

CLAIMS

What is claimed is:

1. An information transmission method, comprising:

5 determining, by a terminal device, a first offset parameter, an uplink control channel resource index, a physical resource block offset parameter, and a number of initial cyclic shift indexes comprised in an initial cyclic shift index set, wherein the first offset parameter is a non-zero value and the first offset parameter is determined based on a first information from a network device;

10 determining, by the terminal device, a resource block index of a resource block occupied by resource of a physical uplink control channel PUCCH, based on the first offset parameter, the uplink control channel resource index, the physical resource block offset parameter, and the number of initial cyclic shift indexes comprised in the initial cyclic shift index set; and

15 sending, by the terminal device on the resource of the PUCCH associated with the resource block index, uplink control information to the network device, wherein the terminal device is reduced capability terminal device.

2. The method according to claim 1, wherein

the resource block index, the first offset parameter, the uplink control channel resource index, the physical resource block offset parameter, and the number of initial cyclic shift indexes comprised in the initial cyclic shift index set satisfy:

20
$$X_1 = RB_{BWP}^{offset} + \lfloor r_{PUCCH} / N_{CS} \rfloor + D;$$

wherein X_1 is the resource block index, RB_{BWP}^{offset} is the physical resource block offset parameter, r_{PUCCH} is the uplink control channel resource index, N_{CS} is the number of initial cyclic shift indexes comprised in the initial cyclic shift index set, D is the first offset parameter, and $\lfloor r_{PUCCH} / N_{CS} \rfloor$ indicates rounding down a result of r_{PUCCH} / N_{CS} .

25 3. The method according to claim 1, wherein

the resource block index, the first offset parameter, the uplink control channel resource index, the physical resource block offset parameter, and the number of initial cyclic shift indexes comprised in the initial cyclic shift index set satisfy:

$$X_2 = N_{BWP}^{size} - 1 - RB_{BWP}^{offset} - \lfloor r_{PUCCH} / N_{CS} \rfloor + D;$$

wherein X_2 is the resource block index, N_{BWP}^{size} is a number of resource blocks comprised in a second frequency range, the second frequency range is less than or equal to a maximum channel bandwidth supported by the terminal device, RB_{BWP}^{offset} is the physical resource block offset parameter, r_{PUCCH} is the uplink control channel resource index, N_{CS} is the number of initial cyclic shift indexes comprised in the initial cyclic shift index set, D is the first offset parameter, and $\lfloor r_{PUCCH} / N_{CS} \rfloor$ indicates rounding down a result of r_{PUCCH} / N_{CS} .

4. The method according to any one of claims 1 to 3, wherein the uplink control information is sent on the resource of the PUCCH associated with the resource block index without frequency hopping.

5. The method according to any one of claims 1 to 4, wherein a value of the first offset parameter is an integer multiple of K, wherein $K = 2$ or 3 or 4 .

6. The method according to any one of claims 1 to 5, wherein the uplink control information is a feedback of Msg4.

7. An information transmission method, comprising:

sending, by a network device, first information to a terminal device, wherein the first information comprises a first offset parameter;

determining a resource block index of a resource block occupied by resource of a physical uplink control channel PUCCH, based on the first offset parameter, an uplink control channel resource index, a physical resource block offset parameter, and a number of initial cyclic shift indexes comprised in an initial cyclic shift index set, wherein the first offset parameter is a non-zero value; and

receiving, by the network device on the resource of the PUCCH associated with the resource block index, uplink control information from the terminal device, wherein the terminal device is reduced capability terminal device.

8. The method according to claim 7, wherein

the resource block index, the first offset parameter, the uplink control channel resource index, the physical resource block offset parameter, and the number of initial cyclic shift indexes comprised in the initial cyclic shift index set satisfy:

$$X_1 = RB_{BWP}^{offset} + \lfloor r_{PUCCH} / N_{CS} \rfloor + D;$$

wherein X_1 is the resource block index, RB_{BWP}^{offset} is the physical resource block offset parameter, r_{PUCCH} is the uplink control channel resource index, N_{CS} is the number of initial cyclic shift indexes comprised in the initial cyclic shift index set, D is the first offset parameter, and $\lfloor r_{PUCCH} / N_{CS} \rfloor$ indicates rounding down a result of r_{PUCCH} / N_{CS} .

9. The method according to claim 7, wherein

the resource block index, the first offset parameter, the uplink control channel resource index, the physical resource block offset parameter, and the number of initial cyclic shift indexes comprised in the initial cyclic shift index set satisfy:

$$X_2 = N_{BWP}^{size} - 1 - RB_{BWP}^{offset} - \lfloor r_{PUCCH} / N_{CS} \rfloor + D;$$

wherein X_2 is the resource block index, the resource associated with the resource block index falls within a first frequency range, N_{BWP}^{size} is a number of resource blocks comprised in a second frequency range, the second frequency range is less than or equal to a maximum channel bandwidth supported by the terminal device, RB_{BWP}^{offset} is the physical resource block offset parameter, r_{PUCCH} is the uplink control channel resource index, N_{CS} is the number of initial cyclic shift indexes comprised in the initial cyclic shift index set, D is the first offset parameter, and $\lfloor r_{PUCCH} / N_{CS} \rfloor$ indicates rounding down a result of r_{PUCCH} / N_{CS} .

10. The method according to any one of claims 7 to 9, wherein the uplink control information is sent on the resource of the PUCCH associated with the resource block index without frequency hopping.

11. The method according to any one of claims 7 to 10, wherein a value of the first offset parameter is an integer multiple of K, wherein $K = 2$ or 3 or 4 .

12. The method according to any one of claims 7 to 11, wherein the uplink control information is a feedback of Msg4.

13. An information transmission apparatus, wherein the apparatus is reduced capability terminal device or a chip of the reduced capability terminal device, the apparatus comprises:

a processing unit, configured to determine, a first offset parameter, an uplink control channel

resource index, a physical resource block offset parameter, and a number of initial cyclic shift indexes comprised in an initial cyclic shift index set, wherein the first offset parameter is a non-zero value and the first offset parameter is determined based on a first information from a network device;

5 the processing unit is further configured to determine, a resource block index of a resource block occupied by resource of a physical uplink control channel PUCCH, based on the first offset parameter, the uplink control channel resource index, the physical resource block offset parameter, and the number of initial cyclic shift indexes comprised in the initial cyclic shift index set; and

a transceiver unit, configured to send, on the resource of the PUCCH associated with the
10 resource block index, uplink control information to a network device.

14. The apparatus according to claim 13, wherein

the resource block index, the first offset parameter, the uplink control channel resource index, the physical resource block offset parameter, and the number of initial cyclic shift indexes comprised in the initial cyclic shift index set satisfy:

$$15 \quad X_1 = RB_{BWP}^{offset} + \lfloor r_{PUCCH} / N_{CS} \rfloor + D;$$

wherein X_1 is the resource block index, RB_{BWP}^{offset} is the physical resource block offset parameter, r_{PUCCH} is the uplink control channel resource index, N_{CS} is the number of initial cyclic shift indexes comprised in the initial cyclic shift index set, D is the first offset parameter, and $\lfloor r_{PUCCH} / N_{CS} \rfloor$ indicates rounding down a result of r_{PUCCH} / N_{CS} .

20 15. The apparatus according to claim 13, wherein

the resource block index, the first offset parameter, the uplink control channel resource index, the physical resource block offset parameter, and the number of initial cyclic shift indexes comprised in the initial cyclic shift index set satisfy:

$$X_2 = N_{BWP}^{size} - 1 - RB_{BWP}^{offset} - \lfloor r_{PUCCH} / N_{CS} \rfloor + D;$$

25 wherein X_2 is the resource block index, N_{BWP}^{size} is a number of resource blocks comprised in a second frequency range, the second frequency range is less than or equal to a maximum channel bandwidth supported by the terminal device, RB_{BWP}^{offset} is the physical resource block offset parameter, r_{PUCCH} is the uplink control channel resource index, N_{CS} is the number of initial

cyclic shift indexes comprised in the initial cyclic shift index set, D is the first offset parameter, and $\lfloor r_{PUCCH} / N_{CS} \rfloor$ indicates rounding down a result of r_{PUCCH} / N_{CS} .

16. The apparatus according to any one of claims 13 to 15, wherein the uplink control information is sent on the resource of the PUCCH associated with the resource block index without frequency hopping.

17. The apparatus according to any one of claims 13 to 16, wherein a value of the first offset parameter is an integer multiple of K , wherein $K = 2$ or 3 or 4 .

18. The apparatus according to any one of claims 13 to 17, wherein the uplink control information is a feedback of Msg4.

19. An information transmission apparatus, comprising:
a transceiver unit, configured to send, first information to a terminal device, wherein the first information comprises a first offset parameter;

a processing unit, configured to determine a resource block index of a resource block occupied by resource of a physical uplink control channel PUCCH, based on the first offset parameter, an uplink control channel resource index, a physical resource block offset parameter, and a number of initial cyclic shift indexes comprised in an initial cyclic shift index set, wherein the first offset parameter is a non-zero value; and

the transceiver unit is further configured to receive, on a resource of the PUCCH associated with the resource block index, uplink control information from the terminal device, wherein the terminal device is reduced capability terminal device.

20. The apparatus according to claim 19, wherein
the resource block index, the first offset parameter, the uplink control channel resource index, the physical resource block offset parameter, and the number of initial cyclic shift indexes comprised in the initial cyclic shift index set satisfy:

$$X_1 = RB_{BWP}^{offset} + \lfloor r_{PUCCH} / N_{CS} \rfloor + D;$$

wherein X_1 is the resource block index, RB_{BWP}^{offset} is the physical resource block offset parameter, r_{PUCCH} is the uplink control channel resource index, N_{CS} is the number of initial cyclic shift indexes comprised in the initial cyclic shift index set, D is the first offset parameter, and $\lfloor r_{PUCCH} / N_{CS} \rfloor$ indicates rounding down a result of r_{PUCCH} / N_{CS} .

21. The apparatus according to claim 19, wherein

the resource block index, the first offset parameter, the uplink control channel resource index, the physical resource block offset parameter, and the number of initial cyclic shift indexes comprised in the initial cyclic shift index set satisfy:

$$X_2 = N_{BWP}^{size} - 1 - RB_{BWP}^{offset} - \lfloor r_{PUCCH} / N_{CS} \rfloor + D;$$

wherein X_2 is the resource block index, the resource associated with the resource block index falls within a first frequency range, N_{BWP}^{size} is a number of resource blocks comprised in a second frequency range, the second frequency range is less than or equal to a maximum channel bandwidth supported by the terminal device, RB_{BWP}^{offset} is the physical resource block offset parameter, r_{PUCCH} is the uplink control channel resource index, N_{CS} is the number of initial cyclic shift indexes comprised in the initial cyclic shift index set, D is the first offset parameter, and $\lfloor r_{PUCCH} / N_{CS} \rfloor$ indicates rounding down a result of r_{PUCCH} / N_{CS} .

22. The apparatus according to any one of claims 19 to 21, the uplink control information is sent on the resource of the PUCCH associated with the resource block index without frequency hopping.

23. The apparatus according to any one of claims 19 to 22, wherein a value of the first offset parameter is an integer multiple of K, wherein $K = 2$ or 3 or 4 .

24. The apparatus according to any one of claims 19 to 23, wherein the uplink control information is a feedback of Msg4.

25. A computer-readable storage medium, wherein the computer-readable storage medium stores a computer program, and when the computer program is run, an apparatus is enabled to perform the method according to any one of claims 1 to 6, or

an apparatus is enabled to perform the method according to any one of claims 7 to 12.