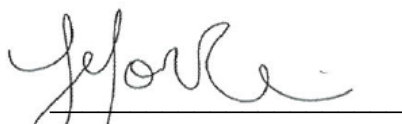


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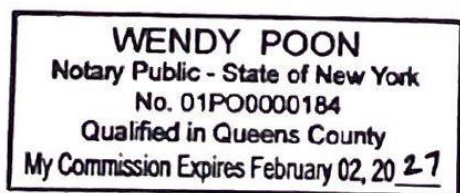


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(54) Title: BWP FREQUENCY HOPPING CONFIGURATION METHOD, NETWORK DEVICE AND TERMINAL

(54) Title of Invention: A BWP Frequency-Hopping Configuration Method, A Network Device and A Terminal

The network device transmits a first configuration information of a transmission physical channel to a terminal, wherein the first configuration information is used to indicate at least one frequency domain displacement separately configured for each of at least one BWP.

101

Fig. 1A

101 A NETWORK DEVICE SENDS A FIRST CONFIGURATION INFORMATION OF A TRANSMISSION PHYSICAL CHANNEL TO A TERMINAL, WHEREIN THE FIRST CONFIGURATION INFORMATION IS USED TO INDICATE AT LEAST ONE FREQUENCY DOMAIN DISPLACEMENT CONFIGURED FOR EACH OF AT LEAST ONE BWP

(57) Abstract: Provided in the present invention is a BWP frequency hopping configuration method, a network device and a terminal. According to embodiments of the present invention, different frequency domain displacement sets are configured for different BWPs, and the bandwidth of each BWP are fully utilized, so that it is possible to maximize the frequency hopping displacement on the basis of not exceeding the bandwidth of BWP, so as to obtain a larger frequency selective gain, thereby improving the transmission performance of the physical channel.

(57) Abstract: The present disclosure provides a BWP frequency-hopping configuration method, a network device and a terminal. According to the embodiments of the present disclosure, different frequency domain displacement sets are configured for different BWPs, and the bandwidth of each BWP is fully utilized, enabling maximization of frequency hopping without exceeding the bandwidth of the BWP, so as to achieve greater frequency-selective gain, thereby improving the transmission performance of the physical channel.

A BWP Frequency-Hopping Configuration Method, A Network Device and A Terminal**Technical Field**

The present disclosure relates to wireless access technology, particularly to a bandwidth part (BWP) frequency-hopping configuration method, a network device and a terminal.

Background Art

In new radio (NR) systems, such as 5G application scenarios, physical channels can adopt frequency-hopping technology to achieve frequency-selective gain and improve the transmission performance of physical channels. Following the introduction of the concept of BWP, as a terminal can be configured with a plurality of BWPs, frequency hopping of the physical channel in each BWP can be achieved through uniform configuration of the frequency domain displacement of the physical channel according to the BWP with the smallest bandwidth.

However, configuring the frequency domain displacement of the physical channel uniformly according to the BWP with the smallest bandwidth makes it impossible to achieve a greater degree of frequency hopping through full utilization of the BWPs with relatively large bandwidth, thus limiting the frequency-selective gain and resulting in reduction of the transmission performance of the physical channel.

Summary of the Invention

The present disclosure provides a BWP frequency-hopping configuration method, a network device and a terminal in a plurality of aspects, in order to improve the transmission performance of physical channels.

In one aspect, the present disclosure provides a BWP frequency-hopping configuration method, comprising: a network device transmitting a first configuration information of a transmission physical channel to a terminal, wherein the first configuration information is used to indicate at least one frequency domain displacement separately configured for each of at least one BWP.

In another aspect, the present disclosure provides another BWP frequency-hopping configuration method, comprising:

a terminal receiving a first configuration information of the transmission physical channel, transmitted by the network device, wherein the first configuration information is used to indicate at least one frequency domain displacement separately configured for each of at least one BWP;

the terminal determines at least one frequency domain displacement for each BWP based on the first configuration information.

In another aspect, the present disclosure provides a network device, comprising:

a transmitting unit, used to transmit a first configuration information of a transmission physical channel to the terminal, wherein the first configuration information is used to indicate at least one frequency domain displacement separately configured for each of at least one BWP.

1 In another aspect, the present disclosure provides a terminal, comprising:
2 a receiving unit, used to receive a first configuration information of a transmission physical channel,
3 transmitted by the network device, wherein the first configuration information is used to indicate at least one
4 frequency domain displacement separately configured for each of at least one BWP;
5 a determining unit, used to determine at least one frequency domain displacement for each BWP based on
6 the first configuration information.

7 It can be seen from the above technical solution that, on one hand, according to the embodiments of the
8 present disclosure, the network device transmits a first configuration information of a transmission physical channel
9 to the terminal, wherein the first configuration information is used to indicate at least one frequency domain
10 displacement separately configured for each of at least one BWP. This helps achieve the configuration of different
11 frequency domain displacement sets for different BWPs and full utilization of the bandwidth of each BWP, enabling
12 maximization of frequency hopping without exceeding the bandwidth of the BWP, so as to achieve greater
13 frequency-selective gain, thereby improving the transmission performance of the physical channel.

14 It can be seen from the above technical solution that, on the other hand, according to the embodiments of
15 the present disclosure, the terminal receives a first configuration information of a transmission physical channel,
16 transmitted by the network device, wherein the first configuration information is used to indicate at least one
17 frequency domain displacement separately configured for each of at least one BWP. Accordingly, based on the first
18 configuration information, the terminal determines at least one frequency domain displacement for each BWP. This
19 helps achieve the configuration of different frequency domain displacement sets for different BWPs and full
20 utilization of the bandwidth of each BWP, enabling maximization of frequency hopping without exceeding the
21 bandwidth of the BWP, so as to achieve greater frequency-selective gain, thereby improving the transmission
22 performance of the physical channel.

23 Description of Attached Drawings

24 In order to more clearly illustrate the technical solutions in the embodiments of the present disclosure, a
25 brief introduction to the attached drawings used in the description of the embodiments or prior art will be provided
26 below. It is evident that the attached drawings described below are some embodiments of the present disclosure.
27 For those of ordinary skill in the art, other attached drawings may also be obtained based on these attached drawings
28 without requiring inventive effort.

29 Fig. 1A is a schematic flowchart of a BWP frequency-hopping configuration method provided in one
30 embodiment of the present disclosure;

31 Fig. 1B is a schematic diagram of a frequency domain displacement configuration provided in the
32 corresponding embodiment shown in Fig. 1A;

33 Fig. 1C is a schematic diagram of another frequency domain displacement configuration provided in the
34 corresponding embodiment shown in Fig. 1A;

35 Fig. 2A is a schematic flowchart of another BWP frequency-hopping configuration method provided in
36 another embodiment of the present disclosure;

37 Fig. 2B is a schematic flowchart of another BWP frequency-hopping configuration method provided in
38 another embodiment of the present disclosure;

39 Fig. 3A is a schematic diagram of the structure of a network device provided in another embodiment of the
40 present disclosure;

41 Fig. 3B is a schematic diagram of the structure of another network device provided in another embodiment
42 of the present disclosure;

43 Fig. 4A is a schematic diagram of the structure of a terminal provided in another embodiment of the present
44 disclosure;

Fig. 4B is a schematic diagram of the structure of another terminal provided in another embodiment of the present disclosure.

Specific Embodiments

In order to make the objectives, technical solutions and advantages of the embodiments of the present disclosure clearer, clear and complete descriptions of the technical solutions in the embodiments of the present disclosure will be provided below with reference to the attached drawings of the embodiments of the present disclosure. It is evident that the embodiments described are only part of the embodiments of the present disclosure and not all embodiments. Based on the embodiments in the present disclosure, all other embodiments that those of ordinary skill in the art may be obtained without making inventive effort fall within the scope protected by the present disclosure.

The term “and/or” herein merely describes the relationship between associated objects, indicating that three types of relationships may exist, for example, A and/or B, which means: the presence of A alone, the presence of both A and B at the same time, or the presence of B alone. Additionally, the symbol “/” herein generally indicates a relationship of “or” between the objects before and after it.

The main idea of the present disclosure is that different frequency domain displacement sets are configured for different BWPs and the bandwidth of each BWP are fully utilized. This enables maximization of frequency hopping without exceeding the bandwidth of the BWP, so as to achieve greater frequency-selective gain, thereby improving the transmission performance of the physical channel.

Fig. 1A is a schematic flowchart of a BWP frequency-hopping configuration method provided in one embodiment of the present disclosure, as shown in Fig. 1A.

In 101, the network device transmits a first configuration information of a transmission physical channel to the terminal, wherein the first configuration information is used to indicate at least one frequency domain displacement separately configured for each of at least one BWP.

Wherein the frequency domain displacement refers to the frequency displacement between two hops in frequency hopping, which can be expressed by number of resource blocks (RBs).

Optionally, according to one possible method for achieving this embodiment, the physical channel may include but is not limited to at least one of a physical uplink shared channel (PUSCH), a physical downlink shared channel (PDSCH), a physical uplink control channel (PUCCH), and a physical downlink control channel (PDCCH).

Optionally, according to one possible method for achieving this embodiment, in 101, the network device may specifically transmit the first configuration information of the transmission physical channel to the terminal through higher-layer signaling or system broadcast messages.

For example, the higher-layer signaling may be radio resource control (RRC) signaling. Specifically, the first configuration information may be carried through an information element (IE) in the RRC signaling, and the RRC signaling may be a RRC signaling in the prior art, such as the RRC connection reconfiguration message, which is not defined in this embodiment. That is, the first configuration information may be carried by extending the existing IEs of RRC signaling, or the RRC signaling may be the one that differs from the RRC signaling already available in the prior art.

1 In another example, specifically, the first configuration information may be carried through the unused bits
2 of the existing master information block (MIB) or system information block (SIB) in the system broadcast messages
3 or the first configuration information may be carried through a newly added SIB.

4 In the present disclosure, the network device may further transmit a second configuration information to the
5 terminal to be used to indicate the configuration of the at least one BWP. After the terminal receives the second
6 configuration information, it can determine the position of each of the at least one BWP.

7 Specifically, the network device may transmit the second configuration information to the terminal through
8 higher-layer signaling or system broadcast messages.

9 For example, the higher-layer signaling may be RRC signaling. Specifically, the second configuration
10 information may be carried through an IE in the RRC signaling, and the RRC signaling may be a RRC signaling in
11 the prior art, such as the RRC connection reconfiguration message, which is not defined in this embodiment. That
12 is, the second configuration information may be carried by extending the existing IEs of RRC signaling, or the RRC
13 signaling may be the one that differs from the RRC signaling already available in the prior art.

14 In another example, specifically, the second configuration information may be carried through the unused
15 bits of the existing MIB or SIB in system broadcast messages, or the second configuration information may be
16 carried through a newly added SIB.

17 Optionally, according to one possible method for achieving this embodiment, following 101, the network
18 device may further transmit a first control information to the terminal, wherein the first control information is used
19 to indicate an activated BWP of at least one BWP. In this way, after the terminal receives the first control
20 information, it can determine at least one frequency domain displacement of the single activated BWP.

21 Specifically, the network device may transmit the first control information to the terminal through the
22 downlink control information (DCI) or higher-layer signaling.

23 For example, the higher-layer signaling may be a media access control (MAC) control element (CE)
24 message, and specifically, the first control information may be carried through a newly added MAC CE message.

25 Optionally, according to one possible method for achieving this embodiment, following 101, the network
26 device may further transmit a second control information to the terminal, wherein the second control information
27 is used to indicate a utilized frequency domain displacement in the at least one frequency domain displacement. In
28 this way, after the terminal receives the second control information, it can determine the utilized frequency domain
29 displacement of the activated BWP.
30

Specifically, the network device may transmit the second control information to the terminal through DCI or higher-layer signaling.

For example, the higher-layer signaling may be a MAC CE message, and specifically, the second control information may be carried through a newly added MAC CE message.

Optionally, according to one possible method for achieving this embodiment, following 101, the network device may further transmit a third control information to the terminal, wherein the third control information is used to indicate the position of the first frequency domain resource of the physical channel to be transmitted in the activated BWP.

Specifically, the network device may transmit the third control information to the terminal through DCI or higher-layer signaling.

For example, the higher-layer signaling may be a MAC CE message, and specifically, the third control information may be carried through a newly added MAC CE message.

Optionally, according to one possible method for achieving this embodiment, following 101, the network device may further transmit the [information of] the physical channel to the terminal over the transmission of the first frequency domain resource and the second frequency domain resource of the physical channel, wherein the position of the second frequency domain resource in the activated BWP may be determined using the formula $R2 = (R1 + W_{\text{displacement}}) \bmod W$. Wherein $R2$ is the position of the second frequency domain resource in the activated BWP; $R1$ is the position of the first frequency domain resource in the activated BWP; $W_{\text{displacement}}$ is the utilized frequency domain displacement; W is the bandwidth of the activated BWP.

It should be noted that the network device may also not transmit at least one of the first control information, the second control information and the third control information to the terminal through higher-layer signaling or system broadcast messages. In this way, the terminal can obtain the contents indicated by at least one of the first control information, the second control information, and the third control information based on the preconfiguration, for example, a protocol.

In order to make the method provided by the embodiments of the present disclosure clearer, the following examples will illustrate configuration of different frequency domain displacements for different BWPs and configuration of two different frequency domain displacement sets.

Fig. 1B is a schematic diagram of a frequency domain displacement configuration provided in the corresponding embodiment shown in Fig. 1A. As shown in Fig. 1B, assume that two BWPs, namely BWP1 and BWP2, are configured for the terminal, wherein BWP1 has a bandwidth of $W1$ and BWP2 has a bandwidth of $W2$, a frequency domain displacement $W_{\text{displacement1}}$ is configured for BWP1, and a frequency domain displacement $W_{\text{displacement2}}$ is configured for BWP2.

If BWP1 is activated, the terminal determines the position of the second frequency domain resource, which is the frequency domain position of the second hop, $R2 = (R1 + W_{\text{displacement1}}) \bmod W1$, based on $W_{\text{displacement1}}$ and the position of the first frequency domain resource, which is the frequency position of the first hop $R1$.

1 If BWP2 is activated, the terminal determines the frequency domain position of the second hop, $R2 = (R1$
 2 $+ W_{\text{displacement}2}) \bmod W2$, based on $W_{\text{displacement}2}$ and the frequency position of the first hop, $R1$.

3 Fig. 1C is a schematic diagram of another frequency domain displacement configuration provided in the
 4 corresponding embodiment shown in Fig. 1A. As shown in Fig. 1C, assume that two BWPs, namely BWP1 and
 5 BWP2, are configured for the terminal, wherein BWP1 has a bandwidth of $W1$ and BWP2 has a bandwidth of $W2$.
 6 For BWP1, two frequency domain displacements, $W_{\text{displacement}1_1}$ and $W_{\text{displacement}1_2}$, are configured, and for BWP2,
 7 two frequency domain displacements, $W_{\text{displacement}2_1}$ and $W_{\text{displacement}2_2}$, are configured.

8 If BWP1 is activated and the base station instructs the terminal to use the first frequency domain
 9 displacement $W_{\text{displacement}1_1}$, the terminal determines the frequency domain position of the second hop, $R2 = (R1 +$
 10 $W_{\text{displacement}1_1}) \bmod W1$, based on $W_{\text{displacement}1_1}$ and the frequency domain position of the first hop, $R1$.

11 If BWP1 is activated and the base station instructs the terminal to use the second frequency domain
 12 displacement $W_{\text{displacement}1_2}$, the terminal determines the frequency domain position of the second hop, $R2 = (R1 +$
 13 $W_{\text{displacement}1_2}) \bmod W1$, based on $W_{\text{displacement}1_2}$ and the frequency domain position of the first hop, $R1$.

14 If BWP2 is activated and the base station instructs the terminal to use the first frequency domain
 15 displacement $W_{\text{displacement}2_1}$, the terminal determines the frequency domain position of the second hop, $R2 = (R1 +$
 16 $W_{\text{displacement}2_1}) \bmod W1$, based on $W_{\text{displacement}2_1}$ and the frequency domain position of the first hop, $R1$.

17 If BWP2 is activated and the base station instructs the terminal to use the second frequency domain
 18 displacement $W_{\text{displacement}2_2}$, the terminal determines the frequency domain position of the second hop, $R2 = (R1 +$
 19 $W_{\text{displacement}2_2}) \bmod W1$, based on $W_{\text{displacement}2_2}$ and the frequency domain position of the first hop, $R1$.

20 In this embodiment, the network device transmits a first configuration information of the transmission
 21 physical channel to the terminal, wherein the first configuration information is used to indicate at least one
 22 frequency domain displacement separately configured for each of at least one BWP. This helps achieve the
 23 configuration of different frequency domain displacement sets for different BWPs and full utilization of the
 24 bandwidth of each BWP, enabling maximization of frequency hopping without exceeding the bandwidth of the
 25 BWP, so as to achieve greater frequency-selective gain, thereby improving the transmission performance of the
 26 physical channel.

27 Fig. 2A is a schematic flowchart of another BWP frequency-hopping configuration method in another
 28 embodiment of the present disclosure, as shown in Fig. 2A.

29 In 201, the terminal receives a first configuration information of a transmission physical channel, transmitted
 30 by the network device, wherein the first configuration information is used to indicate at least one frequency domain
 31 displacement separately configured for each of at least one BWP.

32 In 202, the terminal determines at least one frequency domain displacement for each BWP based on the
 33 first configuration information.

34 Wherein the frequency domain displacement refers to the frequency displacement between two hops in
 35 frequency hopping, which can be expressed by number of RBs.

36 Optionally, according to one possible method for achieving this embodiment, the physical channel may
 37 include but is not limited to at least one of a PUSCH, a PDSCH, a PUCCH, and a PDCCH.
 38

1 Optionally, according to one possible method for achieving this embodiment, in 201, the terminal may
2 specifically receive the first configuration information transmitted by the network device through higher-layer
3 signaling or system broadcast messages.

4 For example, the higher-layer signaling may be RRC signaling. Specifically, the first configuration
5 information may be carried through an IE in the RRC signaling, and the RRC signaling may be a RRC signaling in
6 the prior art, such as the RRC connection reconfiguration message, which is not defined in this embodiment. That
7 is, the first configuration information may be carried by extending the existing IEs of RRC signaling, or the RRC
8 signaling may be the one that differs from the RRC signaling already available in the prior art.

9 In another example, specifically, the first configuration information may be carried through the unused bits
10 of the existing MIB or SIB in system broadcast messages, or the first configuration information may be carried
11 through a newly added SIB.

12 In the present disclosure, the terminal may further receive a second configuration information, transmitted
13 by the network device to be used to indicate the configuration of the at least one BWP. Thus, the terminal can
14 determine the positions of each of at least one BWP.

15 Specifically, the terminal may specifically receive the second configuration information transmitted by the
16 network device through higher-layer signaling or system broadcast messages.

17 For example, the higher-layer signaling may be RRC signaling. Specifically, the second configuration
18 information may be carried through an IE in the RRC signaling, and the RRC signaling may be a RRC signaling in
19 the prior art, such as the RRC connection reconfiguration message, which is not defined in this embodiment. That
20 is, the second configuration information may be carried by extending the existing IEs of RRC signaling, or the RRC
21 signaling may be the one that differs from the RRC signaling already available in the prior art.

22 In another example, specifically, the second configuration information may be carried through the unused
23 bits of the existing MIB or SIB in system broadcast messages, or the second configuration information may be
24 carried through a newly added SIB.

25 Optionally, according to one possible method for achieving this embodiment, as shown in Fig. 2B, following
26 201, 203 may be further executed, wherein the terminal receives a first control information, transmitted by the
27 network device, wherein the first control information is used to indicate an activated BWP of at least one BWP. In
28 this way, the terminal can determine at least one frequency domain displacement of the single activated BWP.

29 Specifically, the terminal may specifically receive the first control information transmitted by the network
30 device through DCI or higher-layer signaling.

31 For example, the higher-layer signaling may be a MAC CE message, and specifically, the first control
32 information may be carried through a new added MAC CE message.
33

1 Optionally, according to one possible method for achieving this embodiment, as shown in Fig. 2B, following
2 201, 204 may be further executed, wherein the terminal receives a second control information transmitted by the
3 network device, wherein the second control information is used to indicate a utilized frequency domain
4 displacement among the at least one frequency domain displacement. In this way, the terminal can determine a
5 frequency domain displacement utilized by the activated BWP.

6 Specifically, the terminal may specifically receive the second control information transmitted by the network
7 device through DCI or higher-layer signaling.

8 For example, the higher-layer signaling may be a MAC CE message, and specifically, the second control
9 information may be carried a newly added MAC CE message.

10 Optionally, according to one possible method for achieving this embodiment, following 201, the terminal
11 may further receive a third control information transmitted by the network device, wherein the third control
12 information is used to indicate the position of the first frequency domain resource of the physical channel to be
13 transmitted in the activated BWP. In this way, the terminal can determine the position of the first frequency domain
14 resource of the physical channel to be transmitted in the activated BWP.

15 Specifically, the terminal may specifically receive the third control information transmitted by the network
16 device through DCI or higher-layer signaling.

17 For example, the higher-layer signaling may be a MAC CE message, and specifically, the third control
18 information may be carried through a newly added MAC CE message.

19 Optionally, according to one possible method for achieving this embodiment, following 201, the terminal
20 may further determine the position of the second frequency domain resource of the physical channel to be
21 transmitted in the activated BWP based on the bandwidth of the activated BWP, the utilized frequency domain
22 displacement, and the position of the first frequency domain resource of the physical channel to be transmitted in
23 the activated BWP, using the formula $R2 = (R1 + W_{\text{displacement}}) \bmod W$; wherein R2 is the position of the second
24 frequency domain resource in the activated BWP; R1 is the position of the first frequency domain resource in the
25 activated BWP; $W_{\text{displacement}}$ is the utilized frequency domain displacement; W is the bandwidth of the activated
26 BWP; thus, the terminal may transmit the physical channel to the network device over the first frequency domain
27 resource and the second frequency domain resource.

28 It should be noted that the network device may also not transmit at least one of the first control information,
29 the second control information and the third control information to the terminal through higher-layer signaling or
30 system broadcast messages. In this way, the terminal can obtain the contents indicated by at least one of the first
31 control information, the second control information, and the third control information based on the preconfiguration,
32 for example, a protocol.
33

1 In order to make the method provided by the embodiments of the present disclosure clearer, similar relevant
2 content can also be referenced in the corresponding embodiments shown in Fig. 1A to Fig. 1C, which will not be
3 repeated here.

4 In this embodiment, the terminal receives a first configuration information of a transmission physical
5 channel, transmitted by the network device, wherein the first configuration information is used to indicate at least
6 one frequency domain displacement separately configured for each of at least one BWP. Accordingly, based on the
7 first configuration information, the terminal determines at least one frequency domain displacement for each BWP.
8 This helps achieve the configuration of different frequency domain displacement sets for different BWPs and full
9 utilization of the bandwidth of each BWP, enabling maximization of frequency hopping without exceeding the
10 bandwidth of the BWP, so as to achieve greater frequency-selective gain, thereby improving the transmission
11 performance of the physical channel.

12 It should be noted that the various aforementioned embodiments of the method are expressed as a series of
13 action combinations for ease of description, but those skilled in the art should be aware that the present disclosure
14 is not limited by the described order of actions, because according to the present disclosure, certain steps may be
15 carried out in a different sequence or concurrently. Secondly, those skilled in the art should also be aware that the
16 embodiments described in the Specification are all preferred embodiments, and the actions and modules involved
17 are not necessarily required by the present disclosure.

18 In the above embodiments, each embodiment is described with its own focus. Any parts that are not detailed
19 in one embodiment can be found in the relevant descriptions of other embodiments.

20 Fig. 3A is a schematic diagram of the structure of a network device provided in another embodiment of the
21 present disclosure. The network device in this embodiment may include a transmitting unit 31, which transmits a
22 first configuration information of a transmission physical channel to the terminal, wherein the first configuration
23 information is used to indicate at least one frequency domain displacement separately configured for each of at
24 least one BWP.

25 Wherein the frequency domain displacement refers to the frequency displacement between two hops in
26 frequency hopping, which can be expressed by number of RBs.

27 Optionally, according to one possible method for achieving this embodiment, the physical channel may
28 include but is not limited to at least one of a PUSCH, a PDSCH, a PUCCH, and a PDCCH.

29 Optionally, according to one possible method for achieving this embodiment, the transmitting unit 31 may
30 specifically be used to transmit a first configuration information to the terminal through RRC signaling or system
31 broadcast messages.

32 Optionally, according to one possible method for achieving this embodiment, the transmitting unit 31 may
33 also be further used to transmit a first control information to the terminal, wherein the first control information is
34 used to indicate an activated BWP of at least one BWP.

35 Specifically, the transmitting unit 31 may be used to transmit a first control information to the terminal
36 through DCI or MAC CE messages.

37 Optionally, according to one possible method for achieving this embodiment, the transmitting unit 31 may
38 also be further used to transmit a second control information to the terminal, wherein the second control information
39 is used to indicate a utilized frequency domain displacement among the at least one frequency domain displacement.

40 Specifically, the transmitting unit 31 may be used to transmit the second control information to the terminal
41 through DCI or MAC CE messages.

42 Optionally, according to one possible method for achieving this embodiment, the transmitting unit 31 may
43 also be further used to transmit a third control information to the terminal, wherein the third control information is
44 used to indicate the position of the first frequency domain resource of the physical channel to be transmitted in the
45 activated BWP.
46

1 Specifically, the transmitting unit 31 may be used to transmit the third control information to the terminal
2 through DCI or MAC CE messages.

3 Optionally, according to one possible method for achieving this embodiment, as shown in Fig. 3B, the
4 network device provided in this embodiment may further include a transmitting unit 32, which is used to transmit
5 the [information of] the physical channel to the terminal over the transmission of the first frequency domain
6 resource and the second frequency domain resource. The position of the second frequency domain resource in the
7 activated BWP is determined using the formula $R2 = (R1 + W_{\text{displacement}}) \bmod W$, based on the bandwidth of the
8 activated BWP, the utilized frequency domain displacement, and the position of the first frequency domain resource
9 of the physical channel be transmitted in the activated BWP; wherein R2 is the position of the second frequency
10 domain resource in the activated BWP; R1 is the position of the first frequency domain resource in the activated
11 BWP; $W_{\text{displacement}}$ is the utilized frequency domain displacement; and W is the bandwidth of the activated BWP.

12 It should be noted that the methods corresponding to the embodiments shown in Fig. 1A to Fig. 1H may be
13 achieved by the network device provided in this embodiment. For detailed descriptions, please refer to the relevant
14 content in the corresponding embodiments shown in Fig. 1A to Fig. 1H, which will not be repeated here.

15 In this embodiment, the transmitting unit transmits a first configuration information of the transmission
16 physical channel to the terminal, wherein the first configuration information is used to indicate at least one
17 frequency domain displacement separately configured for each of at least one BWP. This helps achieve the
18 configuration of different frequency domain displacement sets for different BWPs and full utilization of the
19 bandwidth of each BWP, enabling maximization of frequency hopping without exceeding the bandwidth of the
20 BWP, so as to achieve greater frequency-selective gain, thereby improving the transmission performance of the
21 physical channel.

22 Fig. 4A is a schematic diagram of the structure of a terminal provided in another embodiment of the present
23 disclosure, as shown in Fig. 4A. The network device of this embodiment may include a receiving unit 41 and a
24 determining unit 42. Wherein the receiving unit 41 is used to receive a first configuration information of the
25 transmission physical channel, transmitted by the network device, wherein the first configuration information is
26 used to indicate at least one frequency domain displacement separately configured for each of at least one BWP;
27 the determining unit 42 determines at least one frequency domain displacement for each BWP based on the first
28 configuration information.
29

1 Wherein the frequency domain displacement refers to the frequency displacement between two hops in
2 frequency hopping, which can be expressed by number of RBs.

3 Optionally, according to one possible method for achieving this embodiment, the physical channel may
4 include but is not limited to at least one of a PUSCH, a PDSCH, a PUCCH, and a PDCCH.

5 Optionally, according to one possible method for achieving this embodiment, the receiving unit 41 may
6 specifically be used to receive the first configuration information transmitted by the network device through RRC
7 signaling or system broadcast messages.

8 Optionally, according to one possible method for achieving this embodiment, the receiving unit 41 may
9 further be used to receive a first control information transmitted by the network device, wherein the first control
10 information is used to indicate an activated BWP among the at least one BWP; the determining unit 42 may further
11 be used to determine at least one frequency domain displacement of the activated BWP.

12 Specifically, the receiving unit 41 may be used to receive the first control information transmitted by the
13 network device through DCI or MAC CE messages.

14 Optionally, according to one possible method for achieving this embodiment, the receiving unit 41 may
15 further be used to receive a second control information transmitted by the network device, wherein the second
16 control information is used to indicate a utilized frequency domain displacement among the at least one frequency
17 domain displacement; the determining unit 42 may further be used to determine a utilized frequency domain
18 displacement of the activated BWP.

19 Specifically, the receiving unit 41 may be used to receive the second control information transmitted by the
20 network device through DCI or MAC CE messages.

21 Optionally, according to one possible method for achieving this embodiment, the receiving unit 41 may also
22 be further used to receive a third control information transmitted by the network device, wherein the third control
23 information is used to indicate the position of the first frequency domain resource of the physical channel to be
24 transmitted in the activated BWP.

25 Specifically, the receiving unit 41 may be used to receive the third control information transmitted by the
26 network device through DCI or MAC CE messages.

27 Optionally, according to one possible method for achieving this embodiment, as shown in Fig. 4B, the
28 network device provided in this embodiment may further include a transmitting unit 43, which can be used to
29 determine the position of the second frequency domain resource of the physical channel to be transmitted in the
30 activated BWP based on the bandwidth of the activated BWP, the utilized frequency domain displacement, and the
31 position of the first frequency domain resource of the physical channel to be transmitted in the activated BWP,
32 using the formula $R2 = (R1 + W_{\text{displacement}}) \bmod W$; wherein R2 is the position of the second frequency domain
33 resource in the activated BWP; R1 is the position of the first frequency domain resource in the activated BWP;
34 $W_{\text{displacement}}$ is the utilized frequency domain displacement; W is the bandwidth of the activated BWP. Additionally,
35 the transmitting unit 43 can transmit the [information of] the physical channel to the network device, while
36 [transmitting] the first frequency domain resource and the second frequency domain resource.
37

1 It should be noted that the method corresponding to the embodiment shown in Fig. 2A can be achieved by
2 the terminal provided in this embodiment. For detailed descriptions, please refer to the relevant content in the
3 corresponding embodiments shown in Fig. 2A, which will not be repeated here.

4 In this embodiment, the receiving unit receives a first configuration information of a transmission physical
5 channel, transmitted by the network device, wherein the first configuration information is used to indicate at least
6 one frequency domain displacement separately configured for each of at least one BWP. Accordingly, based on the
7 first configuration information, the determining unit determines at least one frequency domain displacement for
8 each BWP. This helps achieve the configuration of different frequency domain displacement sets for different
9 BWPs and full utilization of the bandwidth of each BWP, enabling maximization of frequency hopping without
10 exceeding the bandwidth of the BWP, so as to achieving greater frequency-selective gain, thereby improving the
11 transmission performance of the physical channel.

12 Those skilled in the art can clearly understand that, for the sake of convenience and brevity in description,
13 the specific operational processes of the systems, devices, and units described above can be found in the
14 corresponding processes in the aforementioned embodiments of the method, which will not be repeated here.

15 In the various embodiments provided by the present disclosure, it should be understood that the disclosed
16 system, device, and method may be achieved in other ways. For example, the embodiments of the device described
17 above are merely illustrative, e.g. the division of the units represents only one type of logical function division. In
18 achieving them, alternative methods of division may exist. For instance, a plurality of units or components may be
19 combined or integrated into another system, or certain features may be omitted or not executed. Another point is
20 that the couplings, direct couplings or communication connections shown or discussed may be achieved through
21 some interfaces, devices, or units via indirect coupling or communication connections, which may be electrical,
22 mechanical, or other forms.

23 The units described as separate components may or may not be physically separated and the components
24 shown as units may or may not be physical units, i.e., they may be located in one place or distributed across a
25 plurality of network units. Some or all of these units may be selected as needed to achieve the objectives of the
26 solution of this embodiment.

27 In addition, the various functional units in the various embodiments of the present disclosure may be
28 integrated into one processing unit, or they may physically exist as separate units. Alternatively, two or more units
29 may be integrated into one unit. The above integrated units may be achieved in the form of hardware or as a
30 combination of hardware and software functional units.

31 Finally, it should be noted that the above embodiments are provided to illustrate the technical solutions of
32 the present disclosure and are not intended to limit them. Although the present disclosure has been described in
33 detail with reference to the aforementioned embodiments, those of ordinary skill in the art should understand that
34 they can still make modifications to the technical solutions described in the various aforementioned embodiments
35 or make equivalent substitutions for some of the technical features. Such modifications or substitutions may not
36 necessarily cause the essence of the corresponding technical solutions to depart from the gist and scope of the
37 technical solutions of the embodiments of the present disclosure.
38

Claims

1. A BWP frequency-hopping configuration method, characterized in that it comprises:
 - a network device transmits a first configuration information of a transmission physical channel to the terminal, wherein the first configuration information is used to indicate at least one frequency domain displacement separately configured for each of at least one BWP.
2. The method according to Claim 1, characterized in that the physical channel comprises at least one of a physical uplink shared channel (PUSCH), physical downlink shared channel (PDSCH), physical uplink control channel (PUCCH) and physical downlink control channel (PDCCH).
3. The method according to Claim 1, characterized in that the network device transmits the first configuration information of the transmission physical channel to the terminal, comprising:
 - the network device transmitting the first configuration information to the terminal through RRC signaling or system broadcast messages.
4. The method according to Claim 1, characterized in that after the network device transmits the first configuration information of the transmission physical channel to the terminal, it further comprises:
 - the network device transmitting a first control information to the terminal, wherein the first control information is used to indicate an activated BWP of at least one BWP.
5. The method according to Claim 4, characterized in that the network device transmits a first control information to the terminal, comprising:
 - the network device transmitting the first control information to the terminal through downlink control information (DCI) or media access control (MAC) control element (CE) messages.
6. The method according to Claim 1, characterized in that after the network device transmits the first configuration information of the transmission physical channel to the terminal, it further comprises:
 - the network device transmitting a second control information to the terminal, wherein the second control information is used to indicate a utilized frequency domain displacement among the at least one frequency domain displacement.
7. The method according to Claim 6, characterized in that the network device transmits a second control information to the terminal, comprising:
 - the network device transmitting the second control information to the terminal through DCI or MAC CE messages.
8. The method according to Claim 1, characterized in that after the network device transmits the first configuration information of the transmission physical channel to the terminal, it further comprises:
 - the network device transmitting a third control information to the terminal, wherein the third control information is used to indicate the position of the first frequency domain resource of the physical channel to be transmitted in the activated BWP.
9. The method according to Claim 8, characterized in that the network device transmits a third control information to the terminal, comprising:

1 the network device transmitting the third control information to the terminal through DCI or MAC CE
2 messages.

3 10. The method according to any one of Claims 1 to 9, characterized in that after the network device
4 transmits the first configuration information of the transmission physical channel to the terminal, it further
5 comprises:

6 the network device transmitting the [information of] the physical channel to the terminal over the
7 transmission of the first frequency domain resource and the second frequency domain resource of the physical
8 channel. The position of the second frequency domain resource in the activated BWP is determined using the
9 formula $R2 = (R1 + W_{\text{displacement}}) \bmod W$, based on the bandwidth of the activated BWP, the utilized frequency
10 domain displacement, and the position of the first frequency domain resource of the physical channel to be
11 transmitted in the activated BWP; wherein R2 is the position of the second frequency domain resource in the
12 activated BWP; R1 is the position of the first frequency domain resource in the activated BWP; $W_{\text{displacement}}$ is the
13 utilized frequency domain displacement; and W is the bandwidth of the activated BWP.

14 11. A BWP frequency-hopping configuration method, characterized in that it comprises:
15 a terminal receiving a first configuration information of the transmission physical channel, transmitted by
16 the network device, wherein the first configuration information is used to indicate at least one frequency domain
17 displacement separately configured for each of at least one BWP;

18 the terminal determines at least one frequency domain displacement for each BWP based on the first
19 configuration information.

20 12. The method according to Claim 11, characterized in that the physical channel comprises at least one of
21 a PUSCH, PDSCH, PUCCH and PDCCH.

22 13. The method according to Claim 11, characterized in that the terminal receives the first configuration
23 information of the transmission physical channel, transmitted by the network device, comprising:

24 the terminal receiving the first configuration information transmitted by the network device through RRC
25 signaling or system broadcast messages.

26 14. The method according to Claim 11, characterized in that after the terminal receives the first configuration
27 information of the transmission physical channel, transmitted by the network device, it further comprises:

28 the terminal receiving a first control information transmitted by the network device, wherein the first control
29 information is used to indicate an activated BWP of at least one BWP;

30 the terminal determining at least one frequency domain displacement of the single activated BWP.

31 15. The method according to Claim 14, characterized in that the terminal receives a first control information
32 transmitted by the network device, comprising:

33 the terminal receiving the first control information transmitted by the network device through DCI or MAC
34 CE messages.

35 16. The method according to Claim 11, characterized in that after the terminal receives the first configuration
36 information of the transmission physical channel, transmitted by the network device, it further comprises:
37

1 the terminal receiving a second control information transmitted by the network device, wherein the second
2 control information is used to indicate a utilized frequency domain displacement among the at least one frequency
3 domain displacement;

4 the terminal determining a utilized frequency domain displacement of the activated BWP.

5 17. The method according to Claim 16, characterized in that the terminal receives a second control
6 information transmitted by the network device, comprising:

7 the terminal receiving the second control information transmitted by the network device through DCI or
8 MAC CE messages.

9 18. The method according to Claim 11, characterized in that after the terminal receives the first configuration
10 information of the transmission physical channel, transmitted by the network device, it further comprises:

11 the terminal receiving a third control information transmitted by the network device, wherein the third
12 control information is used to indicate the position of the first frequency domain resource of the physical channel
13 to be transmitted in the activated BWP.

14 19. The method according to Claim 18, characterized in that the terminal receives a third control information
15 transmitted by the network device, comprising:

16 the terminal receiving the third control information transmitted by the network device through DCI or MAC
17 CE messages.

18 20. The method according to any one of Claims 11 to 19, characterized in that after the terminal receives
19 the first configuration information of the transmission physical channel, transmitted by the network device, it
20 further comprises:

21 the terminal determining the position of the second frequency domain resource of the physical channel to
22 be transmitted in the activated BWP based on the bandwidth of the activated BWP, the utilized frequency domain
23 displacement, and the position of the first frequency domain resource of the physical channel to be transmitted in
24 the activated BWP, using the formula $R2 = (R1 + W_{\text{displacement}}) \bmod W$; wherein R2 is the position of the second
25 frequency domain resource in the activated BWP; R1 is the position of the first frequency domain resource in the
26 activated BWP; $W_{\text{displacement}}$ is the utilized frequency domain displacement; and W is the bandwidth of the activated
27 BWP;

28 the terminal transmitting the [information of] the physical channel to the network device over the first
29 frequency domain resource and the second frequency domain resource.

30 21. A network device, characterized in that it comprises:

31 a transmitting unit, used to transmit a first configuration information of a transmission physical channel to
32 the terminal, wherein the first configuration information is used to indicate at least one frequency domain
33 displacement separately configured for each of at least one BWP.

34 22. The network device according to Claim 21, characterized in that the physical channel comprises at least
35 one of a PUSCH, PDSCH, PUCCH and PDCCH.

36 23. The network device according to Claim 21, characterized in that the transmitting unit is specifically used
37 to

38 transmit the first configuration information to the terminal through RRC signaling or system broadcast
39 messages.
40

24. The network device according to Claim 21, characterized in that the transmitting unit is further used to transmit a first control information to the terminal, wherein the first control information is used to indicate an activated BWP of at least one BWP.

25. The network device according to Claim 24, characterized in that the transmitting unit is specifically used to transmit the first control information to the terminal through DCI or MAC CE messages.

26. The network device according to Claim 21, characterized in that the transmitting unit is further used to transmit a second control information to the terminal, wherein the second control information is used to indicate a utilized frequency domain displacement among the at least one frequency domain displacement.

27. The network device according to Claim 26, characterized in that the transmitting unit is specifically used to transmit the second control information to the terminal through DCI or MAC CE messages.

28. The network device according to Claim 21, characterized in that the transmitting unit is further used to transmit a third control information to the terminal, wherein the third control information is used to indicate the position of the first frequency domain resource of the physical channel to be transmitted in the activated BWP.

29. The network device according to Claim 28, characterized in that the transmitting unit is specifically used to transmit the third control information to the terminal through DCI or MAC CE messages.

30. The network device according to any one of Claims 21 to 29, characterized in that the network device further comprises a transmitting unit, used to

transmit [the information] of the physical channel to the terminal over the transmission of the first frequency domain resource and the second frequency domain resource of the physical channel. The position of the second frequency domain resource in the activated BWP is determined using the formula $R2 = (R1 + W_{\text{displacement}}) \bmod W$, based on the bandwidth of the activated BWP, the utilized frequency domain displacement, and the position of the first frequency domain resource of the physical channel to be transmitted in the activated BWP; wherein R2 is the position of the second frequency domain resource in the activated BWP; R1 is the position of the first frequency domain resource in the activated BWP; $W_{\text{displacement}}$ is the utilized frequency domain displacement; and W is the bandwidth of the activated BWP.

31. A terminal, characterized in that it comprises:
a receiving unit, used to receive a first configuration information of the transmission physical channel, transmitted by the network device, wherein the first configuration information is used to indicate at least one frequency domain displacement separately configured for each of at least one BWP;
a determining unit, used to determine at least one frequency domain displacement for each BWP based on the first configuration information.

32. The terminal according to Claim 31, characterized in that the physical channel comprises at least one of a PUSCH, PDSCH, PUCCH and PDCCH.

33. The terminal according to Claim 31, characterized in that the receiving unit is specifically used to receive the first configuration information transmitted by the network device through RRC signaling or system broadcast messages.

34. The terminal according to Claim 31, characterized in that the receiving unit is further used to receive a first control information transmitted by the network device, wherein the first control information is used to indicate an activated BWP of at least one BWP.

35. The terminal according to Claim 34, characterized in that the receiving unit is specifically used to receive the first control information transmitted by the network device through DCI or MAC CE messages.

36. The terminal according to Claim 31, characterized in that the receiving unit is further used to receive a second control information transmitted by the network device, wherein the second control information is used to indicate a utilized frequency domain displacement among the at least one frequency domain displacement;

the determining unit is further used to determine at least one frequency domain displacement of the single activated BWP.

37. The terminal according to Claim 36, characterized in that the receiving unit is specifically used to receive the second control information transmitted by the network device through DCI or MAC CE messages.

38. The terminal according to Claim 31, characterized in that the receiving unit is further used to receive a third control information transmitted by the network device, wherein the third control information is used to indicate the position of the first frequency domain resource of the physical channel to be transmitted in the activated BWP;

and the determining unit is further used to determine a utilized frequency domain displacement of the activated BWP.

39. The terminal according to Claim 38, characterized in that the receiving unit is specifically used to receive the third control information transmitted by the network device through DCI or MAC CE messages.

40. The terminal according to any of Claims 31 to 39, characterized in that the terminal further comprises a transmitting unit used to

determine the position of the second frequency domain resource of the physical channel to be transmitted in the activated BWP based on the bandwidth of the activated BWP, the utilized frequency domain displacement, and the position of the first frequency domain resource of the physical channel to be transmitted in the activated BWP, using the formula $R2 = (R1 + W_{\text{displacement}}) \bmod W$; wherein R2 is the position of the second frequency domain resource in the activated BWP; R1 is the position of the first frequency domain resource in the activated BWP;

1 $W_{\text{displacement}}$ is the utilized frequency domain displacement; and W is the bandwidth of the activated BWP; and
2 transmitting the [information of] the physical channel to the network device over the first frequency domain
3 resource and the second frequency domain resource.
4

The network device transmits a first configuration information of a transmission physical channel to the terminal, wherein the first configuration information is used to indicate at least one frequency domain displacement separately configured for each of at least one BWP.

Fig. 1A

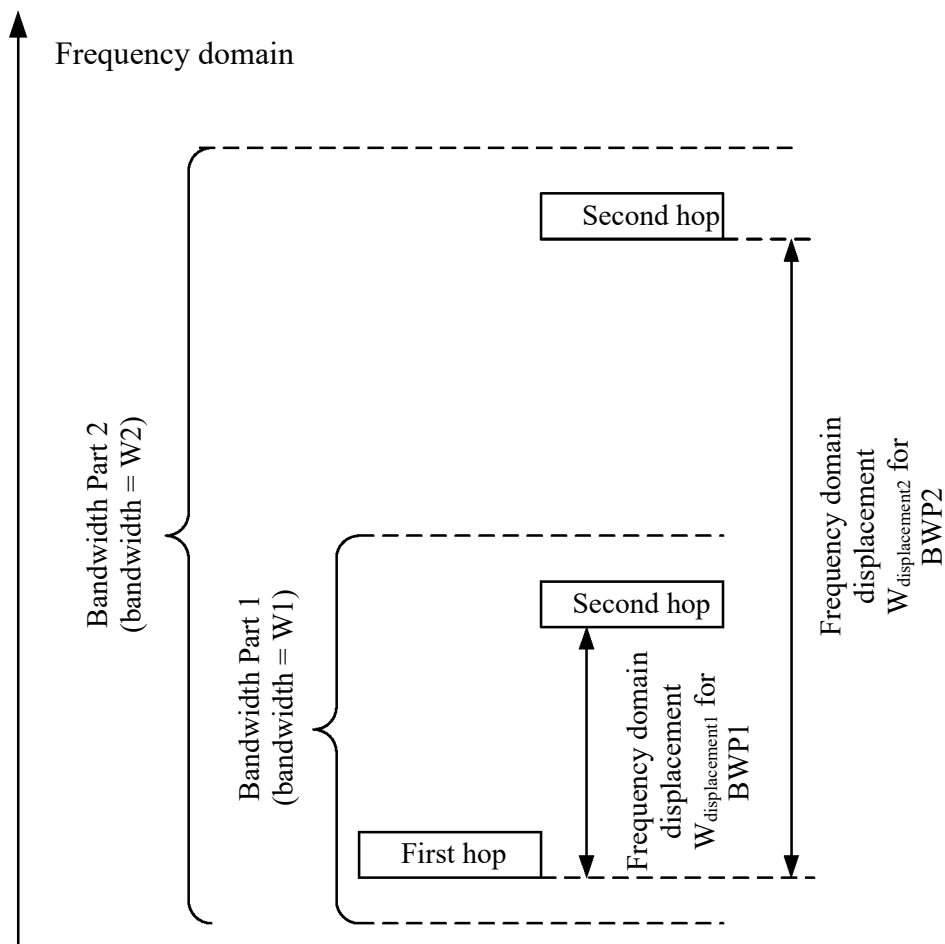


Fig. 1B

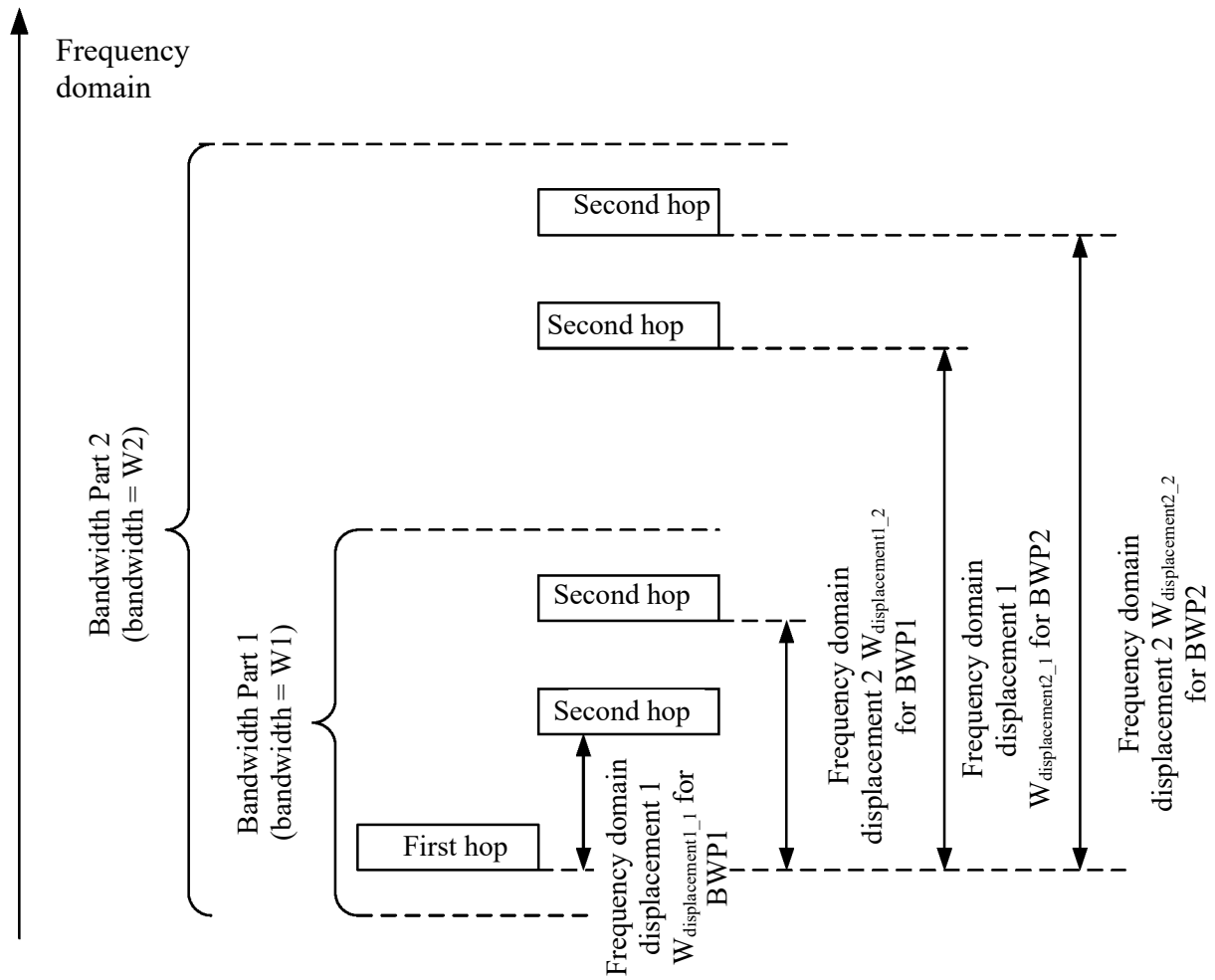


Fig. 1C

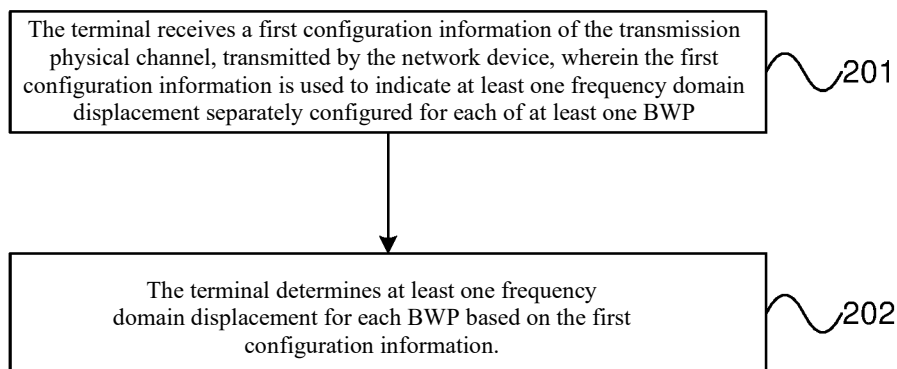
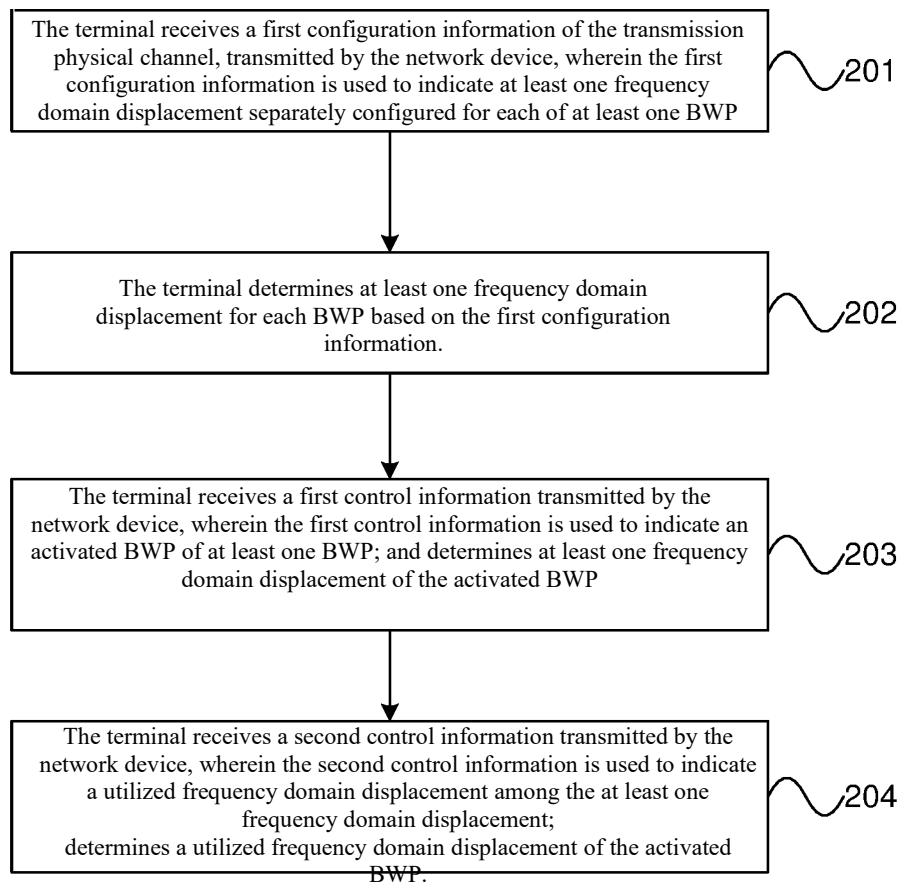
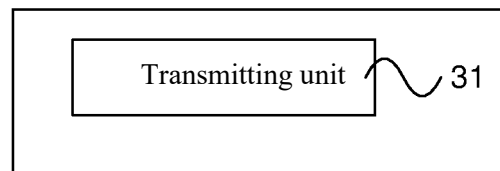
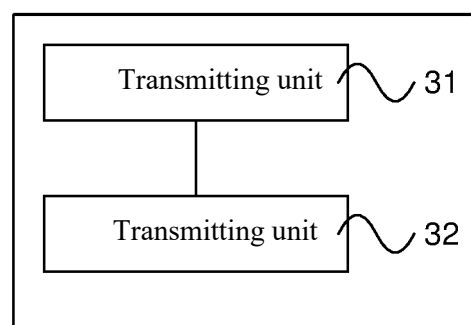


Fig. 2A

**Fig. 2B****Fig. 3A****Fig. 3B**

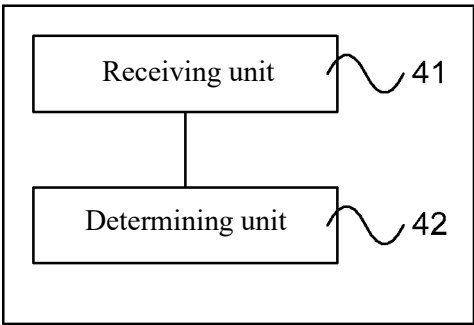


Fig. 4A

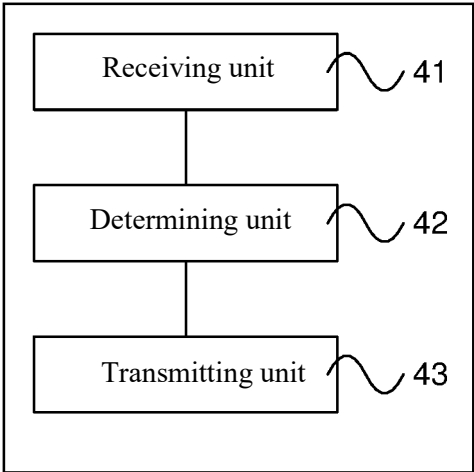


Fig. 4B

INTERNATIONAL SEARCH REPORT

International application No.

PCT/CN2018/071932

A. CLASSIFICATION OF SUBJECT MATTER

H04L 5/00(2006.01)i; H04W 72/04(2009.01)i; H04B 1/713(2011.01)n

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

H04L, H04W, H04B

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

USTXT; EPTXT; CNTXT; WOTXT; VEN; CNABS; CNKI; 3GPP; XP3GPP:bandwidth partitioning, bandwidth part, subband, frequency hopping, displacement, offset, bandwidth, frequency hopping pattern, resource block, frequency-selective gain, frequency diversity gain, activation, new radio, [English text:] NR, new radio, bandwidth part, BWP, BP, sub band, hopping, frequency hopping, HF, offset, bandwidth, hopping pattern, resource block, RB, PRB, PUCCH, PUSCH, PDCCH, PDSCH frequency diversity gain, active

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	OPPO. "Resource Allocation for PUCCH." <i>3GPP TSG RAN WG1 Meeting 91, R1-1719971</i> , 18 November 2017 (2017-11-18), sections 2 and 4	1-3, 11-13, 21-23, 31-33
Y	OPPO. "Resource Allocation for PUCCH." <i>3GPP TSG RAN WG1 Meeting 91, R1-1719971</i> , 18 November 2017 (2017-11-18), sections 2 and 4	4-9, 14-19, 24-29, 34-39
A	OPPO. "Resource Allocation for PUCCH." <i>3GPP TSG RAN WG1 Meeting 91, R1-1719971</i> , 18 November 2017 (2017-11-18), sections 2 and 4	10, 20, 30, 40
X	GUANGDONG OPPO MOBILE TELECOM. "Resource Allocation for PUCCH." <i>3GPP TSG RAN WG1 Meeting NR#3, R1-1715689</i> , 18 September 2017 (2017-09-18), sections 1-4	1-3, 11-13, 21-23, 31-33
Y	GUANGDONG OPPO MOBILE TELECOM. "Resource Allocation for PUCCH." <i>3GPP TSG RAN WG1 Meeting NR#3, R1-1715689</i> , 18 September 2017 (2017-09-18), sections 1-4	4-9, 14-19, 24-29, 34-39



Further documents are listed in the continuation of Box C.



See patent family annex.

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"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art

"&" document member of the same patent family

Date of the actual completion of the international search

02 July 2018

Date of mailing of the international search report

25 September 2018

Name and mailing address of the ISA/CN

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Telephone No.

INTERNATIONAL SEARCH REPORT

International application No.

PCT/CN2018/071932

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	GUANGDONG OPPO MOBILE TELECOM. "Resource Allocation for PUCCH." <i>3GPP TSG RAN WG1 Meeting NR#3, R1-1715689</i> , 18 September 2017 (2017-09-18), sections 1-4	10, 20, 30, 40
X	INTEL CORPORATION. "Remaining Details of UL Data Transmission Procedures in NR." <i>3GPP TSG RAN WG1 Meeting 91, R1-1720097</i> , 22 November 2017 (2017-11-22), pages 2-5, section 2	1-3, 11-13, 21-23, 31-33
Y	INTEL CORPORATION. "Remaining Details of UL Data Transmission Procedures in NR." <i>3GPP TSG RAN WG1 Meeting 91, R1-1720097</i> , 22 November 2017 (2017-11-22), pages 2-5, section 2	4-9, 14-19, 24-29, 34-39
A	INTEL CORPORATION. "Remaining Details of UL Data Transmission Procedures in NR." <i>3GPP TSG RAN WG1 Meeting 91, R1-1720097</i> , 22 November 2017 (2017-11-22), pages 2-5, section 2	10, 20, 30, 40
Y	NEC. "Frequency Hopping Schemes for NR UL PUSCH." <i>3GPP TSG RAN WG1 Meeting 91, R1-1720900</i> , 18 November 2017 (2017-11-18), pages 2-6, sections 3-5	4-9, 14-19, 24-29, 34-39
A	NEC. "Frequency Hopping Schemes for NR UL PUSCH." <i>3GPP TSG RAN WG1 Meeting 91, R1-1720900</i> , 18 November 2017 (2017-11-18), pages 2-6, sections 3-5	1-3, 10-13, 20- 23, 30-33, 40
A	PANASONIC. "Frequency-hopping Details of Long-PUCCH." <i>3GPP TSG RAN WG1 Meeting 91, R1-1720448</i> , 17 November 2017 (2017-11-17), entire document	1-40
A	WO 2016122782 A1 (INTEL IP CORPORATION) 04 August 2016 (2016-08-04) entire document	1-40
A	US 2012120888 A1 (SAMSUNG ELECTRONICS CO., LTD.) 17 May 2012 (2012-05-17) entire document	1-40
A	CN 102668673 A (QUALCOMM INCORPORATED) 12 September 2012 (2012-09-12) entire document	1-40

INTERNATIONAL SEARCH REPORT
Information on patent family members

International application No.

PCT/CN2018/071932

Patent document cited in search report			Publication date (day/month/year)	Patent family member(s)			Publication date (day/month/year)
WO	2016122782	A1	04 August 2016	US	2016226639	A1	04 August 2016
				EP	3251265	A1	06 December 2017
US	2012120888	A1	17 May 2012	WO	2012064098	A2	18 May 2012
				WO	2012064098	A3	19 July 2012
				EP	2638675	A2	18 September 2013
				EP	2638675	A4	19 April 2017
CN	102668673	A	12 September 2012	CN	102668673	B	29 June 2016
				US	9276710	B2	01 March 2016
				WO	2011084822	A1	14 July 2011
				KR	20150029764	A	18 March 2015
				JP	2013515452	A	02 May 2013
				US	2012014330	A1	19 January 2012
				TW	201141287	A	16 November 2011
				KR	101533292	B1	02 July 2015
				KR	20120112629	A	11 October 2012
				JP	5714604	B2	07 May 2015
				EP	2517516	A1	31 October 2012
				IN	201204736	P4	04 October 2013

International Search Report

International Application No.
PCT/CN2018/071932

A. Classification of Subject Matter H04L 5/00(2006.01)i; H04W 72/04(2009.01)i; H04B 1/713(2011.01)n According to International Patent Classification (IPC) or to both national classification and IPC		
B. Fields Searched Minimum Literature Searched (indicate classification system and classification number) H04L, H04W, H04B Search articles other than minimal articles included in the search field Electronic databases consulted during international searches (name of database, and search terms used (if used)) USTXT; EPTXT; CNTXT; WOTXT; VEN; CNABS; CNKI; 3GPP; XP3GPP:bandwidth partitioning, bandwidth part, subband, frequency hopping, displacement, offset, bandwidth, frequency hopping pattern, resource block, frequency-selective gain, frequency diversity gain, activation, new radio, [English text:] NR, new radio, bandwidth part, BWP, BP, sub band, hopping, frequency hopping, HF, offset, bandwidth, hopping pattern, resource block, RB, PRB, PUCCH, PUSCH, PDCCH, PDSCH, frequency diversity gain, active		
C. Relevant Documents		
Type*	Citation of document, with indication, where appropriate, of the relevant passages	Related Claims
X	OPPO, . “Resource allocation for PUCCH,” 3GPP TSG RAN WG1 Meeting 91, RI-1719971, November 18, 2017 (11/18/2017), Sections 2 and 4	1-3, 11-13, 21-23, 31-33
Y	OPPO, . “Resource allocation for PUCCH,” 3GPP TSG RAN WG1 Meeting 91, RI-1719971, November 18, 2017 (11/18/2017), Sections 2 and 4	4-9, 14-19, 24-29, 34-39
A	OPPO, . “Resource allocation for PUCCH,” 3GPP TSG RAN WG1 Meeting 91, RI-1719971, November 18, 2017 (11/18/2017), Sections 2 and 4	10, 20, 30, 40
X	GUANGDONG OPPO MOBILE TELECOM. “Resource allocation for PUCCH,” 3GPP TSG RAN WG1 Meeting NR#3, RI-1715689, September 18, 2017 (09/18/2017), Sections 1-4	1-3, 11-13, 21-23, 31-33
Y	GUANGDONG OPPO MOBILE TELECOM. “Resource allocation for PUCCH,” 3GPP TSG RAN WG1 Meeting NR#3, RI-1715689, September 18, 2017 (09/18/2017), Sections 1-4	4-9, 14-19, 24-29, 34-39
☒ Further documents are listed in the continuation of Box C. ☒ See patent family annex.		
* Special categories of cited documents: “A” Document defining the general state of the art which is not considered to be of particular relevance “E” Earlier application or patent but published on or after the international application date “L” Document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified) “O” Document referring to an oral disclosure, use, exhibition or other means “P” Document published prior to the international filing date but later than the priority date claimed “T” Later Document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention “X” Document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone “Y” Document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art “&” Document member of the same patent family		
Date of the actual completion of the international search July 2, 2018		Date of mailing of the international search report September 25, 2018
Name and mailing address of ISA/CN China National Intellectual Property Administration (ISA/CN) No. 6, Xitucheng Road, Jimenqiao, Haidian District, Beijing 100088, China Fax number (86-10) 62019451		Authorized Officer Zheng Xiaoshuang Phone number 86-(010)-62411271

C. Documents Considered To Be Relevant

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to Claim No.
A	GUANGDONG OPPO MOBILE TELECOM., “Resource allocation for PUCCH, “ 3GPP TSG RAN WG1 Meeting NR#3, RI-1715689, September 18, 2017 (09/18/2017), Sections 1-4	10, 20, 30, 40
X	INTEL CORPORATION, . “Remaining details of UL data transmission procedures in NR, “ 3GPP TSG RAN WG1 Meeting 91, RI-1720097, November 22, 2017 (11/22/2017), Page 2-5, Section 2	1-3, 11-13, 21-23, 31-33
Y	INTEL CORPORATION, . “Remaining details of UL data transmission procedures in NR,” 3GPP TSG RAN WG1 Meeting 91, RI-1720097, November 22, 2017 (11/22/2017), Page 2-5, Section 2	4-9, 14-19, 24-29, 34-39
A	INTEL CORPORATION, . “Remaining details of UL data transmission procedures in NR,” 3GPP TSG RAN WG1 Meeting 91, RI-1720097, November 22, 2017 (11/22/2017), Page 2-5, Section 2	10, 20, 30, 40
Y	NEC, . “Frequency hopping schemes for NR UL PUSCH “ 3GPP TSG RAN WG1 Meeting 91, RI-1720900, November 18, 2017 (11/18/2017), Page 2-6, Section 3-5	4-9, 14-19, 24-29, 34-39
A	NEC, . “Frequency hopping schemes for NR UL PUSCH “ 3GPP TSG RAN WG1 Meeting 91, RI-1720900, November 18, 2017 (11/18/2017), Page 2-6, Section 3-5	1-3, 10-13, 20-23, 30-33, 40
A	PANASONIC, . “Frequency-hopping details of long-PUCCH,” 3GPP TSG RAN WG1 Meeting 91, RI-1720448, November 17, 2017 (11/17/2017), Full text	1-40
A	WO 2016122782 A1 (INTEL IP CORP.) August 4, 2016 (08/04/2016) Full text	1-40
A	US 2012120888 A1 (SAMSUNG ELECTRONICS CO., LTD.) May 17, 2012 (05/17/2012) Full text	1-40
A	CN 102668673 A (QUALCOMM CO., LTD.) September 12, 2012 (09/12/2012) Full text	1-40

**International Search Report
Information on patent families**

International Application No.
PCT/CN2018/071932

Patent Document/s Cited in Search Report			Publication Date (month day, year)	Patent Family Member/s			Publication Date (month day, year)
WO	2016122782	A1	August 4, 2016	US	2016226639	A1	August 4, 2016
				EP	3251265	A1	December 6, 2017
US	2012120888	A1	May 17, 2012	WO	2012064098	A2	May 18, 2012
				WO	2012064098	A3	July 19, 2012
				EP	2638675	A2	September 18, 2013
				EP	2638675	A4	April 19, 2017
CN	102668673	A	September 12, 2012	CN	102668673	B	June 29, 2016
				US	9276710	B2	March 1, 2016
				WO	2011084822	A1	July 14, 2011
				KR	20150029764	A	March 18, 2015
				JP	2013515452	A	May 2, 2013
				US	2012014330	A1	January 19, 2012
				TW	201141287	A	November 16, 2011
				KR	101533292	B1	July 2, 2015
				KR	20120112629	A	October 11, 2012
				JP	5714604	B2	May 7, 2015
				EP	2517516	A1	October 31, 2012
				IN	201204736	P4	October 4, 2013