WHAT IS CLAIMED IS:

1. A frequency hopping method, performed by a terminal device, comprising:

determining a frequency hopping pattern of a physical uplink shared channel (PUSCH);

determining at least one of a number of hops ~~and/~~or a time-domain length of a hop ~~in response to enabling a frequency hopping pattern of a physical uplink shared channel (PUSCH);~~, wherein a transmission pattern of the PUSCH is transport block processing over multi-slots (TBoMS); and

performing frequency hopping according to the frequency hopping pattern of the PUSCH, and the at least one of the number of hops ~~and/~~or the time-domain length of the hop.

2. The method according to claim 1, wherein determining the number of hops comprises: determining the number of hops according to a protocol agreement.

~~3. The method according to claim 2, wherein determining the number of hops according to the protocol agreement comprises:~~

~~obtaining a first preset value agreed by the protocol; wherein the first preset value is greater than or equal to 2; and~~

~~determining the first preset value as the number of hops.~~

4~~3~~. The method according to claim 2 ~~or 3~~, wherein determining the number of hops according to the protocol agreement comprises:

obtaining a time-domain length occupied by the transport block; and

determining the number of hops according to a correspondence relationship agreed by the protocol between the time-domain length occupied by the transport block and the number of hops, and the obtained time-domain length occupied by the transport block.

~~5. The method according to any one of claims 2 to 4, wherein determining the number of hops according to the protocol agreement comprises:~~

~~obtaining a number of demodulation reference signals (DMRSs) configured in the PUSCH; and~~

~~determining the number of hops according to a correspondence relationship agreed by the protocol between the number of DMRSs configured and the number of hops, and the obtained number of DMRSs configured in the PUSCH.~~

~~6~~4. The method according to any one of claims 2 to ~~5~~3, wherein determining the number of hops according to the protocol agreement comprises:

obtaining a time-domain length occupied by the transport block; and

determining the number of hops according to a time-domain length of the hop agreed by the protocol, a correspondence relationship agreed by the protocol among the time-domain length of the hop, the time-domain length occupied by the transport block and the number of hops, and the obtained time-domain length occupied by the transport block.

~~7. The method according to claim 6, wherein the correspondence relationship agreed by the protocol among the time-domain length of the hop, the time-domain length occupied by the transport block and the number of hops comprises:~~

~~the time-domain length occupied by the transport block being a product of the number of hops and the time-domain length of the hop.~~

~~8. The method according to any one of claims 2 to 7, wherein determining the number of hops according to the protocol agreement comprises:~~

~~obtaining a position of an unavailable symbol in the PUSCH, wherein the unavailable symbol cannot be used to transmit data; and~~

~~determining a frequency hopping start position and a frequency hopping end position according to a correspondence relationship agreed by the protocol among the position of the unavailable symbol, the frequency hopping start position and the frequency hopping end position, and the obtained position of the unavailable symbol in the PUSCH.~~

~~9. The method according to claim 8, wherein the correspondence relationship agreed by the protocol among the position of the unavailable symbol, the frequency hopping start position and the frequency hopping end position comprises:~~

~~a position of an adjacent symbol previous to the unavailable symbol is the frequency hopping end position; and~~

~~a position of an adjacent symbol following the unavailable symbol is the frequency hopping start position.~~

~~10~~5. The method according to any one of claims 2 to ~~9~~4, wherein determining the number of hops according to the protocol agreement comprises:

obtaining a position of a slot boundary in the PUSCH; and

determining a frequency hopping start position and a frequency hopping end position according to a correspondence relationship agreed by the protocol among the position of the slot boundary, the frequency hopping start position and the frequency hopping end position, and the obtained position of the slot boundary in the PUSCH.

~~11~~6. The method according to claim ~~10~~5, wherein the correspondence relationship agreed by the protocol among the position of the slot boundary, the frequency hopping start position and the frequency hopping end position comprises:

a position of an adjacent symbol previous to the position of the slot boundary is the frequency hopping end position; and

a position of an adjacent symbol following the position of the slot boundary is the frequency hopping start position.

~~12. The method according to any one of claims 2 to 11, wherein determining the number of hops according to the protocol agreement comprises:~~

~~obtaining a position of a slot boundary in the PUSCH and a first preset number of symbols; and~~

~~determining a frequency hopping start position and a frequency hopping end position according to a correspondence relationship agreed by the protocol among the position of the slot boundary, the first preset number of symbols, the frequency hopping start position and the frequency hopping end position, and the obtained position of the slot boundary in the PUSCH and the obtained first preset number of symbols.~~

~~13. The method according to claim 12, wherein the correspondence relationship agreed by the protocol among the position of the slot boundary, the first preset number of symbols, the frequency hopping start position and the frequency hopping end position comprises:~~

~~a position of an adjacent symbol previous to the position of the slot boundary is the frequency hopping end position, and a position of an adjacent symbol following the position of the slot boundary is the frequency hopping start position; and~~

~~a position of a symbol previous to the position of the slot boundary and separated by the first preset number of symbols from the position of the slot boundary is the frequency hopping start position, and a position of a symbol following the position of the slot boundary and separated by the first preset number of symbols from the position of the slot boundary is the frequency hopping end position.~~

14. The method according to claim 1, wherein determining the number of hops comprises:

determining the number of hops according to a configuration of a base station.

15. The method according to claim 14, wherein determining the number of hops according to the configuration of the base station comprises:

receiving a third preset value sent by the base station; wherein the third preset value is greater than or equal to 2; and

determining the third preset value as the number of hops.

16. The method according to claim 15, wherein obtaining the third preset value configured by the base station comprises:

receiving the third preset value sent by the base station through a remaining minimum system information (RMSI) signaling, or a radio resource control (RRC) signaling, or a downlink control information (DCI) signaling, or a medium access control (MAC) control element (CE) signaling.

17. The method according to claim 16, wherein receiving the third preset value sent by the base station through the DCI signaling comprises:

receiving the third preset value sent by the base station through the DCI signaling by multiplexing part or all of bits in a modulation and coding scheme (MCS) field or in a TPC field in the DCI signaling or by adding a new field in the DCI signaling.

18. The method according to claim 14, wherein determining the number of hops according to the configuration of the base station comprises:

receiving one first parameter value in a first parameter set, indicated by the base station, and determining the first parameter value as the number of hops.

19. The method according to claim 18, wherein receiving the one first parameter value in the first parameter set, indicated by the base station comprises:

receiving the first parameter set configured by the base station through a remaining minimum system information (RMSI) signaling or a radio resource control (RRC) signaling; and

receiving the one first parameter value in the first parameter set, sent by the base station through a downlink control information (DCI) signaling or a medium access control (MAC) control element (CE) signaling.

~~20. The method according to claim 18, wherein receiving the one first parameter value in the first parameter set, indicated by the base station comprises:~~

~~receiving the first parameter set carried on a field added by the base station in a modulation and coding scheme (MCS) table or in a time-domain resource allocation (TDRA) table; and~~

~~receiving the one first parameter value in the first parameter set, sent by the base station through a downlink control information (DCI) signaling by multiplexing an MCS field in the DCI signaling.~~

~~21. The method according to claim 14, wherein determining the number of hops according to the configuration of the base station comprises:~~

~~obtaining a time-domain length occupied by the transport block; and~~

~~determining the number of hops according to a time-domain length of the hop configured by the base station, a specific calculation rule configured by the base station among the time-domain length of the hop, the time-domain length occupied by the transport block and the number of hops, and the obtained time domain occupied by the transport block.~~

~~22~~7. The method according to any one of claims 1 to 6, wherein determining the time-domain length of the hop comprises: determining the time-domain length of the hop according to a protocol agreement.

~~23~~8. The method according to claim 7~~22~~, wherein determining the time-domain length of the hop according to the protocol agreement comprises:

obtaining a ~~second~~ preset value agreed by the protocol; wherein the ~~second~~ preset value is an integer greater than zero; and

determining the second preset value as the time-domain length of the hop.

~~24. The method according to claim 22 or 23, wherein determining the time-domain length of the hop according to the protocol agreement comprises:~~

~~obtaining a time-domain length occupied by the transport block; and~~

~~determining the time-domain length of the hop according to a correspondence relationship agreed by the protocol between the time-domain length occupied by the transport block and the time-domain length of the hop, and the obtained time-domain length occupied by the transport block.~~

25. The method according to any one of claims 22 to 24, wherein determining the time-domain length of the hop according to the protocol agreement comprises:

obtaining a number of demodulation reference signals (DMRSs) configured in the PUSCH; and

determining the time-domain length of the hop according to a correspondence relationship agreed by the protocol between the number of DMRSs configured and the time-domain length of the hop, and the obtained number of DMRSs configured in the PUSCH.

26. The method according to any one of claims 22 to 25, wherein determining the time-domain length of the hop according to the protocol agreement comprises:

obtaining a time-domain length occupied by the transport block; and

determining the time-domain length of the hop according to a number of hops agreed by the protocol, a correspondence relationship agreed by the protocol among the number of hops, the time-domain length occupied by the transport block and the time-domain length of the hop, and the obtained time-domain length occupied by the transport block.

27. The method according to claim 26, wherein the correspondence relationship among the number of hops, the time-domain length occupied by the transport block and the time-domain length of the hop comprises:

the time-domain length occupied by the transport block being a product of the number of hops and the time-domain length of the hop.

28. The method according to any one of claims 22 to 27, wherein determining the time-domain length of the hop according to the protocol agreement comprises:

obtaining a position of an unavailable symbol in the PUSCH, wherein the unavailable symbol cannot be used to transmit data; and

determining a frequency hopping start position and a frequency hopping end position according to a correspondence relationship agreed by the protocol among the position of the unavailable symbol, the frequency hopping start position and the frequency hopping end position, and the obtained position of the unavailable symbol in the PUSCH.

29. The method according to claim 28, wherein the correspondence relationship agreed by the protocol among the position of the unavailable symbol, the frequency hopping start position

~~and the frequency hopping end position comprises:~~

~~a position of an adjacent symbol previous to the unavailable symbol is the frequency hopping end position; and~~

~~a position of an adjacent symbol following the unavailable symbol is the frequency hopping start position.~~

~~30. The method according to any one of claims 22 to 29, wherein determining the time-domain length of the hop according to the protocol agreement comprises:~~

~~obtaining a position of a slot boundary in the PUSCH; and~~

~~determining a frequency hopping start position and a frequency hopping end position according to a correspondence relationship agreed by the protocol among the position of the slot boundary, the frequency hopping start position and the frequency hopping end position, and the obtained position of the slot boundary in the PUSCH.~~

~~31. The method according to claim 30, wherein the correspondence relationship agreed by the protocol among the position of the slot boundary, the frequency hopping start position and the frequency hopping end position comprises:~~

~~a position of an adjacent symbol previous to the position of the slot boundary is the frequency hopping end position; and~~

~~a position of an adjacent symbol following the position of the slot boundary is the frequency hopping start position.~~

~~32. The method according to any one of claims 22 to 31, wherein determining the time-domain length of the hop according to the protocol agreement comprises:~~

~~obtaining a position of a slot boundary in the PUSCH and a second preset number of symbols; and~~

~~determining a frequency hopping start position and a frequency hopping end position according to a correspondence relationship agreed by the protocol among the position of the slot boundary, the second preset number of symbols, the frequency hopping start position and the frequency hopping end position, and the obtained position of the slot boundary in the PUSCH and the obtained second preset number of symbols.~~

~~33. The method according to claim 32, wherein the correspondence relationship agreed by the protocol among the position of the slot boundary, the second preset number of symbols, the~~

frequency hopping start position and the frequency hopping end position comprises:

a position of an adjacent symbol previous to the position of the slot boundary is the frequency hopping end position, and a position of an adjacent symbol following the position of the slot boundary is the frequency hopping start position; and

a position of a symbol previous to the position of the slot boundary and separated by the second preset number of symbols from the position of the slot boundary is the frequency hopping start position, and a position of a symbol following the position of the slot boundary and separated by the second preset number of symbols from the position of the slot boundary is the frequency hopping end position.

34. The method according to any one of claims 22 to 33, wherein determining the time-domain length of the hop according to the protocol agreement comprises:

obtaining a time-domain length occupied by the transport block; and

determining the time-domain length of the hop according to a number of hops preset by the protocol, a specific calculation rule preset by the protocol among the number of hops, the time-domain length occupied by the transport block and the time-domain length of the hop, and the obtained time-domain length occupied by the transport block.

35. The method according to claim 34, wherein the specific calculation rule preset by the protocol among the number of hops, the time-domain length occupied by the transport block and the time-domain length of the hop comprises:

determining a time-domain length of the hop in a $i^{th}$ (i=1, 2, ..., N-1) hop as floor(L/N); where L is the time-domain length occupied by the transport block, N is an integer; and

determining a time-domain length of the hop in a $N^{th}$ hop as L-floor(L/N)*(N-1).

36. The method according to claim 34, wherein the specific calculation rule preset by the protocol among the number of hops, the time-domain length occupied by the transport block and the time-domain length of the hop comprises:

determining a time-domain length of the hop in a $i^{th}$ (i=1, 2, ..., N-L+floor(L/N)*N) hop as floor(L/N); where L is the time-domain length occupied by the transport block, N is an integer; and

determining a time-domain length of the hop in a $i^{th}$ (i=1+N-L+floor(L/N)*N, …, N) hop as ceil(L/N).

37. The method according to claim 1, wherein determining the time-domain length of the hop comprises: determining the time-domain length of the hop according to a configuration of a base station.

38. The method according to claim 37, wherein determining the time-domain length of the hop according to the configuration of the base station comprises:

obtaining a fourth preset value configured by the base station; wherein the fourth preset value is greater than or equal to 2; and

determining the fourth preset value as the time-domain length of the hop.

39. The method according to claim 38, wherein obtaining the fourth preset value configured by the base station comprises:

receiving the fourth preset value sent by the base station through a remaining minimum system information (RMSI) signaling, or a radio resource control (RRC) signaling, or a downlink control information (DCI) signaling, or a medium access control (MAC) control element (CE) signaling.

40. The method according to claim 39, wherein indicating the fourth preset value by the base station through the DCI signaling comprises:

receiving the fourth preset value sent by the base station through the DCI signaling by multiplexing part or all of bits in a modulation and coding scheme (MCS) field or in a transmit power control (TPC) field in the DCI signaling or by adding a new field in the DCI signaling.

41. The method according to claim 37, wherein determining the time-domain length of the hop according to the configuration of the base station comprises:

receiving one second parameter value in a second parameter set indicated by the base station, and determining the second parameter value as the number of hops.

42. The method according to claim 41, wherein receiving the one second parameter value in the second parameter set, indicated by the base station comprises:

receiving the second parameter set configured by the base station through a remaining minimum system information (RMSI) signaling or through a radio resource control (RRC) signaling; and

receiving the one second parameter value in the second parameter set, sent by the base station

through a downlink control information (DCI) signaling or a medium access control (MAC) control element (CE) signaling.

43. The method according to claim 41, wherein receiving the one second parameter value in the second parameter set, indicated by the base station comprises:

receiving the second parameter set carried on a field added by the base station in a modulation and coding scheme (MCS) table or in a time-domain resource allocation (TDRA) table; and

receiving the one second parameter value in the second parameter set, sent by the base station through a downlink control information (DCI) signaling multiplexing an MCS field in the DCI signaling.

44. The method according to claim 37, wherein determining the time-domain length of the hop according to the configuration of the base station comprises:

obtaining a time-domain length occupied by the transport block; and

determining the time-domain length of the hop according to a number of hops configured by the base station, a specific calculation rule configured by the base station among the number of hops, the time-domain length occupied by the transport block and the time-domain length of the hop, and the obtained time-domain length occupied by the transport block.

45. The method according to claim 44, wherein the specific calculation rule configured by the base station among the number of hops, the time-domain length occupied by the transport block and the time-domain length of the hop comprises:

determining a time-domain length of the hop in a $i^{th}$ (i=1, 2, ..., N-1) hop as floor(L/N); where L is the time-domain length occupied by the transport block, N is an integer; and

determining a time-domain length of the hop in a $N^{th}$ hop as L-floor(L/N)*(N-1).

46. The method according to claim 44, wherein the specific calculation rule configured by the base station among the number of hops, the time-domain length occupied by the transport block and the time-domain length of the hop comprises:

determining a time-domain length of the hop in a $i^{th}$ (i=1, 2, ..., N-L+floor(L/N)*N) hop as: floor(L/N) where L is the time-domain length occupied by the transport block, N is an integer; and

determining a time-domain length of the hop in a $i^{th}$ (i=1+N-L+floor(L/N)*N, …, N) hop as ceil(L/N).

47. The method according to any one of claims 1 to 46, wherein the frequency hopping pattern comprises intra-slot frequency hopping, or inter-slot frequency hopping, or intra-transport-block frequency hopping, or intra-retransmission hopping frequency, or inter-retransmission frequency hopping.

48. The method according to claim 47, wherein performing the frequency hopping according to the frequency hopping pattern of the PUSCH, and the number of hops and/or the time-domain length of the hop comprises:

performing the frequency hopping according to the intra-slot frequency hopping, the number of hops determined according to the method according to any one of claims 2 to 21 within a slot, and the time-domain length of the hop determined according to the method according to any one of claims 22 to 46 within a slot.

49. The method according to claim 47, wherein performing the frequency hopping according to the frequency hopping pattern of the PUSCH, and the number of hops and/or the time-domain length of the hop comprises:

performing the frequency hopping according to the inter-slot frequency hopping, the number of hops determined according to the method according to any one of claims 2 to 21, and the time-domain length of the hop determined according to the method according to any one of claims 22 to 46.

50. The method according to claim 47, wherein performing the frequency hopping according to the frequency hopping pattern of the PUSCH, and the number of hops and/or the time-domain length of the hop comprises:

performing the frequency hopping according to the intra-transport-block frequency hopping, the number of hops determined according to the method according to any one of claims 2 to 21 within a transport block, or the time-domain length of the hop determined according to the method according to any one of claims 22 to 46 within a transport block.

51. The method according to claim 47, wherein performing the frequency hopping according to the frequency hopping pattern of the PUSCH, and the number of hops and/or the time-domain length of the hop comprises:

performing the frequency hopping according to the intra-retransmission hopping frequency, the number of hops determined according to the method according to any one of claims 2 to 21

~~within a retransmission copy, or the time-domain length of the hop determined according to the method according to any one of claims 22 to 46 within a retransmission copy.~~

~~52. The method according to claim 47, wherein performing the frequency hopping according to the frequency hopping pattern of the PUSCH, and the number of hops and/or the time-domain length of the hop comprises:~~

~~performing the frequency hopping according to the inter-retransmission frequency hopping, the number of hops determined according to the method according to any one of claims 2 to 21, and the time-domain length of the hop determined according to the method according to any one of claims 22 to 46.~~

~~53. The method according to any one of claims 1 to 52, wherein each hop in the frequency hopping comprises a demodulation reference signal (DMRS) symbol.~~

~~54. The method according to any one of claims 1 to 53, wherein in response to enabling the frequency hopping pattern of the PUSCH comprises:~~

~~enabling the frequency hopping pattern of the PUSCH in response to a frequency hopping indication, from the base station, carried on a radio resource control (RRC) signaling, or a remaining minimum system information (RMSI) signaling, or a medium access control (MAC) control element (CE) signaling, or a downlink control information (DCI) signaling.~~

~~55~~9. A frequency hopping method, performed by a base station, comprising:

determining a frequency hopping pattern of a physical uplink shared channel (PUSCH);

determining at least one of a number of hops ~~and/~~or a time-domain length of a hop of a user equipment (UE) ~~in response to enabling a frequency hopping pattern of a physical uplink shared channel (PUSCH);~~, wherein a transmission pattern of the PUSCH is transport block processing over multi-slots (TBoMS); and

performing frequency hopping for the UE according to the frequency hopping pattern of the PUSCH, and the at least one of the number of hops ~~and/~~or the time-domain length of the hop.

~~56~~10. The method according to claim ~~55~~9, wherein determining the number of hops comprises: determining the number of hops according to a protocol agreement.

~~57. The method according to claim 56, wherein determining the number of hops according to~~

~~the protocol agreement comprises:~~

~~obtaining a fifth preset value agreed by the protocol; wherein the fifth preset value is greater than or equal to 2; and~~

~~determining the fifth preset value as the number of hops.~~

~~58~~11. The method according to claim ~~56 or 57~~10, wherein determining the number of hops according to the protocol agreement comprises:

obtaining a time-domain length occupied by the transport block; and

determining the number of hops according to a correspondence relationship agreed by the protocol between the time-domain length occupied by the transport block and the number of hops, and the obtained time-domain length occupied by the transport block.

~~59. The method according to any one of claims 56 to 58, wherein determining the number of hops according to the protocol agreement comprises:~~

~~obtaining a number of demodulation reference signals (DMRSs) configured in the PUSCH; and~~

~~determining the number of hops according to a correspondence relationship agreed by the protocol between the number of DMRSs configured and the number of hops, and the obtained number of DMRSs configured in the PUSCH.~~

~~60~~12. The method according to any one of claims ~~56~~ 10 to ~~59~~11, wherein determining the number of hops according to the protocol agreement comprises:

obtaining a time-domain length occupied by the transport block; and

determining the number of hops according to a time-domain length of the hop agreed by the protocol, a correspondence relationship agreed by the protocol among the time-domain length of the hop, the time-domain length occupied by the transport block and the number of hops, and the obtained time-domain length occupied by the transport block.

~~61. The method according to claim 60, wherein the correspondence relationship agreed by the protocol among the time-domain length of the hop, the time-domain length occupied by the transport block and the number of hops comprises:~~

~~the time-domain length occupied by the transport block being a product of the number of hops and the time-domain length of the hop.~~

~~62. The method according to any one of claims 56 to 61, wherein determining the number of hops according to the protocol agreement comprises:~~

~~obtaining a position of an unavailable symbol in the PUSCH, wherein the unavailable symbol cannot be used to transmit data; and~~

~~determining a frequency hopping start position and a frequency hopping end position according to a correspondence relationship agreed by the protocol among the position of the unavailable symbol, the frequency hopping start position and the frequency hopping end position, and the obtained position of the unavailable symbol in the PUSCH.~~

~~63. The method according to claim 62, wherein the correspondence relationship agreed by the protocol among the position of the unavailable symbol, the frequency hopping start position and the frequency hopping end position comprises:~~

~~a position of an adjacent symbol previous to the unavailable symbol is the frequency hopping end position; and~~

~~a position of an adjacent symbol following the unavailable symbol is the frequency hopping start position.~~

~~64~~13. The method according to any one of claims ~~56~~ 10 to ~~63~~12, wherein determining the number of hops according to the protocol agreement comprises:

obtaining a position of a slot boundary in the PUSCH; and

determining a frequency hopping start position and a frequency hopping end position according to a correspondence relationship agreed by the protocol among the position of the slot boundary, the frequency hopping start position and the frequency hopping end position, and the obtained position of the slot boundary in the PUSCH.

~~65~~14. The method according to claim ~~64~~13, wherein the correspondence relationship agreed by the protocol among the position of the slot boundary, the frequency hopping start position and the frequency hopping end position comprises:

a position of an adjacent symbol previous to the position of the slot boundary is the frequency hopping end position; and

a position of an adjacent symbol following the position of the slot boundary is the frequency hopping start position.

~~66. The method according to any one of claims 56 to 65, wherein determining the number of~~

hops according to the protocol agreement comprises:

obtaining a position of a slot boundary in the PUSCH and a third preset number of symbols; and

determining a frequency hopping start position and a frequency hopping end position according to a correspondence relationship agreed by the protocol among the position of the slot boundary, the third preset number of symbols, the frequency hopping start position and the frequency hopping end position, and the obtained position of the slot boundary in the PUSCH and the obtained third preset number of symbols.

67. The method according to claim 66, wherein the correspondence relationship agreed by the protocol among the position of the slot boundary, the third preset number of symbols, the frequency hopping start position and the frequency hopping end position comprises:

a position of an adjacent symbol previous to the position of the slot boundary is the frequency hopping end position, and a position of an adjacent symbol following the position of the slot boundary is the frequency hopping start position; and

a position of a symbol previous to the position of the slot boundary and separated by the third preset number of symbols from the position of the slot boundary is the frequency hopping start position, and a position of a symbol following the position of the slot boundary and separated by the third preset number of symbols from the position of the slot boundary is the frequency hopping end position.

68. The method according to claim 55, wherein determining the number of hops comprises: determining the number of hops according to a configuration of a base station.

69. The method according to claim 68, wherein determining the number of hops according to the configuration of the base station comprises:

configuring a sixth preset value to the UE; wherein the sixth preset value is greater than or equal to 2; and

determining the sixth preset value as the number of hops.

70. The method according to claim 69, wherein configuring the sixth preset value to the UE comprises:

configuring a remaining minimum system information (RMSI) signaling, or a radio resource control (RRC) signaling, or a downlink control information (DCI) signaling, or a medium access

control (MAC) control element (CE) signaling to the UE to indicate the sixth preset value.

71. The method according to claim 70, wherein configuring the DCI signaling to the UE to indicate the sixth preset value comprises:

configuring the DCI signaling to the UE to indicate the sixth preset value by multiplexing part or all of bits in a modulation and coding scheme (MCS) field or in a transmit power control (TPC) field in the DCI signaling or by adding a new field in the DCI signaling.

72. The method according to claim 68, wherein determining the number of hops according to the configuration of the base station comprises:

configuring one third parameter value in a third parameter set indicated to the UE, and determining the first parameter value as the number of hops.

73. The method according to claim 72, wherein configuring the one third parameter value in the third parameter set indicated to the UE comprises:

sending a remaining minimum system information (RMSI) signaling or a radio resource control (RRC) signaling configured with the third parameter set; and

sending a downlink control information (DCI) signaling or a medium access control (MAC) control element (CE) signaling to the UE to indicate the one third parameter value in the third parameter set.

74. The method according to claim 72, wherein configuring the one third parameter value in the third parameter set indicated to the UE comprises:

sending a modulation and coding scheme (MCS) table or a time-domain resource allocation (TDRA) table added with three fields for carrying the third parameter set; and

sending a downlink control information (DCI) signaling by multiplexing an MCS field in the DCI signaling to indicate the one third parameter value in the third parameter set.

75. The method according to claim 68, wherein determining the number of hops according to the configuration of the base station comprises:

obtaining a time-domain length occupied by the transport block; and

determining the number of hops according to a time-domain length of the hop configured by the base station, a specific calculation rule configured by the base station among the time-domain length of the hop, the time-domain length occupied by the transport block and the number of hops,

~~and the obtained time-domain occupied by the transport block.~~

~~76~~15. The method according to any one of claims ~~55~~9 to 14, wherein determining the time-domain length of the hop comprises: determining the time-domain length of the hop according to a protocol agreement.

~~77~~16. The method according to claim ~~76~~15, wherein determining the time-domain length of the hop according to the protocol agreement comprises:

obtaining a ~~seventh~~ preset value agreed by the protocol; wherein the ~~seventh~~ preset value is an integer greater than zero; and

determining the seventh preset value as the time-domain length of the hop.

~~78. The method according to claim 76 or 77, wherein determining the time-domain length of the hop according to the protocol agreement comprises:~~

~~obtaining a time-domain length occupied by the transport block; and~~

~~determining the time-domain length of the hop according to a correspondence relationship agreed by the protocol between the time-domain length occupied by the transport block and the time-domain length of the hop, and the obtained time-domain length occupied by the transport block.~~

~~79. The method according to any one of claims 76 to 78, wherein determining the time-domain length of the hop according to the protocol agreement comprises:~~

~~obtaining a number of demodulation reference signals (DMRSs) configured in the PUSCH; and~~

~~determining the time-domain length of the hop according to a correspondence relationship agreed by the protocol between the number of DMRSs configured and the time-domain length of the hop, and the obtained number of DMRSs configured in the PUSCH.~~

~~80. The method according to any one of claims 76 to 79, wherein determining the time-domain length of the hop according to the protocol agreement comprises:~~

~~obtaining a time-domain length occupied by the transport block; and~~

~~determining the time-domain length of the hop according to a number of hops agreed by the protocol, a correspondence relationship agreed by the protocol among the number of hops, the time-domain length occupied by the transport block and the time-domain length of the hop, and~~

~~the obtained time-domain length occupied by the transport block.~~

~~81. The method according to claim 80, wherein the correspondence relationship among the number of hops, the time-domain length occupied by the transport block and the time-domain length of the hop comprises:~~

~~the time-domain length occupied by the transport block being a product of the number of hops and the time-domain length of the hop.~~

~~82. The method according to any one of claims 76 to 81, wherein determining the time-domain length of the hop according to the protocol agreement comprises:~~

~~obtaining a position of an unavailable symbol in the PUSCH, wherein the unavailable symbol cannot be used to transmit data; and~~

~~determining a frequency hopping start position and a frequency hopping end position according to a correspondence relationship agreed by the protocol among the position of the unavailable symbol, the frequency hopping start position and the frequency hopping end position, and the obtained position of the unavailable symbol in the PUSCH.~~

~~83. The method according to claim 82, wherein the correspondence relationship agreed by the protocol among the position of the unavailable symbol, the frequency hopping start position and the frequency hopping end position comprises:~~

~~a position of an adjacent symbol previous to the unavailable symbol is the frequency hopping end position; and~~

~~a position of an adjacent symbol following the unavailable symbol is the frequency hopping start position.~~

~~84. The method according to any one of claims 76 to 83, wherein determining the time-domain length of the hop according to the protocol agreement comprises:~~

~~obtaining a position of a slot boundary in the PUSCH; and~~

~~determining a frequency hopping start position and a frequency hopping end position according to a correspondence relationship agreed by the protocol among the position of the slot boundary, the frequency hopping start position and the frequency hopping end position, and the obtained position of the slot boundary in the PUSCH.~~

~~85. The method according to claim 84, wherein the correspondence relationship agreed by~~

the protocol among the position of the slot boundary, the frequency hopping start position and the frequency hopping end position comprises:

a position of an adjacent symbol previous to the position of the slot boundary is the frequency hopping end position; and

a position of an adjacent symbol following the position of the slot boundary is the frequency hopping start position.

86. The method according to any one of claims 76 to 85, wherein determining the time-domain length of the hop according to the protocol agreement comprises:

obtaining a position of a slot boundary in the PUSCH and a fourth preset number of symbols; and

determining a frequency hopping start position and a frequency hopping end position according to a correspondence relationship agreed by the protocol among a position of a slot boundary, a fourth preset number of symbols, the frequency hopping start position and the frequency hopping end position, and the obtained position of the slot boundary in the PUSCH and the obtained fourth preset number of symbols.

87. The method according to claim 86, wherein the correspondence relationship agreed by the protocol among the position of the slot boundary, the fourth preset number of symbols, the frequency hopping start position and the frequency hopping end position comprises:

a position of an adjacent symbol previous to the position of the slot boundary is the frequency hopping end position, and a position of an adjacent symbol following the position of the slot boundary is the frequency hopping start position; and

a position of a symbol previous to the position of the slot boundary and separated by the fourth preset number of symbols from the position of the slot boundary is the frequency hopping start position, and a position of a symbol following the position of the slot boundary and separated by the fourth preset number of symbols from the position of the slot boundary is the frequency hopping end position.

88. The method according to any one of claims 76 to 87, wherein determining the time-domain length of the hop according to the protocol agreement comprises:

obtaining a time-domain length occupied by the transport block; and

determining the time-domain length of the hop according to a number of hops preset by the protocol, a specific calculation rule preset by the protocol among the number of hops, the time-

~~domain length occupied by the transport block and the time-domain length of the hop, and the obtained time-domain length occupied by the transport block.~~

~~89. The method according to claim 88, wherein the specific calculation rule preset by the protocol among the number of hops, the time-domain length occupied by the transport block and the time-domain length of the hop comprises:~~

~~determining a time-domain length of the hop in a $i^{th}$ (i=1, 2, ..., N-1) hop as: floor(L/N); where L is the time-domain length occupied by the transport block, N is an integer; and~~

~~determining a time-domain length of the hop in a $N^{th}$ hop as: L-floor(L/N)*(N-1).~~

~~90. The method according to claim 88, wherein the specific calculation rule preset by the protocol among the number of hops, the time-domain length occupied by the transport block and the time-domain length of the hop comprises:~~

~~determining a time-domain length of the hop in a $i^{th}$ (i=1, 2, ..., N-L+floor(L/N)*N) hop as: floor(L/N); where L is the time-domain length occupied by the transport block, N is an integer; and~~

~~determining a time-domain length of the hop in a $i^{th}$ (i=1+N-L+floor(L/N)*N, …, N) hop as: ceil(L/N).~~

~~91. The method according to claim 55, wherein determining the time-domain length of the hop comprises: determining the time-domain length of the hop according to a configuration of a base station.~~

~~92. The method according to claim 91, wherein determining the time-domain length of the hop according to the configuration of the base station comprises:~~

~~configuring a fourth preset value to the UE; wherein the eighth preset value is greater than or equal to 2; and~~

~~determining the eighth preset value as the time-domain length of the hop.~~

~~93. The method according to claim 92, wherein configuring the eighth preset value to the UE comprises:~~

~~configuring a remaining minimum system information (RMSI) signaling, or a radio resource control (RRC) signaling, or a downlink control information (DCI) signaling, or a medium access control (MAC) control element (CE) signaling to the UE to indicate the eighth preset value.~~

94. The method according to claim 93, wherein configuring the DCI signaling to the UE to indicate the eighth preset value comprises:

configuring the DCI signaling to the UE to indicate the eighth preset value by multiplexing part or all of bits in a modulation and coding scheme (MCS) field or in a transmit power control (TPC) field in the DCI signaling or by adding a new field in the DCI signaling.

95. The method according to claim 91, wherein determining the time-domain length of the hop according to the configuration of the base station comprises:

configuring one fourth parameter value in a fourth parameter set indicated to the UE, and determining the fourth parameter value as the number of hops.

96. The method according to claim 95, wherein configuring the one fourth parameter value in the fourth parameter set indicated to the UE comprises:

sending a remaining minimum system information (RMSI) signaling or a radio resource control (RRC) signaling configured with the fourth parameter set; and

sending a downlink control information (DCI) signaling or a medium access control (MAC) control element (CE) signaling, to the UE to indicate the one fourth parameter value in the fourth parameter set.

97. The method according to claim 95, wherein configuring the one fourth parameter value in the fourth parameter set indicated to the UE comprises:

sending a modulation and coding scheme (MCS) table or a time-domain resource allocation (TDRA) table added with three fields for carrying the fourth parameter set; and

sending a downlink control information (DCI) signaling multiplexing an MCS field in the DCI signaling to indicate the one fourth parameter value in the fourth parameter set.

98. The method according to claim 91, wherein determining the time-domain length of the hop according to the configuration of the base station comprises:

obtaining a time-domain length occupied by the transport block; and

determining the time-domain length of the hop according to a number of hops configured by the base station, a specific calculation rule configured by the base station among the number of hops, the time-domain length occupied by the transport block and the time-domain length of the hop, and the obtained time-domain length occupied by the transport block.

99. The method according to claim 98, wherein the specific calculation rule configured by the base station among the number of hops, the time-domain length occupied by the transport block and the time-domain length of the hop comprises:

determining a time-domain length of the hop in a $i^{th}$ (i=1, 2, ..., N-1) hop as: floor(L/N); where L is the time-domain length occupied by the transport block, N is an integer; and

determining a time-domain length of the hop in a $N^{th}$ hop as: L-floor(L/N)*(N-1).

100. The method according to claim 98, wherein the specific calculation rule configured by the base station among the number of hops, the time-domain length occupied by the transport block and the time-domain length of the hop comprises:

determining a time-domain length of the hop in a $i^{th}$ (i=1, 2, ..., N-L+floor(L/N)*N) hop as: floor(L/N); where L is the time-domain length occupied by the transport block, N is an integer; and

determining a time-domain length of the hop in a $i^{th}$ (i=1+N-L+floor(L/N)*N, …, N) hop as: ceil(L/N).

101. The method according to any one of claims 55 to 100, wherein the frequency hopping pattern comprises intra-slot frequency hopping, or inter-slot frequency hopping, or intra-transport-block frequency hopping, or intra-retransmission hopping frequency, or inter-retransmission frequency hopping.

102. The method according to claim 101, wherein performing the frequency hopping for the UE according to the frequency hopping pattern of the PUSCH, and the number of hops and/or the time-domain length of the hop comprises:

performing the frequency hopping for the UE according to the intra-slot frequency hopping, the number of hops determined according to the method according to any one of claims 56 to 75 within a slot, and the time-domain length of the hop determined according to the method according to any one of claims 76 to 100 within a slot.

103. The method according to claim 101, wherein performing the frequency hopping for the UE according to the frequency hopping pattern of the PUSCH, and the number of hops and/or the time-domain length of the hop comprises:

performing the frequency hopping for the UE according to the inter-slot frequency hopping,

the number of hops determined according to the method according to any one of claims 56 to 75, and the time-domain length of the hop determined according to the method according to any one of claims 76 to 100.

104. The method according to claim 101, wherein performing the frequency hopping for the UE according to the frequency hopping pattern of the PUSCH, and the number of hops and/or the time-domain length of the hop comprises:

performing the frequency hopping for the UE according to the intra-transport-block frequency hopping, the number of hops determined according to the method according to any one of claims 56 to 75 within a transport block, or the time-domain length of the hop determined according to the method according to any one of claims 76 to 100 within a transport block.

105. The method according to claim 101, wherein performing the frequency hopping for the UE according to the frequency hopping pattern of the PUSCH, and the number of hops and/or the time-domain length of the hop comprises:

performing the frequency hopping for the UE according to the intra-retransmission hopping frequency, the number of hops determined according to the method according to any one of claims 56 to 75 within a retransmission copy, or the time-domain length of the hop determined according to the method according to any one of claims 76 to 100 within a retransmission copy.

106. The method according to claim 101, wherein performing the frequency hopping for the UE according to the frequency hopping pattern of the PUSCH, and the number of hops and/or the time-domain length of the hop comprises:

performing the frequency hopping for the UE according to the inter-retransmission frequency hopping, the number of hops determined according to the method according to any one of claims 56 to 75, and the time-domain length of the hop determined according to the method according to any one of claims 76 to 100.

107. The method according to any one of claims 55 to 106, wherein each hop in the frequency hopping comprises a demodulation reference signal (DMRS) symbol.

108. The method according to any one of claims 55 to 107, wherein in response to enabling the frequency hopping pattern of the PUSCH comprises:

enabling the frequency hopping pattern of the PUSCH in response to sending a frequency

~~hopping indication carried on a radio resource control (RRC) signaling, or a remaining minimum system information (RMSI) signaling, or a medium access control (MAC) control element (CE) signaling, or a downlink control information (DCI) signaling, to the UE.~~

~~109. A communication apparatus, comprising:~~

~~a transceiver module, configured to determine a number of hops and/or a time-domain length of the hop in response to enabling a frequency hopping pattern of a physical uplink shared channel (PUSCH); wherein a transmission pattern of the PUSCH is transport block processing over multi-slots (TBoMS); and~~

~~a processing module, configured to perform frequency hopping according to the frequency hopping pattern of the PUSCH, and the number of hops and/or the time-domain length of the hop.~~

~~110. A communication apparatus, comprising:~~

~~a transceiver module, configured to determine a number of hops and/or a time-domain length of the hop of a user equipment (UE) in response to enabling a frequency hopping pattern of a physical uplink shared channel (PUSCH); wherein a transmission pattern of the PUSCH is transport block processing over multi-slots (TBoMS); and~~

~~a processing module, configured to perform frequency hopping for the UE according to the frequency hopping pattern of the PUSCH, and the number of hops and/or the time-domain length of the hop.~~

~~111~~17. A ~~communication device~~terminal, comprising:

a processor; and

a memory storing ~~, wherein~~ a computer program,

wherein ~~is stored in the memory and~~ the processor is configured to ~~executes the computer program stored in the memory, so that the device~~ performs the method as claimed in any one of claims 1 to ~~54~~8.

~~112~~18. A ~~communication device~~base station, comprising:

a processor: and

a memory storing ~~, wherein~~ a computer program ~~is stored in the memory and~~,

wherein the processor is configured to ~~executes the computer program stored in the memory, so that the device~~ performs the method as claimed in any one of claims ~~55~~9 to ~~108~~16.

~~113. A communication device, comprising: a processor and an interface circuit;~~

~~the interface circuit for receiving code instructions and transmitting the code instructions to the processor;~~

~~the processor for executing the code instructions to perform the method as claimed in any one of claims 1 to 54.~~

~~114. A communication device, comprising: a processor and an interface circuit;~~

~~the interface circuit for receiving code instructions and transmitting the code instructions to the processor;~~

~~the processor for executing the code instructions to perform the method as claimed in any one of claims 55 to 108.~~

~~115~~19. A computer-readable storage medium storing instructions that, when executed by a processor of a terminal, cause the terminal to perform the method of any one of claims ~~1 to 54 to be performed~~1 to 8.

~~116~~20. A computer-readable storage medium storing instructions that, when executed by a processor of a base station, cause the base station to perform the method of any one of claims ~~55 to 108 to be performed~~9 to 16.