resource of the second carrier, a length of the silent time domain resource is greater than or equal to the switching period between the first carrier and the second carrier;

performing transmission on the uplink transmission time domain resource of the second carrier;

or,

performing transmission on a uplink transmission time domain resource of the second carrier;

switching from the second carrier to the first carrier within duration of a silent time domain resource, wherein a preceding symbol adjacent to the silent time domain resource belongs to the uplink transmission time domain resource of the second carrier, a subsequent symbol adjacent to the silent time domain resource belongs to a uplink transmission time domain resource of the first carrier, and a length of the silent time domain resource is greater than or equal to the switching period between the first carrier and the second carrier;

performing transmission on the uplink transmission time domain resource of the first carrier.

13. The method according to any one of claims 1 to 12, characterized in that the method further comprises:

receiving information indicating reporting the first capability information from the network device.

14. The method according to any one of claims 1 to 13, wherein the communication apparatus is a terminal or a chip in the terminal.

15. The method according to claim 14, characterized in that the first carrier and the second carrier are carriers between the terminal and the network device.

16. The method according to claim 15, characterized in that the first carrier and the second carrier are carriers in carrier aggregation, CA, scenario.

17. The method according to claim 14, characterized in that the first carrier and the second carrier are carriers in a dual connectivity, DC, scenario, the first carrier is a carrier between the terminal and the network device, and the second carrier is a carrier between the terminal and a network device different from the network device.

18. A communication method, characterized in that the method is applied to a communication apparatus, comprising:

receiving first capability information and inter-carrier switching period information from a terminal, wherein the first capability information indicates a quantity of multiple-input multiple-output, MIMO, layers supported on a first carrier and a quantity of MIMO layers supported on a second carrier when uplink transmission is performed on the first carrier and the second carrier in time division multiplexing mode, and the inter-carrier switching period information indicates a switching period between the first carrier and the second carrier;

determining the quantity of MIMO layers supported on the first carrier and the quantity of MIMO layers supported on the second carrier when uplink transmission is performed on the first carrier and the second carrier in time division multiplexing mode;

sending indication formation to the terminal, wherein the indication information indicates performing uplink transmission on the first carrier and the second carrier in time division multiplexing mode.

19. The method according to claim 18, characterized in that the method further comprises:

performing uplink transmission with the terminal on the first carrier and the second carrier in time division multiplexing mode.

20. The method according to claim 18 or 19, characterized in that the indication information further indicates a quantity of MIMO layers used on the first carrier and a quantity of MIMO layers used on the second carrier when uplink transmission is performed on the first carrier and the second carrier in time division multiplexing mode.

21. The method according to claim 20, characterized in that when uplink transmission is performed on the first carrier and the second carrier in time division multiplexing mode, the quantity of MIMO layers used on the first carrier is less than or equal to the quantity of MIMO layers supported on the first carrier, and the quantity of MIMO layers used on the second carrier is less than or equal to the quantity of MIMO layers supported on the second carrier.

22. The method according to any one of claims 18 to 21, characterized in that the method further comprises:

scheduling data on the first carrier and the second carrier based on the inter-carrier switching period information, to perform uplink transmission with the terminal on the first carrier and the second carrier in time division multiplexing mode.

23. The method according to claim 22, characterized in that the data is Physical Uplink Shared Channel (PUSCH) data and/or Physical Uplink Control Channel (PUCCH) data.

24. The method according to claim 22, characterized in that the method further comprises:

receiving system frame number and frame timing difference, SFTD, information and uplink TA information from the terminal;

obtaining a time difference between the first carrier and the second carrier, based on the SFTD information and the uplink TA information; and

scheduling data on the first carrier and the second carrier based on the inter-carrier switching period information comprises:

scheduling data on the first carrier and the second carrier based on the inter-carrier switching period information and the time difference, to perform uplink transmission with the terminal on the first carrier and the second carrier in time division multiplexing mode.

25. The method according to claim 18, characterized in that a quantity of MIMO layers used on the first carrier is 2 and a quantity of MIMO layers used on the second carrier is 1 when uplink transmission is performed on the first carrier and the second carrier in time division multiplexing mode; or

a quantity of MIMO layers used on the first carrier is 2 and a quantity of MIMO layers used on the second carrier is 2 when uplink transmission is performed on the first carrier and the second carrier in time division multiplexing mode.

26. The method according to any one of claims 18 to 25, characterized in that a message carrying the first capability information further carries second capability information, and the second capability information indicates a quantity of MIMO layers supported on the first carrier and a quantity of MIMO layers supported on the second carrier when uplink transmission is performed on the first carrier and the second carrier in simultaneous transmission mode.

27. The method according to claim 26, characterized in that a quantity of MIMO layers supported on the first carrier when uplink transmission is performed on the first carrier and the second carrier in time division multiplexing mode is greater than a quantity of MIMO layers supported on the first carrier when uplink transmission is performed on the first carrier and the second carrier in simultaneous transmission mode.

28. The method according to claim 18, characterized in that method further comprises:

determining a silent time domain resource based on the inter-carrier switching period information, a length of the silent time domain resource is greater than or equal to the switching period between the first carrier and the second carrier;

configuring a preceding symbol adjacent to the silent time domain resource as a uplink transmission time domain resource of the first carrier, and a subsequent symbol adjacent to the silent time domain resource as a uplink transmission time domain resource of the second carrier; or

configuring a preceding symbol adjacent to the silent time domain resource as a uplink transmission time domain resource of the second carrier, and a subsequent symbol adjacent to the silent time domain resource as a uplink transmission time domain resource of the first carrier.

29. The method according to any one of claims 18 to 28, characterized in that the method further comprises:

sending information indicating reporting the first capability information to the terminal.

30. The method according to any one of claims 18 to 29, characterized in that the communication apparatus is a terminal or a chip in the terminal.

31. The method according to claim 30, characterized in that the first carrier and the second carrier are carriers between the terminal and the network device.

32. The method according to claim 31, characterized in that the first carrier and the second carrier are carriers in carrier aggregation, CA, scenario.

33. The method according to claim 30, characterized in that the first carrier and the second carrier are carriers in a dual connectivity, DC, scenario, the first carrier is a carrier between the terminal and the network device, and the second carrier is a carrier between the terminal and a network device different from the network device.

34. A communication apparatus, characterized by comprising a processor, wherein the processor is coupled to a memory, and the memory is configured to store at least a part of a computer program or instructions, the processor is configured to execute the computer program or instructions, such that the method of any one of claims 1 to 17 is performed.

35. A communication apparatus, characterized by comprising a processor, wherein the processor is coupled to a memory, and the memory is configured to store at least a part of a computer program or instructions, the processor is configured to execute the computer program or instructions, such that the method of any one of claims 18 to 33 is performed.

36. A chip, comprising a processor and an interface circuit, wherein the processor is coupled to the interface circuit, the processor is configured to execute a computer program or instructions, such that the method of any one of claims 1 to 17 is performed.

37. A communication apparatus, characterized in that the communication device includes one or more units, and the one or more units being configured to execute the method of any one of claims 1 to 17.

38. A communication apparatus, characterized in that the communication device includes one or more units, and the one or more units being configured to execute the method of any one of claims 18 to 33.

39. A computer-readable storage medium, characterized in that the storage medium is configured to store a computer program or instructions, which when executed, the method of any one of claims 1 to 17 is performed, or the method of any one of claims 18 to 33 is performed.

40. A computer program product, characterized by including a computer program or instructions, which when executed, the method of any one of claims 1 to 33 is performed.

41. A communication system, characterized in that the communication system includes a terminal for executing the method of any one of claims 1 to 17 and a network device for executing the method of any one of claims 18 to 33.