above-mentioned first aspect or any probable implementation manner of the first aspect.

[0022] According to a fourth aspect, there is provided a network device that can perform the operations of the network device in the above-mentioned second aspect or any optional implementation manner of the second aspect. Specifically, the network device may include module units configured to perform the operations of the network device in the above-mentioned second aspect or any probable implementation manner of the second aspect.

[0023] According to a fifth aspect, there is provided a terminal device, including: a processor, a transceiver and a memory. The processor, the transceiver and the memory communicate with each other through an internal connection path. The memory is configured to store instructions, and the processor is configured to execute the instructions stored in the memory. When the processor executes the instructions stored in the memory, the execution enables the terminal device to execute the method in the first aspect or any probable implementation manner of the first aspect, or the execution enables the terminal device to implement the terminal device provided in the third aspect.

[0024] According to a six aspect, there is provided a network device, including: a processor, a transceiver and a memory. The processor, the transceiver and the memory communicate with each other through an internal connection path. The memory is configured to store instructions, and the processor is configured to execute the instructions stored in the memory. When the processor executes the instructions stored in the memory, the execution enables the network device to execute the method in the second aspect or any probable implementation manner of the second aspect, or the execution enables the network device to implement the terminal device provided in the fourth aspect.

[0025] According to a seventh aspect, there is provided a computer readable storage medium storing a program that enables the terminal device to execute any one of the data transmission methods described in the above-mentioned first aspect and various implementation manners of the first aspect.

[0026] According to an eighth aspect, there is provided a computer readable storage medium storing a program that enables the network device to execute any one of the data transmission methods described in the above-mentioned second aspect and various implementation manners of the second aspect.

application may be obtained through the following two methods.

[0053] First Method

[0054] Optionally, before the terminal device determines the Resource Block Group (RBG) size under the transmission bandwidth used by the terminal device according to the specific parameter M and the transmission bandwidth, the method further includes: determining, by the terminal device, an M corresponding to a basic parameter set used according to the basic parameter set, wherein different basic parameter sets are corresponding to different parameters M.

[0055] In this embodiment, the terminal device may determine the value of M corresponding to the basic parameter set used according to the basic parameter set used by itself (for example, a subcarrier interval), and a corresponding relationship between a plurality of basic parameter sets and a plurality of values of M. The same value of M is used for one type of basic parameter set, as shown in Table 2 for example, when the subcarrier interval is 15 kHz, M=35; when the subcarrier interval is 30 kHz, M=18; when the subcarrier interval is 60 kHz, M=9; when the subcarrier interval is 120 kHz, M=5; and when the subcarrier interval is 240 kHz, M=3.

[0056] Table 2

Subcarrier Interval	Value of M
15 kHz	35
30 kHz	18
60 kHz	9
120 kHz	5
240 kHz	3

[0057] Second Method

[0058] Optionally, before the terminal device determines the Resource Block Group (RBG) size under the transmission bandwidth used by the terminal device according to the specific parameter M and the transmission bandwidth, the method further includes: receiving, by the terminal device, first indication information for indicating M sent by the network device.

1	5	W_1=14	S_1=1	N_1=14
2	10	W_2=28	S_2=2	N_2=14
3	20	W_3=55	S_3=4	N_3=14
4	30	W_4=83	S_4=8	N_4=11
5	40	W_5=110	S_5=8	N_5=14
6	50	W_6=138	S_6=8	N_6=318
7	60	W_7=165	S_7=16	N_7=11
8	70	W_8=193	S_8=16	N_8=13
9	80	W_9=220	S_9=16	N_9=14
10	90	W_{10}=248	S_{10}=16	N_{10}=16
11	100	W_{11}=275	S_{11}=16	N_{11}=18

[0097] According to Table 4 and Table 6, it can be seen that when the subcarrier interval is 15 kHz, M=35; and when the subcarrier interval is 30 kHz, M=18. Different subcarrier intervals correspond to different values of M. When the subcarrier interval changes from 15 kHz to 30 kHz, the value of M may be appropriately reduced, and the overhead of the downlink control signaling can be further reduced by reducing the number of bits in the bitmap. After the terminal device determines that the size of the bitmap becomes 18 bits, blind detection may be performed on the downlink control signaling according to the bitmap of 18 bit, rather than according to the bitmap of 35 bits, and meanwhile, the blind detection complexity of the terminal device will not be increased.

[0098] Table 7 shows a relationship among the transmission bandwidth, the RBG size and the number of bits N for indicating the target RBG when the subcarrier interval is 60 kHz, and M=35. As shown in Table 7, a candidate RBG size S_i={1, 2, 4}, for a certain transmission bandwidth W_i, the minimum RBG size greater than W_i/35 is used as the RBG size S_i under the transmission bandwidth W_i. The bitmap used for RBG allocation includes 35 bits, $\lceil W_i/S_i \rceil$ bits may be used for RBG allocation, $\lceil W_i/S_i \rceil \leq 35$, and the remaining bits may be left blank or used for other purposes. For example, in the row corresponding to No. 1,

network device, and the network device may be, for example, the network device 10 shown in Fig. 1. As shown in Fig. 4, the data transmission method includes the following steps.

[00125] In 410, a network device determines a Resource Block Group (RBG) size under a transmission bandwidth used for data transmission with a terminal device according to a specific parameter M and the transmission bandwidth.

[00126] M is a positive integer. M may be a fixed value, i.e., M is the same under any transmission condition. M may also vary with change of the transmission conditions, and different values of M are used for different transmission conditions, for example, when transmitting using different basic parameter sets.

[00127] Optionally, before the network device determines the RBG size under the transmission bandwidth for data transmission with the terminal device according to the specific parameter M and the transmission bandwidth, the method further includes: determining, by the network device, an M corresponding to a basic parameter set used according to the basic parameter set, where different basic parameter sets are corresponding to different parameters M.

[00128] In the embodiment, the network device may determine the value of M corresponding to the basic parameter set used according to the basic parameter set used by itself, for example, a subcarrier interval, and a corresponding relationship between a plurality of basic parameter sets and a plurality of values of M. The same value of M is used for one basic parameter set, for example, when the subcarrier interval is 15 kHz, M=35; when the subcarrier interval is 30 kHz, M=18; when the subcarrier interval is 60 kHz, M=9; when the subcarrier interval is 120 kHz, M=5; and when the subcarrier interval is 240 kHz, M=3.

[00129] Optionally, the method further includes: sending, by the network device, first indication information for indicating M to the terminal device.

[00130] Optionally, the first indication information includes Downlink Control Information (DCI), a Radio Resource Control (RRC) Signaling, System Information (SI) or a Media Access Control Element (MAC CE).

[00131] After the network device determines M, it is also necessary to know a transmission bandwidth within the current transmission time period for data transmission with the terminal device. Optionally, before the network device determines the RBG size

transmission bandwidth, wherein the terminal device uses different transmission bandwidths within different transmission time periods.

[00189] Optionally, the processor 710 is specifically configured to: receive second indication information for indicating the transmission bandwidth sent by the network device via the transceiver 720, wherein the second indication information includes DCI, a RRC Signaling, System Information (SI) or a MAC CE.

[00190] It should be understood that, in the embodiments of the present application, the processor 710 may be a Central Processing Unit (CPU), and the processor 710 may also be other general purpose processor, a Digital Signal Processors (DSP), an Application Specific Integrated Circuit (ASIC), a Field Programmable Gate Array (FPGA), or other programmable logic device, discrete gate or transistor logic device, discrete hardware assembly, etc. The general purpose processor may be a microprocessor or the processor may be any conventional processor, or the like.

[00191] The memory 730 may include a read only memory and a random access memory, and provide instructions and data to the processor 710. A portion of the memory 730 may also include a non-volatile random access memory.

[00192] In an implementation process, the steps in the foregoing methods may be completed using an integrated logic circuit of hardware or an instruction in a form of software in the processor 710. The steps of the data transmission methods disclosed with reference to the embodiments of the present application may be directly executed and accomplished by means of a hardware processor or may be executed and accomplished using a combination of hardware and software modules in the processor 710. The software module may be located in a mature storage medium in the art, such as a random access memory, a programmable read-only memory, or an electrically erasable programmable memory, a register, etc. The storage medium is located in the memory 730. The processor 710 reads information from the memory 730 and completes the steps of the foregoing methods in combination with the hardware of the processor. To avoid repetition, details are not described herein again.

[00193] The terminal device 700 according to the embodiments of the present application may correspond to the terminal device for executing the method 200 in the above

method 200 and the terminal device 500 according to the embodiments of the present application, and individual units or modules in the terminal device 700 are respectively used for executing individual actions or processing processes executed by the terminal device in the above method 200. Here, in order to avoid redundancy, detailed description thereof is omitted.

[00194] Fig. 8 is a schematic structure diagram of a network device 800 according to an embodiment of the present application. As shown in Fig. 8, the network device includes a processor 810, a transceiver 820, and a memory 830, wherein the processor 810, the transceiver 820, and the memory 830 communicate with each other through an internal connection path. The memory 830 is configured to store instructions, and the processor 810 is configured to execute the instructions stored in the memory 830 to control the transceiver 820 to receive signals or send signals.

[00195] The processor 810 is configured to determine a Resource Block Group (RBG) size under a transmission bandwidth used for data transmission with a terminal device according to a specific parameter M and the transmission bandwidth, wherein M is a positive integer.

[00196] The processor 810 is further configured to determine a target RBG for data transmission from N RBGs within the transmission bandwidth, wherein N is determined according to the transmission bandwidth and the RBG size, and N is a positive integer less than or equal to M.

[00197] The processor 810 is further configured to generate a bitmap according to the target RBG, wherein the bitmap includes M bits, and values on N bits from the M bits are used for indicating the target RBG.

[00198] The transceiver 820 is further configured to send the bitmap borne in downlink control information to the terminal device.

[00199] The transceiver 820 is further configured to transmit the data with the terminal device on the target RBG.

[00200] Therefore, the network device determines the RBG size used under the current transmission bandwidth based on the specific parameter, and uses the bitmaps with the same size to indicate the RBG when using different transmission bandwidths, so that the network

device can flexibly and efficiently determine the RBG size and the blind detection complexity is reduced.

[00201] Optionally, the transmission bandwidth is equal to W, the RBG size is equal to S, and S is a minimum RBG size greater than W/M from a plurality of preset RBG sizes.

[00202] Optionally, N is equal to $\lceil W/S \rceil$, and $\lceil\ \rceil$ refers to rounding up.

[00203] Optionally, the processor 810 is further configured to: determine an M corresponding to a basic parameter set used according to the basic parameter set, wherein different basic parameter sets are corresponding to different parameters M.

[00204] Optionally, the transceiver 820 is further configured to: send first indication information for indicating M to the terminal device, wherein the first indication information includes Downlink Control Information (DCI), a Radio Resource Control (RRC) Signaling, System Information (SI) or a Media Access Control Element (MAC CE).

[00205] Optionally, the processor 810 is further configured to: determine the transmission bandwidth, wherein the network device uses different transmission bandwidths to perform data transmission with the terminal device within different transmission time periods.

[00206] Optionally, the transceiver 820 is further configured to: send second indication information for indicating the transmission bandwidth to the terminal device, wherein the second indication information includes DCI, a RRC Signaling, System Information (SI) or a MAC CE.

[00207] It should be understood that, in the embodiments of the present application, the processor 810 may be a Central Processing Unit (CPU), and the processor 810 may also be other general purpose processor, a Digital Signal Processors (DSP), an Application Specific Integrated Circuit (ASIC), a Field Programmable Gate Array (FPGA), or other programmable logic device, discrete gate or transistor logic device, discrete hardware assembly, etc. The general purpose processor may be a microprocessor or the processor may be any conventional processor, or the like.

[00208] The memory 830 may include a read only memory and a random access memory, and provide instructions and data to the processor 810. A portion of the memory

830 may also include a non-volatile random access memory. In an implementation process, the steps in the foregoing methods may be completed using an integrated logic circuit of hardware or an instruction in a form of software in the processor 810. The steps of the data transmission methods disclosed with reference to the embodiments of the present application may be directly executed and accomplished by means of a hardware processor or may be executed and accomplished using a combination of hardware and software modules in the processor 810. The software module may be located in a mature storage medium in the art, such as a random access memory, a programmable read-only memory, or an electrically erasable programmable memory, a register, etc. The storage medium is located in the memory 830. The processor 810 reads information from the memory 830 and completes the steps of the foregoing methods in combination with the hardware of the processor. To avoid repetition, details are not described herein again.

[00209] The network device 800 according to the embodiments of the present application may correspond to the network device for executing the method 400 in the above method 400 and the network device 600 according to the embodiments of the present application, and individual units or modules in the network device 800 are respectively used for executing individual actions or processing processes executed by the terminal device in the above method 400. Here, in order to avoid redundancy, detailed description thereof is omitted.

[00210] Fig. 9 is a schematic structure diagram of a system chip according to an embodiment of the present application. The system chip 900 of Fig. 9 includes an input interface 901, an output interface 902, at least one processor 903 and a memory 904. The input interface 901, the output interface 902, the processor 903, and the memory 904 are connected to each other through an internal connection path. The processor 903 is configured to execute codes in the memory 904.

[00211] Alternatively, when the codes are executed, the processor 903 may implement the method 200 executed by the terminal device in the method embodiments. For the sake of brevity, details will not be described herein again.

[00212] Alternatively, when the codes are executed, the processor 903 may implement the method 400 executed by the network device in the method embodiments. For the sake of

brevity, details will not be described herein again.

[00213] Those of ordinary skills in the art may be aware that, in combination with the examples described in the embodiments disclosed herein, units and algorithm steps may be implemented by electronic hardware or a combination of computer software and electronic hardware. Whether the functions are executed by hardware or software depends on particular applications and design constraint conditions of the technical solutions. A person skilled in the art may use different methods to implement the described functions for each particular application, but it should not be considered that the implementation goes beyond the scope of the present application.

[00214] It can be clearly understood by those skilled in the art that, for the sake of convenience and brevity, a detailed working process of the foregoing system, apparatus, and unit may refer to a corresponding process in the foregoing method embodiments, and will not be elaborated herein.

[00215] In the several embodiments provided in the present application, it should be understood that the disclosed systems, apparatuses and methods may be implemented in other ways. For example, the apparatus embodiments described above are merely illustrative. For example, the division of the units is only one logical function division. In practice, there may be another division manner. For example, multiple units or components may be combined or integrated into another system, or some features may be ignored or not executed. In addition, the illustrated or discussed mutual coupling or direct coupling or communication connection may be indirect coupling or communication connection through some interfaces, devices or units, and may be in electrical, mechanical or other forms.

[00216] The units described as separated parts may or may not be physically separated, and the parts displayed as units may or may not be physical units, that is, may be located in one place, or may be distributed on multiple network units. Some or all of the units may be selected according to actual needs to achieve the objects of the solutions in the embodiments.

[00217] In addition, each functional unit in each embodiment of the present application may be integrated in one monitoring unit, or each unit may exist alone physically, or two or more units may be integrated in one unit.

[00218] The function may be stored in a computer-readable storage medium if being

implemented in the form of a software function unit and sold or used as an independent product. Based on such understanding, the essence of the technical solutions of the present application, or the part contributing to the prior art or all or a part of the technical solutions, may be embodied in the form of a software product. The computer software product is stored in a storage medium including a number of instructions such that a computer device (which may be a personal computer, a server, or a network device, etc.) executes all or a part of steps of the method described in each of the embodiments of the present application. The foregoing storage medium includes: any medium that is capable of storing program codes such as a USB disk, a mobile hard disk, a Read-Only Memory (ROM), a Random Access Memory (RAM), a magnetic disk or an optical disk, and the like.

WHAT IS CLAIMED IS:

1. A data transmission method, comprising:

determining, by a terminal device, a Resource Block Group (RBG) size corresponding to a transmission bandwidth used by the terminal device according to the transmission bandwidth and a corresponding relationship between the transmission bandwidth and the RBG size;

receiving, by the terminal device, a bitmap borne in downlink control information sent by a network device, wherein the bitmap comprises M bits, wherein M is a positive integer;

determining, by the terminal device, a target RBG for data transmission from N RBGs within the transmission bandwidth according to values on N bits from the M bits, wherein N is determined according to the transmission bandwidth and the RBG size, and N is a positive integer less than or equal to M; and

transmitting, by the terminal device, the data with the network device on the target RBG.

2. The method according to claim 1, wherein the determining, by the terminal device, the RBG size corresponding to the transmission bandwidth used by the terminal device according to the transmission bandwidth and the corresponding relationship between the transmission bandwidth and the RBG size comprises:

determining, by the terminal device, the RBG size corresponding to the transmission bandwidth used by the terminal device by looking up a table comprising the corresponding relationship between a plurality of transmission bandwidths and a plurality of RBG sizes.

3. The method according to claim 1 or 2, wherein N is a number of the RBGs comprised in the transmission bandwidth.

4. The method according to any one of claims 1-3, wherein the transmission bandwidth is equal to W, the RBG size is equal to S, and S is a minimum RBG size greater than W/M from a plurality of preset RBG sizes.

5. The method according to any one of claims 1-4, wherein N is equal to $\lceil W/S \rceil$, and $\lceil\ \rceil$ refers to rounding up.

6. A terminal device, comprising:

a determination unit configured to determine a Resource Block Group (RBG) size corresponding to a transmission bandwidth used by the terminal device according to the transmission bandwidth and a corresponding relationship between the transmission bandwidth and the RBG size; and

a transmission unit configured to receive a bitmap borne in downlink control information sent by a network device, wherein the bitmap comprises M bits, wherein M is a positive integer;

the determination unit being further configured to determine a target RBG for data transmission from N RBGs within the transmission bandwidth according to values on N bits from the M bits, wherein N is determined according to the transmission bandwidth and the RBG size, and N is a positive integer less than or equal to M; and

the transmission unit being further configured to transmit the data with the network device on the target RBG.

7. The terminal device according to claim 6, wherein the determination unit is further configured to:

determine the RBG size corresponding to the transmission bandwidth used by the terminal device by looking up a table comprising the corresponding relationship between a plurality of transmission bandwidths and a plurality of RBG sizes.

8. The terminal device according to claim 6 or 7, wherein N is a number of the RBGs comprised in the transmission bandwidth.

9. The terminal device according to any one of claims 6 to 8, wherein the transmission bandwidth is equal to W, the RBG size is equal to S, and S is a minimum RBG size greater than W/M from a plurality of preset RBG sizes.

10. The terminal device according to any one of claims 6 to 9, wherein N is equal to $\lceil W/S \rceil$, and $\lceil\ \rceil$ refers to rounding up.

11. The terminal device according to any one of claims 6 to 10, wherein determination unit is implemented by a processor, and the transmission unit is implemented by a transceiver.

12. A network device, comprising:

a determination unit configured to determine a Resource Block Group (RBG) size corresponding to a transmission bandwidth used for data transmission with a terminal device according to the transmission bandwidth and a corresponding relationship between the transmission bandwidth and the RBG size;

the determination unit being further configured to determine a target RBG for data transmission from N RBGs within the transmission bandwidth, wherein N is determined according to the transmission bandwidth and the RBG size;

a processing unit configured to generate a bitmap according to the target RBG, wherein the bitmap comprises M bits, and values on N bits from the M bits are used for indicating the target RBG, wherein M is a positive integer, and N is a positive integer less than or equal to M;

a transmission unit configured to send the bitmap borne in downlink control information to the terminal device; and

the transmission unit being further configured to transmit the data with the terminal device on the target RBG.

13. The network device according to claim 12, wherein the determination unit is further configured to:

determine the RBG size corresponding to the transmission bandwidth by looking up a table comprising the corresponding relationship between a plurality of transmission bandwidths and a plurality of RBG sizes.

14. The network device according to claim 12 or 13, wherein N is a number of the RBGs comprised in the transmission bandwidth.

15. The network device according to any one of claims 12 to 14, wherein the transmission bandwidth is equal to W, the RBG size is equal to S, and S is a minimum RBG size greater than W/M from a plurality of preset RBG sizes.

16. The network device according to any one of claims 12 to 15, wherein N is equal to $\lceil W/S \rceil$, and $\lceil\ \rceil$ refers to rounding up.

17. The network device according to any one of claims 12 to 16, wherein determination unit and the processing unit are implemented by a processor, and the transmission unit is implemented by a transceiver.