

DATA TRANSMISSION METHOD AND RELATED APPARATUS

[0001] This application claims priority to Chinese Patent Application No.202010324346.2, filed with the China National Intellectual Property Administration on April 22, 2020 and entitled "DATA TRANSMISSION METHOD AND RELATED APPARATUS", which is incorporated
5 herein by reference in its entirety.

TECHNICAL FIELD

[0002] This application relates to the field of communication technologies, and in particular, to a data transmission method and a related apparatus.

BACKGROUND

10 [0003] With the development of a wireless local area network (wireless local area network, WLAN), an orthogonal frequency division multiple access (orthogonal frequency division multiple access, OFDMA) technology is newly introduced, and an entire bandwidth is divided into a plurality of resource units (resource units, RUs). In other words, frequency domain resources of users are allocated by resource units instead of by channels. For example, a 20 MHz channel may
15 include a plurality of RUs, which may be a 26-tone RU, a 52-tone RU, and a 106-tone RU, where tone indicates a quantity of subcarriers. In addition, the RU may also be a 242-tone RU, a 484-tone RU, a 996-tone RU, or the like.

[0004] In 802.11ax, a high efficiency signaling field (High Efficient Signal Field, HE-SIG-B) in a physical layer protocol data unit (PHY protocol data unit, PPDU) sent by an access point to
20 each of a plurality of stations includes a common field (Common field). The common field includes a plurality of resource unit allocation subfields (RU Allocation subfields), and the resource unit allocation subfields in the common field are used to indicate a plurality of resource units. A user specific field in the HE-SIG-B includes all user fields corresponding to each resource unit allocation subfield. In this case, the HE-SIG-B sent to each station includes all user fields
25 corresponding to each resource unit

signaling field of the PPDU can be reduced by reducing a quantity of user fields.

[0009] In some implementations, the resource unit allocation subfield indicates that a quantity of user fields corresponding to an RU that is in the resource unit RU included in the channel bandwidth for transmitting the PPDU and that is not allocated to the station parking on the first frequency domain segment is 0, and the RU not allocated to the station parking on the first frequency domain segment is an RU greater than or equal to a 242-tone RU. In this way, a user field corresponding to the RU greater than or equal to the 242-tone RU can be omitted, so that overheads of the signaling field can be effectively reduced.

[0010] In some implementations, a quantity, indicated by the resource unit allocation subfield, of user fields corresponding to an RU not allocated to the station parking on the first frequency domain segment is less than a quantity of user fields actually corresponding to the RU not allocated to the station parking on the first frequency domain segment. In this way, a quantity of user fields in the signaling field transmitted on the first frequency domain segment can be reduced, so that overheads of the signaling field can be reduced.

[0011] In some implementations, the RU that is indicated by the resource unit allocation subfield and that is not allocated to the station parking on the first frequency domain segment is actually at least two RUs not allocated to the station parking on the first frequency domain segment. In this way, the at least two RUs not allocated to the station parking on the first frequency domain segment are indicated as one RU together, and an indication manner of the resource unit allocation subfield is simplified, so that a quantity of user fields corresponding to the at least two RUs is smaller, and overheads of the signaling field can be reduced.

[0012] In some implementations, the at least two RUs are RUs less than a 242-tone RU. In this way, compared with a conventional technology in which the resource unit allocation subfield provides an indication based on the actual resource unit allocation case and each small RU needs to correspond to one user field, in the solutions of this application, the at least two small RUs not allocated to the station parking on the first frequency domain segment are indicated as one RU together. In this way, the RU needs to correspond to only one user field, so that an indication of one user field can be omitted, and overheads of the signaling field can be reduced.

[0013] According to a second aspect, an implementation of this application further provides a data transmission method, including: A station parking on a first frequency domain segment receives a signaling field of a physical layer protocol data unit PPDU on the first frequency domain

5 [00100] When a channel bandwidth for transmitting a PPDU is 40 MHz, FIG. 2B shows various resource unit allocation manners existing when a channel bandwidth for transmitting a PPDU is 40 MHz. The entire channel bandwidth is approximately equivalent to replication of a 20 MHz tone plan. The entire 40 MHz bandwidth may include resource elements (484-tone RUs) that each include 484 subcarriers, or may include various combinations of 26-tone RUs, 52-tone RUs, 106-tone RUs, and 242-tone RUs.

10 [00101] When a channel bandwidth for transmitting a PPDU is 80 MHz, the entire channel bandwidth is approximately equivalent to replication of a 20 MHz tone plan. The entire 80 MHz bandwidth may include resource elements (996-tone RUs) that each include 996 subcarriers, or may include various combinations of 484-tone RUs, 242-tone RUs, 106-tone RUs, 52-tone RUs, and 26-tone RUs. In addition, an intermediate 26-tone RU (Center 26-Tone RU) including two 13-tone subunits exists in the middle of the entire 80 MHz channel bandwidth.

15 [00102] Similarly, when a channel bandwidth for transmitting a PPDU is 160 MHz, the entire channel bandwidth may be considered as replication of an 80 MHz tone plans. The entire channel bandwidth may include an entire 2×996-tone RU (a resource unit including 1992 subcarriers), or may include various combinations of 26-tone RUs, 52-tone RUs, 106-tone RUs, 242-tone RUs, 484-tone RUs, and 996-tone RUs. In addition, a center 26-tone RU including two 13-tone subunits exists in the middle of the entire ~~80~~160 MHz channel bandwidth.

20 [00103] In 802.11ax, the AP notifies the user of RU allocation by using a signaling field (signal field, SIG). FIG. 3A is a schematic diagram of a structure of a signaling field. As shown in FIG. 3A, an HE-SIG includes a common field (common field) and a user specific field (user specific field).

25 [00104] The common field includes 1 to N resource unit allocation subfields (RU allocation subfields), a cyclic redundancy code (cyclic redundancy code, CRC) used for checking, and a tail (Tail) subfield used for cyclic decoding. One resource unit allocation subfield corresponds to resource unit allocation corresponding to one 20 MHz. One resource unit allocation subfield indicates a size and a location of one or more resource units corresponding to 20 MHz.

[00105] One resource unit allocation subfield is one index, and one index indicates a size and a location of one or more resource units corresponding to 20 MHz.

30 [00106] As shown in Table 1, according to 802.11ax, the resource unit allocation subfield may be one index in the first column in Table 1, for example, 00000000, 00000001, and 00000010. A

Resource unit allocation subfield (B7,B6,B5,B4,B3,B2,B1,B0)	#1	#2	#3	#4	#5	#6	#7	#8	#9	Entry quantity
111x4x3x2x1x0	Reserved									32

[00107] The user-specific field of the signaling field (HE-SIG) includes 1 to M user fields (User Field) according to a resource unit allocation sequence. Two of the M user fields are usually in a group, and every two user fields are followed by a CRC field and a tail field. If a quantity of user fields is an odd number, the last user field is separately in a group, and the last user field is followed by a CRC field and a tail field. One user field carries identifier information of a station, to indicate that an RU corresponding to the user field is allocated to a STA.

[00108] When an arrangement and a combination of resource units indicated by one resource unit allocation subfield include a resource unit including greater than or equal to 106 subcarriers, the index is further used to indicate a quantity of MU MIMO users supported by the resource unit including greater than or equal to 106 subcarriers. In the standard 802.11ax, the quantity of MU MIMO users is less than or equal to 8. For example, for the index 01000y₂y₁y₀, when y₂y₁y₀ is 010, it indicates that 106-tone is allocated to three users.

[00109] An arrangement sequence of the user fields in the user specific field is consistent with a sequence of resource units indicated by a corresponding resource unit allocation subfield. A STA may identify, by reading a user field, whether a resource unit corresponding to the user field belongs to the STA. In this case, the STA may determine, based on a location of the user field and a corresponding resource unit allocation subfield, a resource unit allocated to the STA.

[00110] For example, FIG. 3B is a schematic diagram of another possible structure of a signaling field. A resource unit allocation subfield 1 is 00001111. Based on a row in which 000011110 is located in Table 1, it may be determined that resource units indicated by the resource unit allocation subfield 1 are a 52-tone RU, a 52-tone RU, a 26-tone RU, a 52-tone RU, and a 52-tone RU. A user specific field part includes n user fields. Five user fields, namely, a user field 1, a user field 2, a user field 3, a user field 4, and a user field 5, respectively correspond to the 52-tone RU, the 52-tone RU, the 26-tone RU, the 52-tone RU, and the 52-tone RU. In this way, the 52-

the station parks, or may not belong to the frequency domain segment on which the station parks. In other words, the frequency domain segment on which the station parks in this application may be different from a frequency band range in which the station transmits data.

[00126] The PPDU includes a legacy preamble field, a signaling field, and data (data), and the signaling field may include, for example, a U-SIG and an EHT-SIG. The legacy preamble field may be consistent with the legacy preamble field in FIG. 4A or FIG. 4B. The U-SIG is used to carry common information that needs to be received by the station parking on the frequency domain segment. For example, the U-SIG may include information indicating a PPDU version, information indicating an uplink/downlink, information indicating a frequency domain bandwidth of the PPDU, and puncturing indication information. The EHT-SIG is used to carry at least complete scheduling information of the station parking on the frequency domain segment.

[00127] 102. The AP sends corresponding frequency domain segment content on a corresponding frequency domain segment, that is, sends first frequency domain segment content on a first frequency domain segment, and sends second frequency domain segment content on a second frequency domain segment.

[00128] Correspondingly, a method for receiving a preamble part of a PPDU by a station is provided:

[00129] 201. A station receives, on a frequency domain segment on which the station parks, frequency domain segment content that corresponds to the frequency domain segment and that is in a preamble part of a PPDU, where the frequency domain segment content includes complete scheduling information (for example, a resource allocation field of the parking station and all user fields of a parking station that is scheduled) of a scheduled station in the station parking on the frequency domain segment.

[00130] 202. The station obtains scheduling information of the station based on the foregoing information.

[00131] In the foregoing manner, a station parking on a frequency domain segment only needs to obtain a signaling field part in a preamble part corresponding to the frequency domain segment, and does not need to obtain signaling field parts corresponding to an entire channel bandwidth.

[00132] In another embodiment, a station parking on a frequency domain segment may perform transmission only in a frequency band range of a channel bandwidth. ~~In a signaling field transmitted on~~ On each frequency domain segment, only a signaling field related to a frequency band

subfield, RA subfield) table. For example, the resource unit allocation subfield may provide an indication by using an entry in Table 1, or may provide an indication by using an entry in Table 2 or Table 3, or may provide an indication by using an entry in Table 2 or Table 3 in combination with Table 4 or Table 5.

5 **[00180]** S702. The AP sends the signaling field of the PPDU.

[00181] Step S702 may be implemented by a transceiver of the AP, that is, the transceiver of the AP sends the signaling field of the PPDU.

[00182] Correspondingly, a STA parking on the first frequency domain segment receives the PPDU sent by the AP, obtains, from the user field included in the user specific field, a user field
10 that carries an identifier of the STA, and obtains data transmitted on an RU corresponding to the user field. Specifically, a transceiver of the STA receives the PPDU sent by the AP. A processor of the STA obtains, from the user field included in the user specific field, the user field that carries the identifier of the STA, obtains the RU corresponding to the user field, and receives data on the RU.

15 **[00183]** Based on the foregoing data transmission method, the following separately describes the resource unit allocation subfield and the user field in the signaling field when two simplification indication manners are used.

[00184] In some possible implementations, the resource unit allocation subfield in the signaling field provides an indication in the foregoing first simplification indication manner.

20 **[00185]** In this embodiment, a quantity, of user fields, indicated by a resource unit allocation subfield that corresponds to a large RU and that is in the signaling field represents a quantity of user fields that are contributed by the RU to one content channel in the user specific field, and the user field is a user field corresponding to the STA parking on the first frequency domain segment. The user field includes an identifier of a corresponding STA.

25 **[00186]** A signaling field transmitted on each frequency domain segment may be transmitted by using two or more content channels (Content Channel, CC). Each CC is used to transmit a partial signaling field.

[00187] For example, the channel bandwidth for transmitting the PPDU is 320 MHz. The signaling field that is of the PPDU and that is transmitted on the first frequency domain segment
30 is transmitted by using a CC1 and a CC2. The signaling field transmitted on the first frequency domain segment includes sixteen resource unit allocation subfields. In this case, the sixteen

to one 20 MHz in the 320 MHz.

[00201] A resource unit allocation subfield whose sequence number is an odd number is transmitted on the CC1, and a resource unit allocation subfield whose sequence number is an even number is transmitted on the CC2. In this way, a length of a common field transmitted on each CC can be effectively shortened.

[00202] FIG. 8C is a schematic diagram of a structure of a signaling field according to an embodiment of this application. Referring to FIG. 8B and FIG. 8C, the resource unit allocation subfield 1 indicates a 484-tone RU, and indicates that a quantity of user fields that correspond to the 484-tone RU and that are included in the CC1 is 1. The resource unit allocation subfield 2 indicates the 484-tone RU, and indicates that a quantity of user fields that correspond to the 484-tone RU and that are included in the CC2 is 1. The resource unit allocation subfield 3 indicates a 484-tone RU, and indicates that a quantity of user fields that correspond to the 484-tone RU and that are included in the CC1 is 1. The resource unit allocation subfield 4 indicates the 484-tone RU, and indicates that a quantity of user fields that correspond to the 484-tone RU and that are included in the CC2 is 1. The resource unit allocation subfield 5 indicates a 484-tone RU, and indicates that a quantity of user fields that correspond to the 484-tone RU and that are included in the CC1 is ~~1~~0. The resource unit allocation subfield 6 indicates the 484-tone RU, and indicates that a quantity of user fields that correspond to the 484-tone RU and that are included in the CC2 is 1. The resource unit allocation subfield 7 indicates a 484-tone RU, and indicates that a quantity of user fields that correspond to the 484-tone RU and that are included in the CC1 is 1. The resource unit allocation subfield 8 indicates the 484-tone RU, and indicates that a quantity of user fields that correspond to the 484-tone RU and that are included in the CC1 is 0.

[00203] A STA parking on a frequency domain segment may determine, based on a sequence of RUs corresponding to resource unit allocation subfields on all CCs on the frequency domain segment and a sequence of user fields on the CCs, an RU corresponding to each user field.

[00204] For example, a STA1 parking on the first frequency domain segment may determine, based on a sequence of RUs indicated by resource unit allocation subfields on the CC1 and the CC2 and a sequence of user fields, that a user field corresponding to the 484-tone RU corresponding to the 40 MHz with the lowest frequency in the first 80 MHz is 1a, and the user field 1a carries identifier information of the STA1. In this case, the STA1 determines that the 484-tone RU is an RU allocated to the STA1. Similarly, a STA2 parking on the first frequency domain

and that are included in the CC4 is 0. The resource unit allocation subfield 19 indicates the 996-tone RU, and indicates that a quantity of user fields that correspond to the 996-tone RU and that are included in the CC3 is 0. The resource unit allocation subfield 20 indicates the 996-tone RU, and indicates that a quantity of user fields that correspond to the 996-tone RU and that are included in the CC4 is 0. The resource unit allocation subfield 21 indicates a 242-tone RU, and indicates that a quantity of user fields that correspond to the 242-tone RU and that are included in the CC3 is 4. The resource unit allocation subfield 22 indicates nine 26-tone RUs, and indicates that a quantity of user fields that correspond to the nine 26-tone RUs and that are included in the CC4 is 9. The resource unit allocation subfield 23 indicates a 484-tone RU, and indicates that a quantity of user fields that correspond to the 484-tone RU and that are included in the CC3 is 0. The resource unit allocation subfield ~~8~~24 indicates the 484-tone RU, and indicates that a quantity of user fields that correspond to the 484-tone RU and that are included in the CC4 is 0.

[00212] A STA parking on a frequency domain segment may determine, based on a sequence of RUs corresponding to resource unit allocation subfields on all CCs on the frequency domain segment and a sequence of user fields on the CCs, an RU corresponding to each user field.

[00213] For example, a STA6 parking on the second frequency domain segment may determine, based on identifier information of the STA6 in a user field 1b, that the 242-tone RU corresponding to the 20 MHz with the lowest frequency in the second 80 MHz is an RU allocated to the STA6. A STA7 parking on the second frequency domain segment may determine, based on identifier information of the STA7 in a user field 2b, that the 242-tone RU corresponding to the 20 MHz with the lowest frequency in the second 80 MHz is an RU allocated to the STA7. A STA8 parking on the second frequency domain segment may determine, based on identifier information of the STA8 in a user field 3b, that the 242-tone RU corresponding to the 20 MHz with the lowest frequency in the second 80 MHz is an RU allocated to the STA8. A STA9 parking on the second frequency domain segment may determine, based on identifier information of the STA9 in a user field 4b, that the 242-tone RU corresponding to the 20 MHz with the lowest frequency in the second 80 MHz is an RU allocated to the STA9. Another STA parking on the second frequency domain segment may also determine, in the foregoing manner, that an RU corresponding to a user field that includes identifier information of the STA is an RU allocated to the STA.

[00214] It may be learned that, the resource unit allocation subfield in the second signaling field indicates that an RU corresponding to 80 MHz with a lowest frequency in the channel bandwidth

the user fields corresponding to the nine 26-tone RUs are not set in the user specific field part in the first signaling field, so that at least nine user fields can be reduced, and overheads of the signaling field can be reduced.

5 **[00222]** A resource unit allocation subfield in the second signaling field that is included in the PPDU and that is transmitted on the second frequency domain segment provides an indication as follows: In ascending order of frequencies, the first 80 MHz corresponds to one 996-tone RU, and a quantity of user fields corresponding to the 996-tone RU is 0 in the user specific field part; the 20 MHz with the lowest frequency in the second 80 MHz corresponds to one 242-tone RU, and a quantity of user fields corresponding to the 242-tone RU is 0 in the user specific field part; the 20

10 MHz with the second-lowest frequency in the second 80 MHz corresponds to nine 26-tone RUs, and a quantity of user fields corresponding to the nine 26-tone RUs is 9 in the user specific field part; and the 40 MHz with the highest frequency in the second 80 MHz corresponds to a 484-tone RU, and a quantity of user fields corresponding to the 484-tone RU is 0 in the user specific field part.

15 **[00223]** It may be learned that, in ascending order of frequencies, the 996-tone RU corresponding to the first 80 MHz, the 242-tone RU corresponding to the 20 MHz frequency with the lowest in the second 80 MHz, and the 484-tone RU corresponding to the 40 MHz with the highest frequency in the second 80 MHz are RUs not allocated to the STA parking on the second frequency domain segment.

20 **[00224]** In this way, compared with the conventional technology in which a user field corresponding to the 996-tone RU, a user field corresponding to the 242-tone RU, and a user field corresponding to the 484-tone RU need to be set in the user specific field, in this embodiment, the user field corresponding to the 996-tone RU, the user field corresponding to the 242-tone RU, and the user field corresponding to the 484-tone RU are not set in the user specific field part in the ~~first~~

25 second signaling field, so that the user fields can be effectively reduced, and overheads of the signaling field are reduced.

30 **[00225]** It may be learned from the foregoing example that, if an RU corresponding to the channel bandwidth for transmitting the PPDU includes a plurality of RUs that are RUs not allocated to a STA parking on a frequency domain segment on which a signaling field is transmitted, a resource unit allocation subfield in the signaling field may indicate the plurality of RUs as one larger RU. In this way, the resource unit allocation subfield may indicate, through simplification,

the plurality of RUs not allocated to the STA parking on the frequency domain segment on which the signaling field is transmitted. It should be understood that the following needs to be met in this simplification indication manner: A corresponding index in an RA subfield table (for example, Table 1, Table 2, or Table 3) can indicate the plurality of RUs as one RU together.

5 **[00226]** For example, in the foregoing example of FIG. 8A, the 242-tone RU and the nine 26-tone RUs are RUs allocated to the STA parking on the ~~first~~second frequency domain segment. An index 01110010 in Table 1 can indicate a 484-tone RU, and indicate that a quantity of user fields corresponding to the 484-tone RU is 0. In this case, the resource unit allocation subfield in the first signaling field may indicate, by using a corresponding index (for example, 01110010), the 242-
10 tone RU and the nine contiguous 26-tone RUs as one 484-tone RU together, and indicate that a quantity of user fields corresponding to the 484-tone RU is 0.

[00227] In another implementation, the resource unit allocation subfield transmitted on the first frequency domain segment indicates that the 20 MHz corresponds to one 242-tone RU, and indicates that a quantity of user fields corresponding to the 242-tone RU is 1, and a station
15 identifier carried in the user field does not belong to any station parking on the first frequency domain segment. In this way, compared with the conventional technology in which nine user fields corresponding to the nine 26-tone RUs need to be set in the user specific field, in this embodiment, a user field corresponding to the 242-tone RU is set in the user specific field part in the first signaling field, so that at least eight user fields can be reduced, and overheads of the signaling field
20 can be reduced.

[00228] In still another implementation, the resource unit allocation subfield transmitted on the first frequency domain segment indicates that the 20 MHz corresponds to a combination of a plurality of 52-tone RUs and 26-tone RUs such as five RUs: the 52-tone RU, the 52-tone RU, the 26-tone RU, the 52-tone RU, and the 52-tone RU that correspond to 00001111 in Table 1, and
25 indicates that a quantity of user fields corresponding to each RU is 1, and a station identifier carried in the user field does not belong to any station parking on the first frequency domain segment. In this way, compared with the conventional technology in which nine user fields corresponding to the nine 26-tone RUs need to be set in the user specific field, in this embodiment, five user fields corresponding to the five RUs are set in the user specific field part in the first signaling field, so
30 that at least four user fields can be reduced, and overheads of the signaling field can be reduced.

[00229] Further, the foregoing plurality of RUs not allocated to the STA parking on the

nine user fields that are in a one-to-one correspondence with the nine 26-tone RUs indicated by the resource unit allocation subfield. However, if the resource unit allocation subfield provides an indication in the foregoing manner, the resource unit allocation subfield indicates five RUs, and the user specific field part also includes only five user fields corresponding to the RUs indicated by the resource unit allocation subfield.

[00243] It may be learned that, in the solutions of this application, the at least two small RUs not allocated to the STA parking on the frequency domain segment on which the signaling field is transmitted are indicated through combination. Therefore, a quantity of user fields corresponding to a plurality of contiguous small RUs not allocated to the STA parking on the frequency domain segment on which the signaling field is transmitted can be reduced in the user specific field part in the signaling field, so that overheads of the signaling field can be reduced.

[00244] It should be understood that the second simplification indication manner is not merely used to indicate a small RU, and may also be used to indicate a large RU, or may be used to indicate a large RU and a small RU. In this way, if an RU corresponding to the channel bandwidth for transmitting the PPDU includes at least two RUs that are RUs not allocated to the STA parking on the frequency domain segment on which the signaling field is transmitted, in the signaling field transmitted on the frequency domain segment, the resource unit allocation subfield may indicate the at least two RUs as one larger RU, and indicate that a quantity of user fields corresponding to the larger RU is 1. The at least two RUs may be large RUs, or may be small RUs, or may include at least one small RU and at least one large RU.

[00245] The three cases are separately described below by using an example.

[00246] For descriptions of an example in which the at least two RUs are large RUs, refer to the foregoing example in FIG. 8A. In the 320 MHz channel bandwidth for transmitting the PPDU, two RUs in the first 80 MHz with a highest frequency are 484-tone RUs (large RU) allocated to the STA parking on the first frequency domain segment, and each 484-tone RU is allocated to two STAs parking on the first frequency domain segment. In this case, in the signaling field transmitted on the second frequency domain segment, the resource unit allocation subfield may indicate the two 484-tone RUs as one 996-tone RU through combination, and indicate that a quantity of user fields corresponding to the 996-tone RU is 1. In this way, compared with the conventional technology in which an indication is provided based on an actual allocation case and four user fields corresponding to the two 484-tone RUs need to be set in the user specific field part, in the solutions

484+242 multi-RU is 3 in the user specific field part, and a quantity of user fields corresponding to the 242-tone RU is 1 in the user specific field part; the 20 MHz with the lowest frequency in the second 80 MHz corresponds to one 242-tone RU, and a quantity of user fields corresponding to the 242-tone RU is 1 in the user specific field part; and one 242-tone RU corresponding to the second 20 MHz in the second 80 MHz and one 484-tone RU corresponding to the 40 MHz with the highest frequency in the second 80 MHz are combined into a multi-RU, and a quantity of user fields corresponding to the multi-RU is 0 in the user specific field part.

[00284] In this case, a resource unit allocation subfield corresponding to the first 20 MHz in the first 80 MHz may indicate, by using the combination indication 01 and an entry (that is, 1100y3y2y1y0=11010001) that indicates a 484-tone RU and a quantity 2 of users in the entries 208 to 223 (1100y3y2y1y0) in Table 2, that the 484-tone RU is combined with a 242-tone RU (namely, a 242-tone RU corresponding to 20 MHz with a lowest frequency in the second 40 MHz in the first 80 MHz) contiguous within 80 MHz into a 484+242 multi-RU, and a quantity of user fields corresponding to the 484+242 multi-RU is 2. A resource unit allocation subfield corresponding to the second 20 MHz in the first 80 MHz may indicate, by using the combination indication 01 and an entry (that is, 1100y3y2y1y=11010000) that indicates a 484-tone RU and a quantity 1 of users in the entries 208 to 223 (1100y3y2y1y) in Table 2, that the 484-tone RU is combined with the 242-tone RU (namely, the 242-tone RU corresponding to the 20 MHz with the lowest frequency in the second 40 MHz in the first 80 MHz) contiguous within 80 MHz into a 484+242 multi-RU, and a quantity of user fields corresponding to the 484+242 multi-RU is 1. Similarly, a resource unit allocation subfield corresponding to the third 20 MHz in the first 80 MHz may indicate, by using the combination indication 01 and an entry that indicates a 242-tone RU and a quantity 0 of users in the entries 192 to 207 (1100y3y2y1y0) in Table 2, that the 242-tone RU is combined with a 484-tone RU (namely, a 484-tone RU corresponding to the first 20 MHz and the second 20 MHz in the first 80 MHz) contiguous within 80 MHz into a 242+484 multi-RU, and a quantity of user fields corresponding to the 242+484 multi-RU is 0. It may be learned that the resource unit allocation subfield corresponding to the first 20 MHz, the resource unit allocation subfield corresponding to the second 20 MHz, and the resource unit allocation subfield corresponding to the third 20 MHz indicate that there are three user fields corresponding to the 484+242 multi-RUs in total.

[00285] A resource unit allocation subfield that corresponds to the second 20 MHz in the second

80 MHz and that is included in the signaling field, of the PPDU, transmitted on the first frequency domain segment may indicate, by using the entry 113 of the resource unit indication in Table 2 and the combination indication 10 corresponding to the entry 113, that an RU corresponding to the 20 MHz is a 242-tone RU, indicate that the 242-tone RU is combined with a 484-tone RU (namely, a 484-tone RU corresponding to the 40 MHz with the highest frequency in the second 80 MHz) contiguous within 80 MHz into a multi-RU, and indicate that a quantity of user fields corresponding to the multi-RU is 0. Resource unit allocation subfields corresponding to the third 20 MHz and the fourth 20 MHz in the second 80 MHz may indicate, by using the entry 114 of the resource unit indication in Table 2 and the combination indication 01 corresponding to the entry 114, that an RU corresponding to each 20 MHz is a 484-tone RU, indicate that the 484-tone RU is combined with a 242-tone RU (namely, a 242-tone RU corresponding to the second 20 MHz in the second 80 MHz) contiguous within 80 MHz into a multi-RU, and indicate that a quantity of user fields corresponding to the multi-RU is 0.

[00286] The resource unit allocation subfield in the foregoing embodiment corresponding to FIG. 7A does not merely provide an indication by using the foregoing example entry in Table 2, and may provide an indication by using another entry in Table 2 based on an actual RU allocation case in another embodiment. In this application, an entry specifically used by the resource unit allocation subfield for providing an indication is not specifically limited.

[00287] In addition, the resource unit allocation subfield in the embodiment corresponding to FIG. 7A does not merely provide an indication in the multi-RU indication manner shown in Table 2. There may be another implementation for the multi-RU indication manner.

[00288] For example, in another possible implementation, the entries 192 to ~~225~~255 of the resource unit indication in Table 2 may be replaced with entries 192 to 225 of a resource unit indication in Table 3. Table 3 includes an entry indicating to allocate an RU greater than or equal to the 106-tone RU to zero to sixteen STAs.

RU, and the entries 200 to 207 separately indicate that the 484-tone RU is allocated to one to eight STAs. A combination indication 00 corresponding to any one of the entries 200 to 207 of the resource unit indication indicates that the 484-tone RU is not combined with another RU into a multi-RU. A combination indication 01 corresponding to any one of the entries 200 to 207 of the resource unit indication indicates that the 484-tone RU is combined with a 242-tone RU into a multi-RU contiguous within 80 MHz. A combination indication 10 corresponding to any one of the entries 200 to 207 of the resource unit indication indicates that the 484-tone RU is combined with a 242-tone RU into a multi-RU not contiguous within 80 MHz. A combination indication 11 corresponding to any one of the entries 200 to 207 of the resource unit indication indicates that the 484-tone RU is combined with a 996-tone RU into a multi-RU contiguous within 160 MHz.

[00291] The entries 208 to 215 of the resource unit indication in Table 3 indicate a 996-tone RU, and the entries 208 to 215 separately indicate that the 996-tone RU is allocated to one to eight STAs. A combination indication 00 corresponding to any one of the entries 208 to 215 of the resource unit indication indicates that the 996-tone RU is not combined with another RU into a multi-RU. A combination indication 01 corresponding to any one of the entries 208 to 215 of the resource unit indication indicates that the 996-tone RU is combined with a 484-tone RU into a multi-RU contiguous within 160 MHz. A combination indication 10 corresponding to any one of the entries 208 to 215 of the resource unit indication indicates that the 996-tone RU is combined with a 484-tone RU into a multi-RU not contiguous within 160 MHz. A combination indication 11 corresponding to any one of the entries 208 to 215 of the resource unit indication indicates that the 996-tone RU is combined with a 2*996-tone RU into a multi-RU contiguous within 320 MHz.

[00292] The entries 216 to 223 of the resource unit indication in Table 3 indicate a 2*996-tone RU, and the entries 216 to 223 separately indicate that the 2*996-tone RU is allocated to one to eight STAs. A combination indication 00 corresponding to any one of the entries 216 to 223 of the resource unit indication indicates that the 2*996-tone RU is not combined with another RU into a multi-RU. A combination indication 01 corresponding to any one of the entries 216 to 223 of the resource unit indication indicates that the 2*996-tone RU is combined with a 996-tone RU into a multi-RU contiguous within ~~160~~320 MHz. A combination indication 10 corresponding to any one of the entries 216 to 223 of the resource unit indication indicates that the 2*996-tone RU is combined with a 996-tone RU into a multi-RU not contiguous within ~~160~~320 MHz. A combination indication 11 corresponding to any one of the entries 216 to 223 of the resource unit indication indicates that the

~~996-tone RU is combined with a 2*996-tone RU into a multi-RU contiguous within 320 MHz is reserved.~~

[00293] The entries 224 to 231 of the resource unit indication in Table 3 indicate a 242-tone RU, and the entries 224 to 231 separately indicate that the 242-tone RU is allocated to nine to sixteen STAs. A combination indication 00 corresponding to any one of the entries 224 to 231 of the resource unit indication indicates that the 242-tone RU is not combined with another RU into a multi-RU. A combination indication 01 corresponding to any one of the entries 224 to 231 of the resource unit indication indicates that the 242-tone RU is combined with a 484-tone RU into a multi-RU contiguous within 80 MHz.

[00294] The entries 232 to 239 of the resource unit indication in Table 3 indicate a 484-tone RU, and the entries 232 to 239 separately indicate that the 484-tone RU is allocated to nine to sixteen STAs. A combination indication 00 corresponding to any one of the entries 232 to 239 of the resource unit indication indicates that the 484-tone RU is not combined with another RU into a multi-RU. A combination indication 01 corresponding to any one of the entries 232 to 239 of the resource unit indication indicates that the 484-tone RU is combined with a 242-tone RU into a multi-RU contiguous within 80 MHz. A combination indication 10 corresponding to any one of the entries 232 to 239 of the resource unit indication indicates that the 484-tone RU is combined with a 242-tone RU into a multi-RU not contiguous within 80 MHz. A combination indication 11 corresponding to any one of the entries 232 to 239 of the resource unit indication indicates that the 484-tone RU is combined with a 996-tone RU into a multi-RU contiguous within 160 MHz.

[00295] The entries 240 to 237 of the resource unit indication in Table 3 indicate a 996-tone RU, and the entries 240 to 237 separately indicate that the 996-tone RU is allocated to nine to sixteen STAs. A combination indication 00 corresponding to any one of the entries 240 to 237 of the resource unit indication indicates that the 996-tone RU is not combined with another RU into a multi-RU. A combination indication 01 corresponding to any one of the entries 240 to 237 of the resource unit indication indicates that the 996-tone RU is combined with a 484-tone RU into a multi-RU contiguous within 160 MHz. A combination indication 10 corresponding to any one of the entries 240 to 237 of the resource unit indication indicates that the 996-tone RU is combined with a 484-tone RU into a multi-RU not contiguous within 160 MHz. A combination indication 11 corresponding to any one of the entries 240 to 237 of the resource unit indication indicates that the 996-tone RU is combined with a 2*996-tone RU into a multi-RU contiguous within 320 MHz.

[00296] The entries 248 to 255 of the resource unit indication in Table 3 indicate a 2*996-tone

RU, and the entries 248 to 255 separately indicate that the 2*996-tone RU is allocated to nine to sixteen STAs. A combination indication 00 corresponding to any one of the entries 248 to 255 of the resource unit indication indicates that the 2*996-tone RU is not combined with another RU into a multi-RU. A combination indication 01 corresponding to any one of the entries 248 to 255 of the resource unit indication indicates that the 2*996-tone RU is combined with a 996-tone RU into a multi-RU contiguous within 320 MHz. A combination indication 10 corresponding to any one of the entries 248 to 255 of the resource unit indication indicates that the 2*996-tone RU is combined with a 996-tone RU into a multi-RU not contiguous within 320 MHz. A combination indication 11 ~~corresponding to any one of the entries 248 to 255 of the resource unit indication indicates that the 996 tone RU is combined with a 2*996 tone RU into a multi-RU contiguous within 320 MHz~~ is reserved.

[00297] The resource unit allocation subfield in the foregoing embodiment corresponding to FIG. 5 or FIG. 7A may provide an indication by using the entry in Table 3. A specifically selected entry may be determined based on an RU allocation case.

[00298] This embodiment of this application further provides a solution for indicating an RU through combination. The resource unit allocation subfield includes a resource unit indication and a 2-bit combination indication part. Combination indications in all resource unit allocation subfields corresponding to a large RU cooperate to indicate a combination case of the large RU. The STA determines a combination case of one large RU based on combination indications in all resource unit allocation subfields corresponding to the large RU, and learns of a specific combination location of a multi-RU. An entry of the resource unit indication part in any one of the foregoing Table 1, Table 2, or Table 3 may be used for the resource unit indication part.

[00299] The solution for indicating an RU through combination may be applied to a data transmission method in an embodiment of this application, and the data transmission method includes:

[00300] An AP generates a signaling field of a PPDU, where the signaling field includes at least two resource unit allocation subfields corresponding to one multi-RU, the multi-RU is obtained by combining at least two RUs included in a channel bandwidth for transmitting the PPDU, each resource unit allocation subfield in the at least two resource unit allocation subfields includes an indication part and a combination indication part, and combination indication parts in the at least two resource unit allocation subfields indicate that the at least two RUs are combined into the

multi-RU.

[00301] The AP sends the signaling field.

[00302] Correspondingly, a STA receives the signaling field, to obtain the at least two resource unit allocation subfields in the signaling field.

5 **[00303]** With reference to Table 4, the following specifically describes the foregoing solution for providing an indication through combination.

[00304] Referring to Table 4, a 242-tone RU corresponds to one resource unit allocation subfield, that is, the 242-tone RU corresponds to one 2-bit combination indication. As shown in Table 4, a combination indication 00 indicates that no combination is performed. A combination
10 indication 01 indicates that the 242-tone RU and a 484-tone RU are combined within 80 MHz into one multi-RU. A remaining combination indication (such as 11) may be used as a reserved entry to indicate another RU combination case or indicate other information.

[00305] A 484-tone RU corresponds to two resource unit allocation subfields, that is, the 484-tone RU corresponds to two 2-bit combination indications. As shown in Table 4, two combination
15 indications 00 and 00 indicate that no combination is performed. Two combination indications 00 and 01 indicate that the 484-tone RU and a 242-tone RU are combined within 80 MHz into one multi-RU contiguous within 80 MHz. Two combination indications 00 and 10 indicate that the 484-tone RU and a 242-tone RU are combined within 80 MHz into one multi-RU not contiguous within 80 MHz. A remaining combination indication combination (such as 10 and 10, and 10 and
20 11) may be used as a reserved entry to indicate another RU combination case or indicate other information.

[00306] A 996-tone RU corresponds to four resource unit allocation subfields, that is, the 996-tone RU corresponds to four 2-bit combination indications. As shown in Table 4, four combination
25 indications 00, 00, 00, and 00 indicate that no combination is performed. Four combination indications 00, 00, 00, and 01 indicate that the 996-tone RU and a 484-tone RU are combined within 160 MHz into one multi-RU contiguous within ~~80~~160 MHz. Four combination indications 00, 00, 00, and 10 indicate that the 996-tone RU and a 484-tone RU are combined within 160 MHz
into one multi-RU not contiguous within ~~80~~160 MHz. A remaining combination indication combination (such as four 10s and four 11s) may be used as a reserved entry to indicate another
30 RU combination case or indicate other information.

subfield 1 is the same as a combination indication that is transmitted on a CC2 and that is in the resource~~first~~ unit allocation subfield 2. A combination indication that is transmitted on the CC1 and that is in the resource unit allocation subfield 3 is the same as a combination indication that is transmitted on the CC2 and that is in the resource~~first~~ unit allocation subfield 4.

5 **[00313]** Specifically, referring to Table 5, a 242-tone RU corresponds to one resource unit allocation subfield, that is, the 242-tone RU corresponds to one 2-bit combination indication. As shown in Table 4, a combination indication 00 indicates that no combination is performed. A combination indication 01 indicates that the 242-tone RU and a 484-tone RU are combined within 80 MHz into one multi-RU. A remaining combination indication (such as 11) may be used as a
10 reserved entry to indicate another RU combination case or indicate other information.

[00314] A 484-tone RU corresponds to two resource unit allocation subfields, that is, the 484-tone RU corresponds to two 2-bit combination indications. The two combination indications are respectively transmitted on the CC1 and the CC2. The two combination indications are the same. As shown in Table 4~~5~~, when two resource unit indications in the two resource unit allocation
15 subfields corresponding to the RU indicate the 484-tone RU, the two combination indications 00 and 00 in the two resource unit allocation subfields are respectively transmitted on the CC1 and the CC2, and a combination indication 00 on either of the CCs indicates that no combination is performed; two combination indications 01 and 01 in the two resource unit allocation subfields are respectively transmitted on the CC1 and the CC2, and a combination indication 01 on either of the
20 CCs indicates that the 484-tone RU and a 242-tone RU are combined within 80 MHz into one multi-RU contiguous within 80 MHz; similarly, two combination indications 10 and 10 in the two resource unit allocation subfields are respectively transmitted on the CC1 and the CC2, and a combination indication 10 on either of the CCs indicates that the 484-tone RU and a 242-tone RU are combined within 80 MHz into one multi-RU not contiguous within 80 MHz; and two
25 combination indications 11 and 11 indicate that the 484-tone RU and a 996-tone RU are combined into one multi-RU.

[00315] A 996-tone RU corresponds to four resource unit allocation subfields, that is, the 996-tone RU corresponds to four 2-bit combination indications. The four combination indications are respectively transmitted on the CC1 and the CC2. The first combination indication is transmitted
30 on the CC1, the second combination indication is transmitted on the CC2, the third combination indication is transmitted on the CC1, and the fourth combination indication is transmitted on the

CC2. The first combination indication is the same as the second combination indication. The third combination indication is the same as the fourth combination indication.

[00316] When RUs indicated by resource unit indication parts in four resource unit allocation subfields corresponding to one RU each are a 996-tone RU, a combination indication may be but is not limited to the following cases.

[00317] Four combination indications in the four resource unit allocation subfields are 00, 00, 00, and 00, the first 00 and the third 00 that are transmitted on the CC1 indicate that no combination is performed, and the second 00 and the fourth 00 that are transmitted on the CC2 also indicate that no combination is performed. In practice, when the STA may receive two combination indications 00 and 00 on one CC, the STA may determine that no combination is performed.

[00318] Four combination indications in the four resource unit allocation subfields are 00, 00, 01, and 01. The first 00 and the first 01 are transmitted on the CC1, and indicate that the 996-tone RU and a 484-tone RU are combined within 160 MHz into one multi-RU contiguous within 160 MHz. The second 00 and the second 01 are transmitted on the CC2, and also indicate that the 996-tone RU and a 484-tone RU are combined within 160 MHz into one multi-RU contiguous within 80 MHz. In this way, the STA can determine, based on the combination indications 00 and 01 on one CC, that the 996-tone RU and the 484-tone RU are combined within 160 MHz into one multi-RU contiguous within 80 MHz.

[00319] Four combination indications in the four resource unit allocation subfields are 00, 00, 10, and 10. The first 00 and the first 10 are transmitted on the CC1, and indicate that the 996-tone RU and a 484-tone RU are combined within 160 MHz into one multi-RU not contiguous within 80 MHz. The second 00 and the second 10 are transmitted on the CC2, and indicate that the 996-tone RU and a 484-tone RU are combined within 160 MHz into one multi-RU not contiguous within 80 MHz.

[00320] A remaining combination indication combination (such as four 10s and four 11s) may be used as a reserved entry to indicate another RU combination case or indicate other information.

Table 5

242-tone RU	00	242-tone RU
	01	242+484 multi-RU (combination within 80 MHz)

CLAIMS

What is claimed is:

1. A data transmission method, comprising:

generating a signaling field of a physical layer protocol data unit (PPDU), wherein a channel
5 bandwidth for transmitting the PPDU comprises at least two frequency domain segments, and the
at least two frequency domain segments comprise a first frequency domain segment, wherein

the signaling field is transmitted on the first frequency domain segment, and comprises a
common field and a user specific field, the common field comprises a resource unit allocation
subfield, and the user specific field comprises a user field;

10 the resource unit allocation subfield indicates a resource unit (RU)/multi-resource unit (MRU)
comprised in the channel bandwidth for transmitting the PPDU, and indicates a quantity of user
fields corresponding to an RU/MRU that is in the RU/MRU and that is allocated to a station
parking on the first frequency domain segment, and a quantity of user fields corresponding to an
RU/MRU that is in the RU/MRU and that is not allocated to a station parking on the first frequency
15 domain segment; and

the RU/MRU and the corresponding user fields allocated to the station parking on the first
frequency domain segment are indicated according to the actual situation, while the RU/MRU and
the corresponding user fields not allocated to the station parking on the first frequency domain
segment are not indicated according to the actual situation;

20 the quantity of user fields indicated by a resource unit allocation subfield corresponding to
the RU/MRU allocated to the station parking on the first frequency domain segment represents a
quantity of user fields that are contributed to one content channel in the user specific field; and
sending the signaling field on the first frequency domain segment.

2. The method according to claim 1, wherein the resource unit allocation subfield indicates
25 that a quantity of user fields corresponding to an RU/multi-resource unit (MRU) that is in the
resource unit RU/multi-resource unit (MRU) comprised in the channel bandwidth for transmitting
the PPDU and that is not allocated to the station parking on the first frequency domain segment is
0, and the RU/MRU not allocated to the station parking on the first frequency domain segment is
an RU greater than or equal to a 242-tone RU.

30 3. The method according to claim 1, wherein a quantity, indicated by the resource unit

allocation subfield, of user fields corresponding to an RU/MRU not allocated to the station parking on the first frequency domain segment is less than a quantity of user fields actually corresponding to the RU/MRU not allocated to the station parking on the first frequency domain segment.

4. The method according to claim 3, wherein the RU/MRU that is indicated by the resource unit allocation subfield and that is not allocated to the station parking on the first frequency domain segment is actually at least two RUs/MRUs not allocated to the station parking on the first frequency domain segment.

5. The method according to claim 4, wherein the at least two RUs/MRUs are RUs/MRUs less than a 242-tone RU.

6. The method according to claim 1, wherein the at least two frequency domain fragments comprise a second frequency domain fragment, and when a RU corresponding to a lowest frequency 80MHz of the channel bandwidth transmitting the PPDU is actually two 484-tone RUs, both of which are not allocated to the STA parking on the second frequency domain fragment, the resource unit allocation subfield in the second signaling field transmitted in the second frequency domain fragment does not truthfully indicate the two 484-tone RUs according to the actual situation, nor does it truthfully indicate the user field corresponding to the two 484-tone RUs according to the actual situation.

7. The method according to claim 1 or 6, wherein the at least two frequency domain fragments comprise a second frequency domain fragment, and when a RU corresponding to the lowest frequency 80MHz of the channel bandwidth transmitting the PPDU is actually two 484-tone RUs, both of which are not allocated to the STA parking on the second frequency domain fragment, the resource unit allocation subfield in the second signaling field transmitted in the second frequency domain fragment indicates that the RU corresponding to the 80MHz of the lowest frequency of the channel bandwidth of the transmission PPDU is 996-tone RU, and indicates that a quantity of user fields corresponding to the 996-tone RU in a user specific field is 0.

8. The method according to claim 1, wherein the resource unit allocation subfields included in the signaling field correspond to the size of the channel bandwidth transmitting the PPDU, and each of the resource unit allocation subfields corresponds to a bandwidth of 20MHz.

9. A data transmission method, comprising:
receiving, by a station parking on a first frequency domain segment, a signaling field of a physical layer protocol data unit (PPDU) on the first frequency domain segment, wherein a channel

bandwidth for transmitting the PPDU comprises at least two frequency domain segments, and the at least two frequency domain segments comprise the first frequency domain segment, wherein the signaling field comprises a common field and a user specific field, the common field comprises a resource unit allocation subfield, and the user specific field comprises a user field;

5 the resource unit allocation subfield indicates a resource unit (RU)/ multi-resource unit (MRU) in the channel bandwidth for transmitting the PPDU, and indicates a quantity of user fields corresponding to an RU/MRU that is in the RU/MRU and that is allocated to the station parking on the first frequency domain segment, and a quantity of user fields corresponding to an RU/MRU that is in the RU/MRU and that is not allocated to a station parking on the first frequency domain
10 segment; and

the RU/MRU and the corresponding user fields allocated to the station parking on the first frequency domain segment are indicated according to the actual situation, while the RU/MRU and the corresponding user fields not allocated to the station parking on the first frequency domain segment are not indicated according to the actual situation;

15 the quantity of user fields indicated by a resource unit allocation subfield corresponding to the RU/MRU allocated to the station parking on the first frequency domain segment represents a quantity of user fields that are contributed to one content channel in the user specific field, and the user field is a user field corresponding to the station parking on the first frequency domain segment;
and

20 obtaining, by the station from the user field comprised in the user specific field in the received signaling field, a user field that carries an identifier of the station, and obtaining data transmitted on an RU/MRU corresponding to the user field.

10. The method according to claim 9, wherein the resource unit allocation subfield indicates that a quantity of user fields corresponding to an RU/multi-resource unit (MRU) that is in the
25 resource unit RU/MRU comprised in the channel bandwidth for transmitting the PPDU and that is not allocated to the station parking on the first frequency domain segment is 0, and the RU/MRU not allocated to the station parking on the first frequency domain segment is an RU/MRU greater than or equal to a 242-tone RU.

11. The method according to claim 9, wherein a quantity, indicated by the resource unit
30 allocation subfield, of user fields corresponding to an RU/MRU not allocated to the station parking on the first frequency domain segment is less than a quantity of user fields actually corresponding

to the RU/MRU not allocated to the station parking on the first frequency domain segment.

12. The method according to claim 11, wherein the RU/MRU that is indicated by the resource unit allocation subfield and that is not allocated to the station parking on the first frequency domain segment is actually at least two RUs/MRUs not allocated to the station parking on the first frequency domain segment.

13. The method according to claim 12, wherein the at least two RUs/MRUs are RUs/MRUs less than a 242-tone RU.

14. The method according to claim 9, wherein the at least two frequency domain fragments comprise a second frequency domain fragment, and when a RU corresponding to a lowest frequency 80MHz of the channel bandwidth transmitting the PPDU is actually two 484-tone RUs, both of which are not allocated to the STA parking on the second frequency domain fragment, the resource unit allocation subfield in the second signaling field transmitted in the second frequency domain fragment does not truthfully indicate the two 484-tone RUs according to the actual situation, nor does it truthfully indicate the user field corresponding to the two 484-tone RUs according to the actual situation.

15. The method according to claim 9 or 14, wherein the at least two frequency domain fragments comprise a second frequency domain fragment, and when a RU corresponding to the lowest frequency 80MHz of the channel bandwidth transmitting the PPDU is actually two 484-tone RUs, both of which are not allocated to the STA parking on the second frequency domain fragment, the resource unit allocation subfield in the second signaling field transmitted in the second frequency domain fragment indicates that the RU corresponding to the 80MHz of the lowest frequency of the channel bandwidth of the transmission PPDU is 996-tone RU, and indicates that a quantity of user fields corresponding to the 996-tone RU in a user specific field is 0.

16. The method according to claim 9, wherein the resource unit allocation subfields included in the signaling field correspond to the size of the channel bandwidth transmitting the PPDU, and each of the resource unit allocation subfields corresponds to a bandwidth of 20MHz.

17. A data transmission method, comprising:

generating a signaling field of a physical layer protocol data unit PPDU, wherein a channel bandwidth for transmitting the PPDU comprises at least two frequency domain segments, and the at least two frequency domain segments comprise a first frequency domain segment; and

sending the signaling field on the first frequency domain segment, wherein the signaling field comprises a common field and a user specific field, the common field comprises a resource unit allocation subfield, and the user specific field comprises a user field;

the resource unit allocation subfield indicates a resource unit RU/multi-resource unit MRU in the channel bandwidth for transmitting the PPDU;

an RU indicated by at least one resource unit allocation subfield comprised in the common field is a plurality of RUs/MRUs less than a 242-tone RU; and

each RU/MRU in the plurality of RUs/MRUs less than the 242-tone RU corresponds to at least one user field, a user field corresponding to at least one first RU/MRU carries an identifier of a station parking on the first frequency domain segment, a user field corresponding to at least one second RU/MRU does not carry the identifier of the station parking on the first frequency domain segment, and at least a part of subcarriers corresponding to the second RU/MRU indicated by the resource unit allocation subfield belong to at least two RUs.

18. A data transmission method, comprising:

receiving, by a station parking on a first frequency domain segment, a signaling field of a physical layer protocol data unit (PPDU) on the first frequency domain segment, wherein a channel bandwidth for transmitting the PPDU comprises at least two frequency domain segments, and the at least two frequency domain segments comprise the first frequency domain segment, wherein

the signaling field comprises a common field and a user specific field, the common field comprises a resource unit allocation subfield, and the user specific field comprises a user field;

the resource unit allocation subfield indicates a resource unit RU/multi-resource unit (MRU) in the channel bandwidth for transmitting the PPDU;

an RU/MRU indicated by at least one resource unit allocation subfield comprised in the common field is a plurality of RUs/MRUs less than a 242-tone RU; and

each RU/MRU in the plurality of RUs/MRUs less than the 242-tone RU corresponds to at least one user field, a user field corresponding to at least one first RU/MRU carries an identifier of the station parking on the first frequency domain segment, a user field corresponding to at least one second RU/MRU does not carry the identifier of the station parking on the first frequency domain segment, and at least a part of subcarriers corresponding to the second RU/MRU indicated by the resource unit allocation subfield belong to at least two RUs; and

obtaining, by the station from the user field comprised in the user specific field, a user field

that carries the identifier of the station, and obtaining data transmitted on an RU corresponding to the user field.

19. A communication apparatus, comprising a processor and a transceiver, wherein when the processor executes a computer program or instructions in a memory, the method according to any one of claims 1 to 8 is performed, or the method according to any one of claims 9 to 16 is performed, or the method according to claim 17 is performed, or the method according to claim 18 is performed.

20. A communication apparatus, comprising a processor, wherein the processor is coupled to a memory, and is configured to: read instructions in the memory, and implement, based on the instructions, the method according to any one of claims 1 to 8, the method according to any one of claims 9 to 16, the method according to claim 17, or the method according to claim 18.

21. A computer-readable storage medium, wherein the computer-readable storage medium stores computer instructions, and the computer instruction instructs a communication apparatus to perform the method according to any one of claims 1 to 8, or the computer instruction instructs a communication apparatus to perform the method according to any one of claims 9 to 16, or the computer instruction instructs a communication apparatus to perform the method according to claim 17, or the computer instruction instructs a communication apparatus to perform the method according to claim 18.

22. A computer program product, wherein when the computer program product is executed on a computer, the method according to any one of claims 1 to 8, the method according to any one of claims 9 to 16, the method according to claim 17, or the method according to claim 18 is implemented.

~~1. A data transmission method, comprising:~~

~~generating a signaling field of a physical layer protocol data unit PPDU, wherein a channel bandwidth for transmitting the PPDU comprises at least two frequency domain segments, and the at least two frequency domain segments comprise a first frequency domain segment, wherein the signaling field is transmitted on the first frequency domain segment, and comprises a common field and a user specific field, the common field comprises a resource unit allocation subfield, and the user specific field comprises a user field;~~

~~the resource unit allocation subfield indicates a resource unit RU comprised in the channel bandwidth for transmitting the PPDU, and indicates a quantity of user fields corresponding to an~~

RU that is in the RU and that is allocated to a station parking on the first frequency domain segment;
and

the quantity of user fields corresponding to the RU allocated to the station parking on the first frequency domain segment represents a quantity of user fields that are contributed by the RU to one content channel in the user specific field, and the user field is a user field corresponding to the station parking on the first frequency domain segment; and

sending the signaling field on the first frequency domain segment.

2. The method according to claim 1, wherein the resource unit allocation subfield indicates that a quantity of user fields corresponding to an RU that is in the resource unit RU comprised in the channel bandwidth for transmitting the PPDU and that is not allocated to the station parking on the first frequency domain segment is 0, and the RU not allocated to the station parking on the first frequency domain segment is an RU greater than or equal to a 242-tone RU.

3. The method according to claim 1, wherein a quantity, indicated by the resource unit allocation subfield, of user fields corresponding to an RU not allocated to the station parking on the first frequency domain segment is less than a quantity of user fields actually corresponding to the RU not allocated to the station parking on the first frequency domain segment.

4. The method according to claim 3, wherein the RU that is indicated by the resource unit allocation subfield and that is not allocated to the station parking on the first frequency domain segment is actually at least two RUs not allocated to the station parking on the first frequency domain segment.

5. The method according to claim 4, wherein the at least two RUs are RUs less than a 242-tone RU.

6. A data transmission method, comprising:

receiving, by a station parking on a first frequency domain segment, a signaling field of a physical layer protocol data unit PPDU on the first frequency domain segment, wherein a channel bandwidth for transmitting the PPDU comprises at least two frequency domain segments, and the at least two frequency domain segments comprise the first frequency domain segment, wherein

the signaling field comprises a common field and a user specific field, the common field comprises a resource unit allocation subfield, and the user specific field comprises a user field;

the resource unit allocation subfield indicates a resource unit RU in the channel bandwidth for transmitting the PPDU, and indicates a quantity of user fields corresponding to an RU that is

in the RU and that is allocated to the station parking on the first frequency domain segment; and
the quantity of user fields corresponding to the RU allocated to the station parking on the first
frequency domain segment represents a quantity of user fields that are contributed by the RU to
one content channel in the user specific field, and the user field is a user field corresponding to the
5 station parking on the first frequency domain segment; and

obtaining, by the station from the user field comprised in the user specific field in the received
signaling field, a user field that carries an identifier of the station, and obtaining data transmitted
on an RU corresponding to the user field.

7. The method according to claim 6, wherein the resource unit allocation subfield indicates
10 that a quantity of user fields corresponding to an RU that is in the resource unit RU comprised in
the channel bandwidth for transmitting the PPDU and that is not allocated to the station parking
on the first frequency domain segment is 0, and the RU not allocated to the station parking on the
first frequency domain segment is an RU greater than or equal to a 242-tone RU.

8. The method according to claim 6, wherein a quantity, indicated by the resource unit
15 allocation subfield, of user fields corresponding to an RU not allocated to the station parking on
the first frequency domain segment is less than a quantity of user fields actually corresponding to
the RU not allocated to the station parking on the first frequency domain segment.

9. The method according to claim 8, wherein the RU that is indicated by the resource unit
allocation subfield and that is not allocated to the station parking on the first frequency domain
20 segment is actually at least two RUs not allocated to the station parking on the first frequency
domain segment.

10. The method according to claim 9, wherein the at least two RUs are RUs less than a 242-
tone RU.

11. A data transmission method, comprising:
25 generating a signaling field of a physical layer protocol data unit PPDU, wherein a channel
bandwidth for transmitting the PPDU comprises at least two frequency domain segments, and the
at least two frequency domain segments comprise a first frequency domain segment; and
sending the signaling field on the first frequency domain segment, wherein
the signaling field comprises a common field and a user specific field, the common field
30 comprises a resource unit allocation subfield, and the user specific field comprises a user field;
the resource unit allocation subfield indicates a resource unit RU in the channel bandwidth

for transmitting the PPDU;

an RU indicated by at least one resource unit allocation subfield comprised in the common field is a plurality of RUs less than a 242-tone RU; and

each RU in the plurality of RUs less than the 242-tone RU corresponds to at least one user field, a user field corresponding to at least one first RU carries an identifier of a station parking on the first frequency domain segment, a user field corresponding to at least one second RU does not carry the identifier of the station parking on the first frequency domain segment, and at least a part of subcarriers corresponding to the second RU indicated by the resource unit allocation subfield belong to at least two RUs.

12. A data transmission method, comprising:

receiving, by a station parking on a first frequency domain segment, a signaling field of a physical layer protocol data unit PPDU on the first frequency domain segment, wherein a channel bandwidth for transmitting the PPDU comprises at least two frequency domain segments, and the at least two frequency domain segments comprise the first frequency domain segment, wherein

the signaling field comprises a common field and a user specific field, the common field comprises a resource unit allocation subfield, and the user specific field comprises a user field;

the resource unit allocation subfield indicates a resource unit RU in the channel bandwidth for transmitting the PPDU;

an RU indicated by at least one resource unit allocation subfield comprised in the common field is a plurality of RUs less than a 242-tone RU; and

each RU in the plurality of RUs less than the 242-tone RU corresponds to at least one user field, a user field corresponding to at least one first RU carries an identifier of the station parking on the first frequency domain segment, a user field corresponding to at least one second RU does not carry the identifier of the station parking on the first frequency domain segment, and at least a part of subcarriers corresponding to the second RU indicated by the resource unit allocation subfield belong to at least two RUs; and

obtaining, by the station from the user field comprised in the user specific field, a user field that carries the identifier of the station, and obtaining data transmitted on an RU corresponding to the user field.

13. A communication apparatus, comprising a processor and a transceiver, wherein when the processor executes a computer program or instructions in a memory, the method according to any

one of claims 1 to 5 is performed, or the method according to any one of claims 6 to 10 is performed, or the method according to claim 11 is performed, or the method according to claim 12 is performed.

5 14. A communication apparatus, comprising a processor, wherein the processor is coupled to a memory, and is configured to: read instructions in the memory, and implement, based on the instructions, the method according to any one of claims 1 to 5, the method according to any one of claims 6 to 10, the method according to claim 11, or the method according to claim 12.

10 15. A computer-readable storage medium, wherein the computer-readable storage medium stores computer instructions, and the computer instruction instructs a communication apparatus to perform the method according to any one of claims 1 to 5, or the computer instruction instructs a communication apparatus to perform the method according to any one of claims 6 to 10, or the computer instruction instructs a communication apparatus to perform the method according to claim 11, or the computer instruction instructs a communication apparatus to perform the method according to claim 12.

15 16. A computer program product, wherein when the computer program product is executed on a computer, the method according to any one of claims 1 to 5, the method according to any one of claims 6 to 10, the method according to claim 11, or the method according to claim 12 is implemented.