CLAIMS

What is claimed is:

1. A communication method, comprising:

determining a first transmission manner from a plurality of transmission manners; and

sending a physical uplink control channel (PUCCH) to a network device in the first transmission manner, wherein

the plurality of transmission manners comprise a non-frequency hopping transmission manner and an intra-time unit frequency hopping transmission manner, wherein

the non-frequency hopping transmission manner is that the PUCCH is transmitted without frequency hopping in a time unit, wherein uplink control information (UCI) on the PUCCH occupies L5 symbols, a demodulation reference signal (DMRS) on the PUCCH occupies L6 symbols, and Li (i = 5 or 6) is an integer; and

the intra-time unit frequency hopping transmission is that the PUCCH is transmitted with frequency hopping in a time unit.

2. The method according to claim 1, wherein

the first transmission manner is non-frequency hopping transmission manner.

3. The method according to claim 1 or 2, wherein

the PUCCH occupies one resource of X PUCCH resources, and

when second indication information is received, a resource block (RB) index of the PUCCH is determined according to a second rule or a third rule, wherein the second indication information indicates one of the second rule and the third rule, wherein

the X PUCCH resources are on one side of a bandwidth part (BWP) according to the second rule; or

the X PUCCH resources are on the other side of the bandwidth part (BWP) according to the third rule.

4. The method according to claim 3, wherein

the second indication information is indicated by 1 bit; and

when a bit value of the second indication information is 0, the second indication information indicates that the RB index of the PUCCH is determined according to the second rule; or

when a bit value of the second indication information is 1, the second indication information

indicates that the RB index of the PUCCH is determined according to the third rule.

5. The method according to claim 3 or 4, wherein

the second rule is: $0 \leq r_{PUCCH} \leq$ X–1, and an RB index value of the PUCCH is equal to $RB_{\mathrm{BWP}}^{\mathrm{offset}} + \lfloor r_{\mathrm{PUCCH}} / N_{\mathrm{CS}} \rfloor$; and

the third rule is: $0 \leq r_{PUCCH} \leq$ X–1, and the RB index value of the PUCCH is equal to $N_{\mathrm{BWP}}^{\mathrm{size}} - 1 - RB_{\mathrm{BWP}}^{\mathrm{offset}} - \lfloor r_{\mathrm{PUCCH}} / N_{\mathrm{CS}} \rfloor$, wherein

r_{PUCCH} is a PUCCH resource index, N_{CS} is a quantity of cyclic shifts of a PUCCH resource set, RB_{BWP}^{offset} is a frequency domain offset value of the PUCCH resource set, N_{BWP}^{Size} is a size of a bandwidth part BWP on which the PUCCH resource is configured, and X is an integer.

6. The method according to claim 1 or 2, wherein

the PUCCH occupies one resource of X PUCCH resources, and

when second indication information is absent, an RB index of the PUCCH is determined according to a default rule, wherein

the default rule is that in the X PUCCH resources, X/2 PUCCH resources are on one side of a BWP (or carrier), and X/2 PUCCH resources are on the other side of the BWP.

7. The method according to claim 6, wherein the default rule is:

$0 \leq r_{PUCCH} \leq$ (X/2) – 1, and an RB index value of the PUCCH is equal to $RB_{\mathrm{BWP}}^{\mathrm{offset}} + \lfloor r_{\mathrm{PUCCH}} / N_{\mathrm{CS}} \rfloor$; and

X/2 $\leq r_{PUCCH} \leq$ X – 1, and the RB index value of the PUCCH is equal to $N_{\mathrm{BWP}}^{\mathrm{size}} - 1 - RB_{\mathrm{BWP}}^{\mathrm{offset}} - \lfloor (r_{\mathrm{PUCCH}} - 8) / N_{\mathrm{CS}} \rfloor$.

8. The method according to any one of claims 3 to 7, wherein X = 16.

9. A communication method, comprising:

determining a first transmission manner from a plurality of transmission manners; and

receiving a physical uplink control channel (PUCCH) from a terminal device in the first transmission manner, wherein

the plurality of transmission manners comprise a non-frequency hopping transmission manner and an intra-time unit frequency hopping transmission manner, wherein

the non-frequency hopping transmission manner is that the PUCCH is transmitted without frequency hopping in a time unit, uplink control information (UCI) on the PUCCH occupies L5 symbols, a demodulation reference signal (DMRS) on the PUCCH occupies L6 symbols, and Li

(i = 5 or 6) is an integer; and

the intra-time unit frequency hopping transmission is that the PUCCH is transmitted with frequency hopping in a time unit.

10. The method according to claim 9, wherein the first transmission manner is non-frequency hopping transmission manner.

11. The method according to claim 9 or 10, wherein

the PUCCH occupies one resource of X PUCCH resources, and

sending second indication information to the terminal device, wherein the second indication information indicates to determine a resource block (RB) index of the PUCCH according to a second rule or a third rule, wherein

the X PUCCH resources are on one side of a bandwidth part (BWP) according to the second rule; or

the X PUCCH resources are on the other side of the bandwidth part (BWP) according to the third rule.

12. The method according to claim 11, wherein

the second indication information is indicated by 1 bit; and

when a bit value of the second indication information is 0, the second indication information indicates that the RB index of the PUCCH is determined according to the second rule; or

when a bit value of the second indication information is 1, the second indication information indicates that the RB index of the PUCCH is determined according to the third rule.

13. The method according to claim 11 or 12, wherein

the second rule is: $0 \leq r_{PUCCH} \leq$ X–1, and an RB index value of the PUCCH is equal to $RB_{\mathrm{BWP}}^{\mathrm{offset}} + \lfloor r_{\mathrm{PUCCH}} / N_{\mathrm{CS}} \rfloor$; and

the third rule is: $0 \leq r_{PUCCH} \leq$ X–1, and the RB index value of the PUCCH is equal to $N_{\mathrm{BWP}}^{\mathrm{size}} - 1 - RB_{\mathrm{BWP}}^{\mathrm{offset}} - \lfloor r_{\mathrm{PUCCH}} / N_{\mathrm{CS}} \rfloor$, wherein

r_{PUCCH} is a PUCCH resource index, N_{CS} is a quantity of cyclic shifts of a PUCCH resource set, RB_{BWP}^{offset} is a frequency domain offset value of the PUCCH resource set, N_{BWP}^{Size} is a size of a bandwidth part BWP on which the PUCCH resource is configured, and X is an integer.

14. The method according to claim 9 or 10, wherein

the PUCCH occupies one resource of X PUCCH resources, and

an RB index of the PUCCH is determined according to a default rule by not configuring second indication information, wherein

the default rule is that in X PUCCH resources, X/2 PUCCH resources are on one side of a BWP (or carrier), and X/2 PUCCH resources are on the other side of the BWP.

15. The method according to claim 14, wherein the default rule is:

$0 \leq r_{PUCCH} \leq (X/2) - 1$, and an RB index value of the PUCCH is equal to $RB_{BWP}^{offset} + \lfloor r_{PUCCH} / N_{CS} \rfloor$; and

$X/2 \leq r_{PUCCH} \leq X - 1$, and the RB index value of the PUCCH is equal to $N_{BWP}^{size} - 1 - RB_{BWP}^{offset} - \lfloor (r_{PUCCH} - 8) / N_{CS} \rfloor$.

16. The method according to any one of claims 11 to 15, wherein X = 16.

17. A communication apparatus, comprising a transceiver module and a processing module, wherein

the processing module is configured to determine a first transmission manner from a plurality of transmission manners; and

the transceiver module is configured to send a physical uplink control channel (PUCCH) to a network device in the first transmission manner, wherein

the plurality of transmission manners comprise a non-frequency hopping transmission manner and an intra-time unit frequency hopping transmission manner, wherein

the non-frequency hopping transmission manner is that the PUCCH is transmitted without frequency hopping in a time unit, wherein uplink control information (UCI) on the PUCCH occupies L5 symbols, a demodulation reference signal (DMRS) on the PUCCH occupies L6 symbols, and Li (i = 5 or 6) is an integer; and

the intra-time unit frequency hopping transmission is that the PUCCH is transmitted with frequency hopping in a time unit.

18. The apparatus according to claim 17, wherein

the first transmission manner is non-frequency hopping transmission manner.

19. The apparatus according to claim 17 or 18, wherein

the PUCCH occupies one resource of X PUCCH resources, and

when second indication information is received, a resource block (RB) index of the PUCCH is determined according to a second rule or a third rule, wherein the second indication information

indicates one of the second rule and the third rule, wherein

the X PUCCH resources are on one side of a bandwidth part (BWP) according to the second rule; or

the X PUCCH resources are on the other side of the bandwidth part (BWP) according to the third rule.

20. The apparatus according to claim 19, wherein

the second indication information is indicated by 1 bit; and

when a bit value of the second indication information is 0, the second indication information indicates that the RB index of the PUCCH is determined according to the second rule; or

when a bit value of the second indication information is 1, the second indication information indicates that the RB index of the PUCCH is determined according to the third rule.

21. The apparatus according to claim 19 or 20, wherein

the second rule is: $0 \le r_{PUCCH} \le$ X–1, and an RB index value of the PUCCH is equal to $RB_{\mathrm{BWP}}^{\mathrm{offset}} + \lfloor r_{\mathrm{PUCCH}} / N_{\mathrm{CS}} \rfloor$; and

the third rule is: $0 \le r_{PUCCH} \le$ X–1, and the RB index value of the PUCCH is equal to $N_{\mathrm{BWP}}^{\mathrm{size}} - 1 - RB_{\mathrm{BWP}}^{\mathrm{offset}} - \lfloor r_{\mathrm{PUCCH}} / N_{\mathrm{CS}} \rfloor$, wherein

r_{PUCCH} is a PUCCH resource index, N_{CS} is a quantity of cyclic shifts of a PUCCH resource set, RB_{BWP}^{offset} is a frequency domain offset value of the PUCCH resource set, N_{BWP}^{Size} is a size of a bandwidth part BWP on which the PUCCH resource is configured, and X is an integer.

22. The apparatus according to claim 17 or 18, wherein

the PUCCH occupies one resource of X PUCCH resources, and

when second indication information is absent, an RB index of the PUCCH is determined according to a default rule, wherein

the default rule is that in X PUCCH resources, X/2 PUCCH resources are on one side of a BWP (or carrier), and X/2 PUCCH resources are on the other side of the BWP.

23. The apparatus according to claim 22, wherein the default rule is:

$0 \le r_{PUCCH} \le$ (X/2) – 1, and an RB index value of the PUCCH is equal to $RB_{\mathrm{BWP}}^{\mathrm{offset}} + \lfloor r_{\mathrm{PUCCH}} / N_{\mathrm{CS}} \rfloor$; and

X/2 $\le r_{PUCCH} \le$ X – 1, and the RB index value of the PUCCH is equal to

$N_{\mathrm{BWP}}^{\mathrm{size}}-1-RB_{\mathrm{BWP}}^{\mathrm{offset}}-\lfloor(r_{\mathrm{PUCCH}}-8)/N_{\mathrm{CS}}\rfloor$.

24. The apparatus according to any one of claims 19 to 23, wherein X = 16.

25. A communication apparatus, comprising a transceiver module and a processing module, wherein

the processing module is configured to determine a first transmission manner from a plurality of transmission manners; and

the transceiver module is configured to receive a physical uplink control channel (PUCCH) from a terminal device in the first transmission manner, wherein

the plurality of transmission manners comprise a non-frequency hopping transmission manner and an intra-time unit frequency hopping transmission manner, wherein

the non-frequency hopping transmission manner is that the PUCCH is transmitted without frequency hopping in a time unit, uplink control information (UCI) on the PUCCH occupies L5 symbols, a demodulation reference signal (DMRS) on the PUCCH occupies L6 symbols, and Li (i = 5 or 6) is an integer; and

the intra-time unit frequency hopping transmission is that the PUCCH is transmitted with frequency hopping in a time unit.

26. The apparatus according to claim 25, wherein the first transmission manner is non-frequency hopping transmission manner.

27. The apparatus according to claim 25 or 26, wherein the PUCCH occupies one resource of X PUCCH resources, and the transceiver module is further configured to send second indication information to the terminal device, wherein the second indication information indicates to determine a resource block (RB) index of the PUCCH according to a second rule or a third rule, wherein

the X PUCCH resources are on one side of a bandwidth part (BWP) according to the second rule; or

the X PUCCH resources are on the other side of the bandwidth part (BWP) according to the third rule.

28. The apparatus according to claim 27, wherein

the second indication information is indicated by 1 bit; and

when a bit value of the second indication information is 0, the second indication information indicates that the RB index of the PUCCH is determined according to the second rule; or

when a bit value of the second indication information is 1, the second indication information indicates that the RB index of the PUCCH is determined according to the third rule.

29. The apparatus according to claim 27 or 28, wherein

the second rule is: $0 \le r_{PUCCH} \le X-1$, and an RB index value of the PUCCH is equal to $RB_{BWP}^{offset} + \lfloor r_{PUCCH} / N_{CS} \rfloor$; and

the third rule is: $0 \le r_{PUCCH} \le X-1$, and the RB index value of the PUCCH is equal to $N_{BWP}^{size} - 1 - RB_{BWP}^{offset} - \lfloor r_{PUCCH} / N_{CS} \rfloor$, wherein

r_{PUCCH} is a PUCCH resource index, N_{CS} is a quantity of cyclic shifts of a PUCCH resource set, RB_{BWP}^{offset} is a frequency domain offset value of the PUCCH resource set, N_{BWP}^{Size} is a size of a bandwidth part BWP on which the PUCCH resource is configured, and X is an integer.

30. The apparatus according to claim 25 or 26, wherein the PUCCH occupies one resource of X PUCCH resources, and the processing module is further configured to determine, by not configuring second indication information, an RB index of the PUCCH according to a default rule, wherein

the default rule is that in the X PUCCH resources, X/2 PUCCH resources are on one side of a BWP (or carrier), and X/2 PUCCH resources are on the other side of the BWP.

31. The apparatus according to claim 30, wherein the default rule is:

$0 \le r_{PUCCH} \le (X/2) - 1$, and an RB index value of the PUCCH is equal to $RB_{BWP}^{offset} + \lfloor r_{PUCCH} / N_{CS} \rfloor$; and

$X/2 \le r_{PUCCH} \le X - 1$, and the RB index value of the PUCCH is equal to $N_{BWP}^{size} - 1 - RB_{BWP}^{offset} - \lfloor (r_{PUCCH} - 8) / N_{CS} \rfloor$.

32. The apparatus according to any one of claims 27 to 31, wherein X = 16.

33. A computer-readable storage medium, wherein the computer-readable storage medium stores computer instructions, and when the computer instructions are executed, the computer is enabled to perform the method according to any one of claims 1 to 8.

34. A computer-readable storage medium, wherein the computer-readable storage medium stores computer instructions, and when the computer instructions are executed, the computer is enabled to perform the method according to any one of claims 9 to 16.