CLAIMS

What is claimed is:

1. An information transmission method, comprising:

receiving~~, by a first terminal device,~~ first information, wherein the first information indicates M bandwidth resources, M is a positive integer, ~~the first terminal device is a first-type terminal device,~~ and a size of each of the M bandwidth resources is equal to or less than a maximum channel bandwidth supported by ~~the~~ a first terminal device, the first terminal device is a first-type terminal device;

receiving~~, by the first terminal device,~~ a first parameter, wherein the first parameter is a quantity of random access channel occasions for frequency division multiplexing in a time unit;

determining~~, by the first terminal device,~~ a first bandwidth resource from the M bandwidth resources based on the first information and the first parameter; and

sending~~, by the first terminal device,~~ uplink information or receiving downlink information on the first bandwidth resource.

2. The method according to claim 1, wherein a value of the first parameter is greater than 4, and

when M=1, the M bandwidth resources are the first bandwidth resource, the first bandwidth resource comprises predefined resources of N random access channel occasions, the random access channel occasions whose quantity is the first parameter comprise the N random access channel occasions, and N is a positive integer; or

when M=1, the M bandwidth resources are the first bandwidth resource, a start resource block of the first bandwidth resource is the same as a start resource block of a first random access channel occasion, and the first random access channel occasion is indicated by first indication information; or

when M>1, each of the M bandwidth resources comprises a resource corresponding to at least one random access channel occasion.

3. The method according to claim 1 or 2, wherein the value of the first parameter is 8, indexes of the random access channel occasions sorted in a first order are 0 to 7, and the first order comprises an ascending order of frequencies.

4. The method according to claim 3, wherein the method further comprises:

~~the first terminal device further receives~~ receiving the first indication information, wherein when the first indication information comprises one bit, the first indication information indicates an index of the first random access channel occasion in indexes {0, 4}; or when the first indication information comprises two bits, the first indication information indicates an index of the first

random access channel occasion in indexes {1, 2, 3, 4}; or when the first indication information comprises three bits, the first indication information indicates an index of the first random access channel occasion in indexes {0, 1, 2, 3, 4}; or when the first indication information comprises three bits, the first indication information indicates an index of the first random access channel occasion in indexes {0, 1, 2, 3, 4, 5, 6, 7}; or

when ~~the first terminal device~~ does not receive the first indication information, an index of the first random access channel occasion is 0.

5. The method according to any one of claims 1 to 4, wherein the first information indicates the M bandwidth resources; and

a size of each of the M bandwidth resources is predefined; or

when M=2, one bandwidth resource in the bandwidth resources comprises resources of random access channel occasions {0, 1, 2, 3}, and the other bandwidth resource in the bandwidth resources comprises resources of random access channel occasions {4, 5, 6, 7}; or

when M>1, remaining (M–1) bandwidth resources are determined based on a first candidate bandwidth resource, and the first candidate bandwidth resource is indicated by using first signaling.

6. The method according to claim 1, wherein when M>1, the method further comprises:

receiving~~, by the first terminal device,~~ second indication information, wherein the second indication information indicates a second bandwidth resource;

sending~~, by the first terminal device,~~ a random access preamble on the first bandwidth resource; and

sending~~, by the first terminal device~~ on the second bandwidth resource, a message 3 in a random access process or a physical uplink control channel for feeding back a contention resolution message.

7. The method according to claim 6, wherein the second indication information is carried in one or more of a random access response message, downlink control information for scheduling the random access response message, a contention resolution message, and downlink control information for scheduling the contention resolution message; and/or

the second indication information is carried in an uplink grant of each media access control random access response in a random access response message.

8. The method according to claim ~~6 or 7~~1, wherein the method further comprises:

sending~~, by the first terminal device,~~ the random access preamble on the first bandwidth resource; and

receiving~~, by the first terminal device,~~ third indication information, wherein the third indication information indicates a bandwidth resource for the first terminal device to send ~~the~~ a message 3 in the random access process and/or the physical uplink control channel for feeding

back ~~the~~ a contention resolution message.

9. The method according to claim 8, wherein

a bit status of the third indication information indicates the bandwidth resource for sending the message 3 in the random access process and/or the physical uplink control channel for feeding back the contention resolution message.

10. The method according to claims 8 or 9, wherein

the third indication information is an identifier information, and the identifier information is included in a downlink control information (DCI) or higher layer signaling.

11. The method according to any one of claims 1 to 10, wherein

the first-type terminal device is reduced capability (REDCAP) terminal device.

12. The method according to claim 10, wherein

the identifier information comprises 1 bit.

~~9. The method according to claim 8, wherein the method comprises:~~

~~when a bit status of the third indication information is a first bit state, sending, by the first terminal device on the first bandwidth resource, the message 3 in the random access process and/or the physical uplink control channel for feeding back the contention resolution message; or~~

~~when a bit status of the third indication information is a second bit state, sending, by the first terminal device on the second bandwidth resource, the message 3 in the random access process and/or the physical uplink control channel for feeding back the contention resolution message.~~

~~10~~13. The method according to claim 1, wherein the method further comprises:

obtaining~~, by the first terminal device,~~ fourth indication information, wherein the fourth indication information indicates that an association configuration between an SSB and a random access channel occasion is a first association configuration or a second association configuration, and the association configuration is an association configuration between a quantity of SSBs and a quantity of random access channel occasions.

~~11~~14. The method according to claim 1, wherein the method further comprises:

if ~~the first terminal device~~ receives fourth indication information, the fourth indication information indicates that an association configuration between an SSB and a random access is a first association configuration; or if ~~the first terminal device~~ does not receive fourth indication information, an association configuration between an SSB and a random access is a second association configuration; or

if ~~the first terminal device~~ receives fourth indication information, the fourth indication information indicates that an association configuration between an SSB and a random access channel occasion is a second association configuration; or if ~~the first terminal device~~ does not receive fourth indication information, an association configuration between an SSB and a random

access channel occasion is a first association configuration.

~~12~~15. The method according to any one of claims 1 to ~~11~~14, wherein the first parameter is carried in random access channel configuration information.

~~13~~16. The method according to any one of claims 1 to ~~12~~15, wherein the first information comprises system information.

~~14~~17. An information transmission method, comprising:

sending~~, by a network device,~~ first information to a first terminal device, wherein the first information indicates M bandwidth resources, M is a positive integer, a size of each of the M bandwidth resources is equal to or less than a maximum channel bandwidth supported by the first terminal device, and the first terminal device is a first-type terminal device;

sending~~, by the network device,~~ a first parameter, wherein the first parameter is a quantity of random access channel occasions for frequency division multiplexing in a time unit; and

receiving~~, by the network device,~~ uplink information ~~sent by~~from the first terminal device, or sending downlink information to the first terminal device on a first bandwidth resource, wherein the first bandwidth resource is determined by the first terminal device from the M bandwidth resources based on the first information and the first parameter.

~~15~~18. The method according to claim ~~14~~17, wherein a value of the first parameter is greater than 4, and

when M=1, the M bandwidth resources are the first bandwidth resource, the first bandwidth resource comprises predefined resources of N random access channel occasions, the random access channel occasions whose quantity is the first parameter comprise the N random access channel occasions, and N is a positive integer; or

when M=1, ~~the network device~~ sends first indication information, wherein the first indication information indicates a first random access channel occasion, a start resource block of the first bandwidth resource is the same as a start resource block of the first random access channel occasion, and the M bandwidth resources are the first bandwidth resource; or

when M>1, each of the M bandwidth resources comprises a resource corresponding to at least one random access channel occasion.

~~16~~19. The method according to claim ~~14~~ 17 or ~~15~~18, wherein the value of the first parameter is 8, indexes of the random access channel occasions sorted in a first order are 0 to 7, and the first order comprises an ascending order of frequencies.

~~17~~20. The method according to claim ~~16~~19, wherein

when the first indication information comprises one bit, the first indication information indicates an index of the first random access channel occasion in indexes {0, 4}; or

when the first indication information comprises two bits, the first indication information

indicates an index of the first random access channel occasion in indexes {1, 2, 3, 4}; or

when the first indication information comprises three bits, the first indication information indicates an index of the first random access channel occasion in indexes {0, 1, 2, 3, 4}; or

when the first indication information comprises three bits, the first indication information indicates an index of the first random access channel occasion in indexes {0, 1, 2, 3, 4, 5, 6, 7}; or

when ~~the network device~~ does not send the first indication information, an index of the first random access channel occasion is 0.

~~18~~21. The method according to any one of claims ~~14~~ 17 to 20~~17~~, wherein the first information indicates the M bandwidth resources; and

a size of each of the M bandwidth resources is predefined; or

when M=2, one bandwidth resource in the bandwidth resources comprises resources of random access channel occasions {0, 1, 2, 3}, and the other bandwidth resource in the bandwidth resources comprises resources of random access channel occasions {4, 5, 6, 7}; or

when M>1, ~~the network device~~ sends first signaling, wherein the first signaling is used to indicate a first candidate bandwidth resource, and remaining (M–1) bandwidth resources are determined based on the first candidate bandwidth resource.

~~19~~22. The method according to claim ~~14~~17, wherein when M>1, the method further comprises:

sending~~, by the network device,~~ second indication information, wherein the second indication information indicates a second bandwidth resource;

receiving~~, by the network device,~~ a random access preamble on the first bandwidth resource; and

receiving~~, by the network device~~ on the second bandwidth resource, a message 3 in a random access process or a physical uplink control channel for feeding back a contention resolution message.

~~20~~23. The method according to claim ~~19~~22, wherein the second indication information is carried in one or more of a random access response message, downlink control information for scheduling the random access response message, a contention resolution message, and downlink control information for scheduling the contention resolution message; and/or

the second indication information is carried in an uplink grant of each media access control random access response in a random access response message.

~~21~~24. The method according to claim ~~19 or 20~~17, wherein ~~when M>1,~~ the method further comprises:

receiving~~, by the network device,~~ ~~the~~ a random access preamble on the first bandwidth resource; and

sending~~, by the network device,~~ third indication information, wherein the third indication

information indicates a bandwidth resource for ~~the first terminal device to send the~~ a message 3 in the random access process and/or the physical uplink control channel for feeding back ~~the~~ a contention resolution message.

25. The method according to claim 24, wherein

a bit status of the third indication information indicates the bandwidth resource for the message 3 in the random access process and/or the physical uplink control channel for feeding back the contention resolution message.

26. The method according to claim 24 or 25, wherein

the third indication information is an identifier information, and the identifier information is included in a downlink control information (DCI) or higher layer signaling

27. The method according to any one of claims 17 to 26, wherein

the first-type terminal device is reduced capability (REDCAP) terminal device.

28. The method according to claim 26, wherein

the identifier information comprises 1 bit.

~~22. The method according to claim 21, wherein the method comprises:~~

~~when a bit status of the third indication information is a first bit state, receiving, by the network device on the first bandwidth resource, the message 3 in the random access process and/or the physical uplink control channel for feeding back the contention resolution message; or~~

~~when a bit status of the third indication information is a second bit state, receiving, by the network device on the second bandwidth resource, the message 3 in the random access process and/or the physical uplink control channel for feeding back the contention resolution message.~~

~~23~~29. The method according to claim 1~~7~~, wherein the method further comprises:

sending~~, by the network device,~~ fourth indication information, wherein the fourth indication information indicates that an association configuration between an SSB and a random access channel occasion is a first association configuration or a second association configuration, and the association configuration is an association configuration between a quantity of SSBs and a quantity of random access channel occasions.

~~24~~30. The method according to claim ~~1~~17, wherein the method further comprises:

if ~~the network device~~ sends fourth indication information, the fourth indication information indicates that an association configuration between an SSB and a random access channel occasion is a first association configuration; or if ~~the network device~~ does not send fourth indication information, an association configuration between an SSB and a random access channel occasion is a second association configuration; or

if ~~the network device~~ sends fourth indication information, the fourth indication information

indicates that an association configuration between an SSB and a random access channel occasion is a second association configuration; or if ~~the network device~~ does not send fourth indication information, an association configuration between an SSB and a random access channel occasion is a first association configuration.

~~25~~31. The method according to any one of claims ~~14~~ 17 to ~~24~~30, wherein the first parameter is carried in random access channel configuration information.

32~~26~~. The method according to any one of claims ~~14~~ 17 to ~~25~~31, wherein the first information comprises system information.

~~27~~33. A communication apparatus, comprising a processor, wherein the processor is connected to a memory, the memory is configured to store a computer program, and the processor is configured to execute the computer program stored in the memory, so that the apparatus performs the method according to any one of claims 1 to ~~13~~16, or performs the method according to any one of claims ~~14~~ 17 to ~~26~~32.

~~28~~34. A computer-readable storage medium, wherein the computer-readable storage medium is configured to store a computer program, and when the computer program runs on a computer, the computer is enabled to perform the method according to any one of claims 1 to ~~13~~16, or the computer is enabled to perform the method according to any one of claims ~~14~~ 17 to ~~26~~32.

~~29~~35. A chip, comprising a processor and a communication interface, wherein the processor is configured to read instructions to perform the method according to any one of claims 1 to ~~13~~16, or perform the method according to any one of claims ~~14~~ 17 to ~~26~~32.

~~30~~36. A communication apparatus, comprising modules configured to perform the method according to any one of claims 1 to ~~13~~ 16 or claims ~~14~~ 17 to 32~~26~~.

~~31. A computer program product, wherein the computer program product comprises computer program code, and when the computer program code is run, the method according to any one of claims 1 to 13 or 14 to 26 is implemented.~~