

METHOD AND APPARATUS FOR TRANSMITTING/RECEIVING PHYSICAL LAYER PROTOCOL DATA UNIT

TECHNICAL FIELD

[0001] This application relates to the field of wireless communication technologies, and more specifically, to a method and apparatus for transmitting/receiving a physical layer protocol data unit.

BACKGROUND

[0002] With development of the mobile Internet and popularization of intelligent terminals, data traffic grows rapidly, and users impose increasingly high requirements on communication service quality. The Institute of Electrical and Electronics Engineers (Institute of Electrical and Electronics Engineers, IEEE) 802.11ax standard can no longer meet user requirements for a high throughput, a low jitter, a low latency, and the like. Therefore, it is urgent to develop a next-generation wireless local area network (wireless local area network, WLAN) technology, that is, the IEEE 802.11be standard.

[0003] Different from the IEEE 802.11ax, the IEEE 802.11be uses ultra-large bandwidths, such as 240 MHz and 320 MHz, to achieve ultra-high transmission rates and support scenarios with an ultra-high user density. Therefore, how to design a long training field (long training field, LTF) sequence for a larger channel bandwidth is a problem worth concern.

SUMMARY

[0004] This application provides a method and apparatus for transmitting a physical layer protocol data unit, so as to design a long training field sequence for a larger channel bandwidth.

[0005] According to a first aspect, a method for transmitting a physical layer protocol data unit is provided, including: generating a physical layer protocol data unit (physical protocol data unit, PPDU), where the PPDU includes a long training field (long training field, LTF), a length of a frequency-domain sequence of the LTF is greater than a first length, and the first length is a length

of a frequency-domain sequence of an LTF of a PPDU transmitted over a channel whose bandwidth is 160 MHz; and sending the PPDU over a target channel, where a bandwidth of the target channel is greater than 160 MHz.

[0006] The frequency-domain sequence of the LTF provided in this embodiment of this application considers a phase rotation at a non-pilot location, a plurality of puncturing patterns for 240 MHz/320 MHz, and multiple RU combination, so that a finally provided frequency-domain sequence of the LTF has relatively small PAPR values on multiple RUs in the plurality of puncturing patterns for 240 MHz/320 MHz.

[0007] According to a second aspect, a method for receiving a physical layer protocol data unit is provided, including: receiving a physical layer protocol data unit (physical protocol data unit, PPDU), where the PPDU includes a long training field (long training field, LTF), a length of a frequency-domain sequence of the LTF is greater than a first length, and the first length is a length of a frequency-domain sequence of an LTF of a PPDU transmitted over a channel whose bandwidth is 160 MHz; and parsing the PPDU.

[0008] The frequency-domain sequence of the LTF received in this embodiment of this application has a relatively small PAPR value on a multiple RU in a plurality of puncturing patterns for 240 MHz/320 MHz.

BRIEF DESCRIPTION OF DRAWINGS

[0009] FIG. 1 is a schematic diagram of a communication system applicable to a method according to an embodiment of this application;

[0010] FIG. 2 is a diagram of an internal structure of an access point applicable to an embodiment of this application;

[0011] FIG. 3 is a diagram of an internal structure of a station applicable to an embodiment of this application;

[0012] FIG. 4 shows an 80 MHz tone plan; and

[0013] FIG. 5 is a flowchart of a method according to an embodiment of this application.

DESCRIPTION OF EMBODIMENTS

[0014] The following describes technical solutions of this application with reference to the accompanying drawings.

[0015] The technical solutions of embodiments of this application may be applied to various communication systems, such as: a wireless local area network (wireless local area network, WLAN) communication system, a global system for mobile communications (global system of mobile communications, GSM), a code division multiple access (code division multiple access, CDMA) system, a wideband code division multiple access (wideband code division multiple access, WCDMA) system, a general packet radio service (general packet radio service, GPRS) system, a long term evolution (long term evolution, LTE) system, an LTE frequency division duplex (frequency division duplex, FDD) system, an LTE time division duplex (time division duplex, TDD), a universal mobile telecommunications system (universal mobile telecommunications system, UMTS), a worldwide interoperability for microwave access (worldwide interoperability for microwave access, WiMAX) communication system, a 5th generation (5th generation, 5G) system, or new radio (new radio, NR).

[0016] The following is used as an example for description. Only the WLAN system is used as an example below to describe an application scenario in the embodiments of this application and a method in the embodiments of this application.

[0017] Specifically, the embodiments of this application may be applied to a wireless local area network (wireless local area network, WLAN), and the embodiments of this application may be applied to any protocol in the institute of electrical and electronics engineers (institute of electrical and electronics engineers, IEEE) 802.11 series protocols currently used in the WLAN. The WLAN may include one or more basic service sets (basic service set, BSS). A network node in the basic service sets includes an access point (access point, AP) and a station (station, STA).

[0018] In the embodiments of this application, an initiator device may be a STA in a WLAN, and correspondingly a responder device may be an AP in the WLAN. Certainly, alternatively, an initiator device may be an AP in a WLAN, and a responder device may be a STA in the WLAN in the embodiments of this application.

[0019] For ease of understanding the embodiments of this application, a communication system shown in FIG. 1 is first used as an example to describe in detail a communication system

applicable to the embodiments of this application. A scenario system shown in FIG. 1 may be a WLAN system. The WLAN system in FIG. 1 may include one or more APs and one or more STAs. In FIG. 1, one AP and three STAs are used as an example. Wireless communication may be performed between the AP and the STA according to various standards. For example, wireless communication between the AP and the STA may be performed by using a single-user multiple-input multiple-output (single-user multiple-input multiple-output, SU-MIMO) technology or a multi-user multiple-input multiple-output (multi-user multiple-input multiple-output, MU-MIMO) technology.

[0020] The AP is also referred to as a wireless access point, a hotspot, or the like. The AP is an access point for a mobile user to access a wired network, and is mainly deployed in homes, buildings, and campuses, or is deployed outdoors. The AP is equivalent to a bridge that connects the wired network and a wireless network. A main function of the AP is to connect wireless network clients together, and then connect the wireless network to the Ethernet. Specifically, the AP may be a terminal device or a network device with a wireless fidelity (wireless fidelity, Wi-Fi) chip. Optionally, the AP may be a device that supports a plurality of WLAN standards such as 802.11. FIG. 2 shows a diagram of an internal structure of an AP product. The AP may have a plurality of antennas or may have a single antenna. In FIG. 2, the AP includes a physical layer (physical layer, PHY) processing circuit and a media access control (media access control, MAC) processing circuit. The physical layer processing circuit may be configured to process a physical layer signal, and the MAC layer processing circuit may be configured to process a MAC layer signal. The 802.11 standard focuses on a PHY and MAC part, and this embodiment of this application focuses on protocol design on the MAC and the PHY.

[0021] A STA product is usually a terminal product, for example, a mobile phone, a notebook computer, that supports the 802.11 series standards. FIG. 3 shows a diagram of a structure of a STA with a single antenna. In an actual scenario, the STA may also have a plurality of antennas, and may be a device with more than two antennas. In FIG. 3, the STA may include a physical layer (physical layer, PHY) processing circuit and a media access control (media access control, MAC) processing circuit. The physical layer processing circuit may be configured to process a physical layer signal, and the MAC layer processing circuit may be configured to process a MAC layer signal.

[0022] The following describes the embodiments of this application and content related to the

embodiments of this application.

[0023] The following first describes some content related to the embodiments of this application.

[0024] 1. 802.11be tone plan

5 **[0025]** FIG. 4 shows an 802.11be 80 MHz subcarrier design. A 240 MHz bandwidth and a 320 MHz bandwidth are added to the 802.11be, where the 240 MHz is obtained by directly concatenating three 802.11be 80 MHz subcarriers, and the 320 MHz is obtained by directly concatenating four 802.11be 80 MHz subcarriers.

[0026] In the 80 MHz subcarrier design in FIG. 4, indexes of data subcarriers and pilot
10 subcarriers in RU26 are listed in table 1.

Table 1

	RU1–RU18		RU19–RU36		Pilot location
26-tone	–499	–474	13	38	{–494, –480}, {–468, –454}, {–
RU	–473	–448	39	64	440, –426}, {–414, –400}, {–386,
	–445	–420	67	92	–372}, {–360, –346}, {–334, –
	–419	–394	93	118	320}, {–306, –292}, {–280, –
	–392	–367	120	145	266}, {–246, –232}, {–220, –
	–365	–340	147	172	206}, {–192, –178}, {–166, –
	–339	–314	173	198	152}, {–140, –126}, {–112, –98},
	–311	–286	201	226	{–86, –72}, {–58, –44}, {–32, –
	–285	–260	227	252	18}, {18, 32}, {44, 58}, {72, 86},
	–252	–227	260	285	{98, 112}, {126, 140}, {152, 166},
	–226	–201	286	311	{178, 192}, {206, 220}, {232,
	–198	–173	314	339	246}, 5 DC, {266, 280}, {292,
	–172	–147	340	365	306}, {320, 334}, {346, 360},
	–145	–120	367	392	{372, 386}, {400, 414}, {426,
	–118	–93	394	419	440}, {454, 468}, {480, 494}
	–92	–67	420	445	

	RU1–RU18	RU19–RU36	Pilot location
	–64 –39	448 473	
	–38 –13	474 499	

[0027] It should be noted that, in table 1, each row in the 2nd column and the 3rd column indicates one RU. For example, the last row in the 2nd column indicates RU18 [–38: –13]. Locations for RU18 are a subcarrier numbered –38 to a subcarrier numbered –13. The 4th column sequentially indicates pilot subcarrier indexes for a corresponding 26-tone RU. For example, the 1st 26-tone RU includes a subcarrier numbered –499 to a subcarrier numbered –474, where pilot subcarriers are a subcarrier numbered –494 and a subcarrier numbered –480.

[0028] It should be understood that, the following table describes similar meanings, which are not repeated below.

[0029] In the 80 MHz subcarrier design in FIG. 4, indexes of data subcarriers and pilot subcarriers in RU52 are listed table 2.

Table 2

	RU1–RU16	Pilot location
52-tone RU	–499 –448	{–494, –480, –468, –454}, {–440, –426, –414, –400},
	–445 –394	{–360, –346, –334, –320}, {–306, –292, –280, –266},
	–365 –314	{–246, –232, –220, –206}, {–192, –178, –166, –152},
	–311 –260	{–112, –98, –86, –72}, {–58, –44, –32, –18}, {18, 32,
	–252 –201	44, 58}, {72, 86, 98, 112}, {152, 166, 178, 192}, {206,
	–198 –147	220, 232, 246}, {266, 280, 292, 306}, {320, 334, 346,
	–118 –67	360}, {400, 414, 426, 440}, {454, 468, 480, 494}
	–64 –13	
	13 64	
	67 118	
	147 198	
	201 252	
	260 311	

	RU1–RU16	Pilot location
	314 365	
	394 445	
	448 499	

[0030] In the 80 MHz subcarrier design in FIG. 4, indexes of data subcarriers and pilot subcarriers in RU106 are listed in table 3.

Table 3

	RU1–RU8	Pilot location
106-tone	–499 –394	{–494, –468, –426, –400}, {–360, –334, –292, –266}, {–246, –220, –178, –152}, {–112, –86, –44, –18}, {18, 44, 86, 112}, {152, 178, 220, 246}, {266, 292, 334, 360}, {400, 426, 468, 494}
RU	–365 –260	
	–252 –147	
	–118 –13	
	13 118	
	147 252	
	260 365	
	394 499	

5

[0031] In the 80 MHz subcarrier design in FIG. 4, indexes of data subcarriers and pilot subcarriers in RU242 are listed in table 4.

Table 4

	RU1–RU4	Pilot location
242-tone	–500 –259	{–494, –468, –426, –400, –360, –334, –292, –266}, {–246, –220, –178, –152, –112, –86, –44, –18}, {18, 44, 86, 112, 152, 178, 220, 246}, {266, 292, 334, 360, 400, 426, 468, 494}
RU	–253 –12	
	12 253	
	259 500	

10 **[0032]** In the 80 MHz subcarrier design in FIG. 4, indexes of data subcarriers and pilot

subcarriers in RU484 are listed in table 5. An 80 MHz 484-tone RU in the 802.11ax is an RU composed of 484 consecutive subcarriers. An 80 MHz 484-tone RU in the 802.11be is composed of 468 data subcarriers and 16 pilot subcarriers, and there are 5 direct current subcarriers or null subcarriers in the middle. For example, in the 1st 484-tone RU, subcarriers are numbered from – 500 to –12. The 5 direct current subcarriers are numbered –258, –257, –256, –255, and –254. The 16 pilot subcarriers are numbered –494, –468, –426, –400, –360, –334, –292, –266, –246, –220, –178, –152, –112, –86, –44, and –18.

Table 5

	RU1 and RU2	Pilot location
484-tone RU	[–500: –259, –253: –12] [12: 253, 259: 500]	{–494, –468, –426, –400, –360, –334, –292, –266, –246, –220, –178, –152, –112, –86, –44, –18}, {18, 44, 86, 112, 152, 178, 220, 246, 266, 292, 334, 360, 400, 426, 468, 494}

[0033] In the 80 MHz subcarrier design in FIG. 4, indexes of data subcarriers and pilot subcarriers in RU996 are listed in table 6. An 80 MHz 996-tone RU in the 802.11be is composed of 980 data subcarriers and 16 pilot subcarriers, and there are 5 direct current subcarriers in the middle. For example, in the 1st 484-tone RU, subcarriers are numbered –500 to 500, and the 5 direct current subcarriers are numbered –2, –1, 0, 1, and 2. The 16 pilot subcarriers are numbered –468, –400, –334, –266, –220, –152, –86, –18, +18, +86, +152, +220, +266, +334, +400, and +468.

Table 6

	RU1	Pilot location
996-tone RU	[–500:–3, 3:500]	{–468, –400, –334, –266, –220, –152, –86, –18, +18, +86, +152, +220, +266, +334, +400, +468}

[0034] The LTF sequence provided in this embodiment of this application is used for the 240 MHz bandwidth and the 320 MHz bandwidth, and the 240 MHz bandwidth and the 320 MHz bandwidth are constructed by using the tone plan shown in FIG. 4.

[0035] A subcarrier design of a 160 MHz bandwidth is based on two 80 MHz, that is, [subcarriers indexes for RUs in 80 MHz, subcarrier indexes for pilot locations]–521,80 MHz [subcarrier indexes for RUs in 80 MHz, subcarrier indexes for pilot locations]+521.

[0036] The 240 MHz bandwidth is based on three 80 MHz.

5 **[0037]** A subcarrier design of the 320 MHz bandwidth is based on two 160 MHz, that is, [subcarrier indexes in 160 MHz]–1024, [subcarrier indexes in 160 MHz]+1024.

[0038] **2. Puncturing patterns for the 240 MHz and puncturing patterns for the 320 MHz**

[0039] A bitmap is used to indicate a puncturing pattern. Each bit indicates whether one 20 MHz subchannel is punctured. For example, "0" indicates that the 20 MHz subchannel
10 corresponding to the bit is punctured, and "1" indicates that the 20 MHz subchannel corresponding to the bit is not punctured. Optionally, bits from left to right sequentially correspond to 20 MHz subchannel with channel frequencies from low to high.

[0040] 2-1. Puncturing patterns for the 240 MHz

[0041] Pattern 1: [1 1 1 1 1 1 1 1 1 1 1], corresponding to a channel bandwidth of 240 MHz
15 and 3072 subcarriers.

[0042] Pattern 2: [0 0 1 1 1 1 1 1 1 1 1], corresponding to an available channel bandwidth of 200 MHz.

[0043] Pattern 3: [1 1 0 0 1 1 1 1 1 1 1], corresponding to an available channel bandwidth of 200 MHz.

20 **[0044]** Pattern 4: [1 1 1 1 0 0 1 1 1 1 1], corresponding to an available channel bandwidth of 200 MHz.

[0045] Pattern 5: [1 1 1 1 1 1 0 0 1 1 1], corresponding to an available channel bandwidth of 200 MHz.

[0046] Pattern 6: [1 1 1 1 1 1 1 1 0 0 1], corresponding to an available channel bandwidth of
25 200 MHz.

[0047] Pattern 7: [1 1 1 1 1 1 1 1 1 0 0], corresponding to an available channel bandwidth of 200 MHz.

[0048] Pattern 8: [0 0 0 0 1 1 1 1 1 1 1], corresponding to an available channel bandwidth of 160 MHz.

30 **[0049]** Pattern 9: [1 1 1 1 0 0 0 0 1 1 1], corresponding to an available channel bandwidth of 160 MHz.

[0050] Pattern 10: [1 1 1 1 1 1 1 1 0 0 0 0], corresponding to an available channel bandwidth of 160 MHz.

[0051] 2-2. Puncturing patterns for the 320 MHz

[0052] Specifically, the channel puncturing patterns for the 320 MHz may be classified into two types: one type is compatible with 240 MHz puncturing, and the other type is not compatible with 240 MHz puncturing. "Compatible" means: After 240 MHz is formed by channel puncturing on 320 MHz, puncturing is further performed based on the 240 MHz formed by puncturing, that is, puncturing is continued on the 240 MHz formed by puncturing.

[0053] (A). The 320 MHz channel puncturing is compatible with 240 MHz channel puncturing.

[0054] Pattern 1: [1 1 1 1 1 1 1 1 1 1 1 1 1 1 1], corresponding to a channel bandwidth of 320 MHz and 4096 subcarriers.

[0055] Pattern 2: [0 0 1 1 1 1 1 1 1 1 1 1 1 1 1], corresponding to an available channel bandwidth of 280 MHz.

[0056] Pattern 3: [1 1 0 0 1 1 1 1 1 1 1 1 1 1 1], corresponding to an available channel bandwidth of 280 MHz.

[0057] Pattern 4: [1 1 1 1 0 0 1 1 1 1 1 1 1 1 1], corresponding to an available channel bandwidth of 280 MHz.

[0058] Pattern 5: [1 1 1 1 1 1 0 0 1 1 1 1 1 1 1], corresponding to an available channel bandwidth of 280 MHz.

[0059] Pattern 6: [1 1 1 1 1 1 1 1 0 0 1 1 1 1 1], corresponding to an available channel bandwidth of 280 MHz.

[0060] Pattern 7: [1 1 1 1 1 1 1 1 1 1 0 0 1 1 1], corresponding to an available channel bandwidth of 280 MHz.

[0061] Pattern 8: [1 1 1 1 1 1 1 1 1 1 1 1 0 0 1], corresponding to an available channel bandwidth of 280 MHz.

[0062] Pattern 9: [1 1 1 1 1 1 1 1 1 1 1 1 1 1 0 0], corresponding to an available channel bandwidth of 280 MHz.

[0063] Pattern 10: [1 1 1 1 0 0 0 0 1 1 1 1 1 1 1], corresponding to an available channel bandwidth of 240 MHz.

[0064] Pattern 11: [1 1 1 1 1 1 1 1 0 0 0 0 1 1 1], corresponding to an available channel bandwidth of 240 MHz.

- [0065]** Pattern 12: [1 1 1 1 1 1 1 1 1 1 1 0 0 0 0], corresponding to an available channel bandwidth of 240 MHz.
- [0066]** Pattern 13: [0 0 0 0 1 1 1 1 1 1 1 1 1 1 1], corresponding to an available channel bandwidth of 240 MHz.
- 5 **[0067]** Puncturing is further performed based on the available channel bandwidth of 240 MHz formed in pattern 10 to obtain pattern 14 to pattern 22.
- [0068]** Pattern 14: [0 0 1 1 0 0 0 0 1 1 1 1 1 1 1], corresponding to an available channel bandwidth of 200 MHz.
- [0069]** Pattern 15: [1 1 0 0 0 0 0 0 1 1 1 1 1 1 1], corresponding to an available channel
10 bandwidth of 200 MHz.
- [0070]** Pattern 16: [1 1 1 1 0 0 0 0 0 0 1 1 1 1 1], corresponding to an available channel bandwidth of 200 MHz.
- [0071]** Pattern 17: [1 1 1 1 0 0 0 0 1 1 0 0 1 1 1], corresponding to an available channel bandwidth of 200 MHz.
- 15 **[0072]** Pattern 18: [1 1 1 1 0 0 0 0 1 1 1 1 0 0 1 1], corresponding to an available channel bandwidth of 200 MHz.
- [0073]** Pattern 19: [1 1 1 1 0 0 0 0 1 1 1 1 1 1 0 0], corresponding to an available channel bandwidth of 200 MHz.
- [0074]** Pattern 20: [0 0 0 0 0 0 0 0 1 1 1 1 1 1 1 1], corresponding to an available channel
20 bandwidth of 160 MHz.
- [0075]** Pattern 21: [1 1 1 1 0 0 0 0 0 0 0 0 1 1 1 1], corresponding to an available channel bandwidth of 160 MHz.
- [0076]** Pattern 22: [1 1 1 1 0 0 0 0 1 1 1 1 0 0 0 0], corresponding to an available channel bandwidth of 160 MHz.
- 25 **[0077]** Puncturing is further performed based on the available channel bandwidth of 240 MHz formed in pattern 11 to obtain pattern 23 to pattern 31.
- [0078]** Pattern 23: [0 0 1 1 1 1 1 1 0 0 0 0 1 1 1 1], corresponding to an available channel bandwidth of 200 MHz.
- [0079]** Pattern 24: [1 1 0 0 1 1 1 1 0 0 0 0 1 1 1 1], corresponding to an available channel
30 bandwidth of 200 MHz.
- [0080]** Pattern 25: [1 1 1 1 0 0 1 1 0 0 0 0 1 1 1 1], corresponding to an available channel

bandwidth of 200 MHz.

[0081] Pattern 26: [1 1 1 1 1 1 0 0 0 0 0 1 1 1 1], corresponding to an available channel bandwidth of 200 MHz.

[0082] Pattern 27: [1 1 1 1 1 1 1 1 0 0 0 0 0 1 1], corresponding to an available channel bandwidth of 200 MHz.

[0083] Pattern 28: [1 1 1 1 1 1 1 1 0 0 0 0 1 1 0 0], corresponding to an available channel bandwidth of 200 MHz.

[0084] Pattern 29: [0 0 0 0 1 1 1 1 0 0 0 0 1 1 1 1], corresponding to an available channel bandwidth of 160 MHz.

[0085] Pattern 30: [1 1 1 1 0 0 0 0 0 0 0 0 1 1 1 1], corresponding to an available channel bandwidth of 160 MHz.

[0086] Pattern 31: [1 1 1 1 1 1 1 1 0 0 0 0 0 0 0 0], corresponding to an available channel bandwidth of 160 MHz.

[0087] Puncturing is further performed based on the available channel bandwidth of 240 MHz formed in pattern 12 to obtain pattern 32 to pattern 40.

[0088] Pattern 32: [0 0 1 1 1 1 1 1 1 1 1 1 0 0 0 0], corresponding to an available channel bandwidth of 200 MHz.

[0089] Pattern 33: [1 1 0 0 1 1 1 1 1 1 1 1 0 0 0 0], corresponding to an available channel bandwidth of 200 MHz.

[0090] Pattern 34: [1 1 1 1 0 0 1 1 1 1 1 1 0 0 0 0], corresponding to an available channel bandwidth of 200 MHz.

[0091] Pattern 35: [1 1 1 1 1 1 0 0 1 1 1 1 0 0 0 0], corresponding to an available channel bandwidth of 200 MHz.

[0092] Pattern 36: [1 1 1 1 1 1 1 1 0 0 1 1 0 0 0 0], corresponding to an available channel bandwidth of 200 MHz.

[0093] Pattern 37: [1 1 1 1 1 1 1 1 1 1 0 0 0 0 0 0], corresponding to an available channel bandwidth of 200 MHz.

[0094] Pattern 38: [0 0 0 0 1 1 1 1 1 1 1 1 0 0 0 0], corresponding to an available channel bandwidth of 160 MHz.

[0095] Pattern 39: [1 1 1 1 0 0 0 0 1 1 1 1 0 0 0 0], corresponding to an available channel bandwidth of 160 MHz.

- [0096]** Pattern 40: [1 1 1 1 1 1 1 0 0 0 0 0 0 0], corresponding to an available channel bandwidth of 160 MHz.
- [0097]** Puncturing is further performed based on the available channel bandwidth of 240 MHz formed in pattern 13 to obtain pattern 41 to pattern 49.
- 5 **[0098]** Pattern 41: [0 0 0 0 0 0 1 1 1 1 1 1 1 1], corresponding to an available channel bandwidth of 200 MHz.
- [0099]** Pattern 42: [0 0 0 0 1 1 0 0 1 1 1 1 1 1], corresponding to an available channel bandwidth of 200 MHz.
- [00100]** Pattern 43: [0 0 0 0 1 1 1 1 0 0 1 1 1 1], corresponding to an available channel
10 bandwidth of 200 MHz.
- [00101]** Pattern 44: [0 0 0 0 1 1 1 1 1 1 0 0 1 1], corresponding to an available channel bandwidth of 200 MHz.
- [00102]** Pattern 45: [0 0 0 0 1 1 1 1 1 1 1 1 0 0], corresponding to an available channel bandwidth of 200 MHz.
- 15 **[00103]** Pattern 46: [0 0 0 0 1 1 1 1 1 1 1 1 1 0], corresponding to an available channel bandwidth of 200 MHz.
- [00104]** Pattern 47: [0 0 0 0 0 0 0 0 1 1 1 1 1 1], corresponding to an available channel bandwidth of 160 MHz.
- [00105]** Pattern 48: [0 0 0 0 1 1 1 1 0 0 0 0 1 1], corresponding to an available channel
20 bandwidth of 160 MHz.
- [00106]** Pattern 49: [0 0 0 0 1 1 1 1 1 1 1 1 0 0], corresponding to an available channel bandwidth of 160 MHz.
- [00107]** (B). The 320 MHz channel puncturing is incompatible with 240 MHz channel puncturing.
- 25 **[00108]** Pattern 1: 320 MHz [1 1 1 1 1 1 1 1 1 1 1 1 1 1], corresponding to a channel bandwidth of 320 MHz and 4096 subcarriers.
- [00109]** Pattern 2: 280 MHz [0 0 1 1 1 1 1 1 1 1 1 1 1 1], corresponding to an available channel bandwidth of 280 MHz.
- [00110]** Pattern 3: 280 MHz [1 1 0 0 1 1 1 1 1 1 1 1 1 1], corresponding to an available
30 channel bandwidth of 280 MHz.
- [00111]** Pattern 4: 280 MHz [1 1 1 1 0 0 1 1 1 1 1 1 1 1], corresponding to an available

channel bandwidth of 280 MHz.

[00112] Pattern 5: 280 MHz [1 1 1 1 1 0 0 1 1 1 1 1 1 1], corresponding to an available channel bandwidth of 280 MHz.

[00113] Pattern 6: 280 MHz [1 1 1 1 1 1 1 0 0 1 1 1 1 1], corresponding to an available channel bandwidth of 280 MHz.

[00114] Pattern 7: 280 MHz [1 1 1 1 1 1 1 1 1 0 0 1 1 1], corresponding to an available channel bandwidth of 280 MHz.

[00115] Pattern 8: 280 MHz [1 1 1 1 1 1 1 1 1 1 0 0 1 1], corresponding to an available channel bandwidth of 280 MHz.

[00116] Pattern 9: 280 MHz [1 1 1 1 1 1 1 1 1 1 1 1 1 0 0], corresponding to an available channel bandwidth of 280 MHz.

[00117] Pattern 10: 240 MHz [1 1 1 1 0 0 0 0 1 1 1 1 1 1 1], corresponding to an available channel bandwidth of 240 MHz.

[00118] Pattern 11: 240 MHz [1 1 1 1 1 1 1 0 0 0 0 1 1 1 1], corresponding to an available channel bandwidth of 240 MHz.

[00119] Pattern 12: 240 MHz [1 1 1 1 1 1 1 1 1 1 0 0 0 0], corresponding to an available channel bandwidth of 240 MHz.

[00120] Pattern 13: 240 MHz [0 0 0 0 1 1 1 1 1 1 1 1 1 1 1], corresponding to an available channel bandwidth of 240 MHz.

[00121] **3. Multiple RU combination for the 240 MHz and multiple RU combination for the 320 MHz**

[00122] 3-1. Multiple RU combination manners for the 240 MHz:

RU26, RU52, RU26+RU52, RU106, RU26+RU106, RU242, RU484, RU242+RU484, RU996, RU484+RU996, RU242+RU484+RU996, RU484+2*RU996, and 3*RU996.

[00123] 3-2. Multiple RU combination manners for the 320 MHz:

RU26, RU52, RU26+RU52, RU106, RU26+RU106, RU242, RU484, RU242+RU484, RU996, RU484+RU996, RU242+RU484+RU996, RU484+2*RU996, 3*RU996, 3*RU996+RU484, and 4*RU996.

[00124] RU2*996 indicates two RU996, and may alternatively be represented as 2*RU996.

RU3*996 may alternatively be represented as 3*RU996, and RU4*996 may alternatively be represented as 4*RU996. RUA+RUB is equivalent to RUB+RUA, and refers to a combination or

concatenation of RUA and RUB.

[00125] Modes considered for a 1x LTF sequence over the 240 MHz bandwidth include the descriptions in 2-1.

[00126] Modes considered for a 1x LTF sequence over the 320 MHz bandwidth include the descriptions in 2-2.

[00127] Modes considered for a 2x LTF sequence/4x LTF sequence over the 240 MHz bandwidth include content in table A below.

Table A

<i>RU size</i>	<i>RU 26</i>	<i>RU 52</i>	<i>RU 26 +R U5 2</i>	<i>RU1 06</i>	<i>RU2 6+R U10 6</i>	<i>RU2 42</i>	<i>RU 48 4</i>	<i>RU2 42+ RU4 84</i>	<i>RU 99 6</i>	<i>RU48 4+RU 996</i>	<i>RU2 *996</i>	<i>RU4 84+ RU2 *996</i>	<i>R U 3* 99 6</i>
<i>Modes</i>	<i>36 *3</i>	<i>16 *3</i>	<i>4* 3</i>	<i>8*3</i>	<i>4*3</i>	<i>4*3</i>	<i>2* 3</i>	<i>4*3</i>	<i>1* 3</i>	<i>8</i>	<i>3</i>	<i>6</i>	<i>1</i>

[00128] The 240 MHz is formed by concatenating three 80 MHz. Each 80 MHz has thirty-six 26-tone RUs with sequence numbers from small to large and corresponding frequencies from low to high. Implementation is similar for a 52-tone RU (RU52), a 106-tone RU (RU106), a 242-tone RU (RU242), a 484-tone RU (RU484), and a 996-tone RU (RU996).

[00129] Multiple RU combination is to allocate a plurality of RUs to one STA. Each RU still uses data subcarrier locations and pilot subcarrier locations of the RU. For example, for RU26+RU52, RU26 uses its own data subcarrier locations and pilot locations, and RU52 uses its own data subcarrier locations and pilot subcarrier locations.

[00130] In table A, RU26+RU52 has fixed combination or concatenation modes. There are 4 fixed combination modes in each 80 MHz, and therefore 12 combination or concatenation modes in the 240 MHz. Details are as follows:

[00131] The 1st 80 MHz in the 240 MHz bandwidth includes:
the 1st RU26+RU52: the 8th RU26 and the 3rd RU52;

the 2nd RU26+RU52: the 11th RU26 and the 6th RU52;
the 3rd RU26+RU52: the 26th RU26 and the 11th RU52; and
the 4th RU26+RU52: the 29th RU26 and the 14th RU52.

[00132] The 2nd 80 MHz in the 240 MHz bandwidth includes:

5 the 5th RU26+RU52: the 44th RU26 and the 19th RU52;
the 6th RU26+RU52: the 47th RU26 and the 22nd RU52;
the 7th RU26+RU52: the 62nd RU26 and the 27th RU52; and
the 8th RU26+RU52: the 65th RU26 and the 30th RU52.

[00133] The 5th RU26+RU52 in the 240 MHz bandwidth is the 1st RU26+RU52 in the 2nd 80
10 MHz bandwidth. Implementation is the same for the following description.

[00134] The 3rd 80 MHz in the 240 MHz bandwidth includes:

the 9th RU26+RU52: the 80th RU26 and the 35th RU52;
the 10th RU26+RU52: the 83rd RU26 and the 38th RU52;
the 11th RU26+RU52: the 98th RU26 and the 43rd RU52; and
15 the 12th RU26+RU52: the 101st RU26 and the 46th RU52.

[00135] The 9th RU26+RU52 in the 240 MHz bandwidth is the 1st RU26+RU52 in the 3rd 80
MHz bandwidth. Implementation is the same for the following description.

[00136] It should be understood that, each 80 MHz has 36 RU26, which are sequentially
represented as the 1st RU26, the 2nd RU26, ..., and the 36th RU26 from left to right (from a low
20 frequency to a high frequency), as shown in FIG. 4. The 240 MHz is composed of three 80 MHz,
and RU26 included in the 240 MHz are sequentially represented as the 1st RU26, the 2nd RU26, ...,
and the 108th RU26 from left to right (from a low frequency to a high frequency). That is, RU26
included in the 1st 80 MHz of the 240 MHz are sequentially represented as the 1st RU26, the 2nd
RU26, ..., the 36th RU26; RU26 included in the 2nd 80 MHz of the 240 MHz are sequentially
25 represented as the 37th RU26, the 38th RU26, ..., and the 72nd RU26; and RU26 included in the 3rd
80 MHz of the 240 MHz are sequentially represented as the 73rd RU26, the 74th RU26, ..., and the
108th RU26.

[00137] In table A, RU26+RU106 has fixed combination or concatenation modes. There are 4
fixed combination modes in each 80 MHz, and therefore 12 combination or concatenation modes
30 in the 240 MHz. Details are as follows:

[00138] The 1st 80 MHz in the 240 MHz bandwidth includes:

the 1st RU26+RU106: the 5th RU26 and the 1st RU106;
the 2nd RU26+RU106: the 14th RU26 and the 4th RU106;
the 3rd RU26+RU106: the 23rd RU26 and the 5th RU106; and
the 4th RU26+RU106: the 32nd RU26 and the 8th RU106.

5 **[00139]** The 2nd 80 MHz in the 240 MHz bandwidth includes:

the 5th RU26+RU106: the 41st RU26 and the 9th RU106;
the 6th RU26+RU106: the 50th RU26 and the 12th RU106;
the 7th RU26+RU106: the 59th RU26 and the 13th RU106; and
the 8th RU26+RU106: the 68th RU26 and the 16th RU106.

10 **[00140]** The 5th RU26+RU106 in the 240 MHz bandwidth is the 1st RU26+RU106 in the 2nd 80 MHz bandwidth. Implementation is the same for the following description.

[00141] The 3rd 80 MHz in the 240 MHz bandwidth includes:

the 9th RU26+RU106: the 77th RU26 and the 17th RU106;
the 10th RU26+RU106: the 86th RU26 and the 20th RU106;
15 the 11th RU26+RU106: the 95th RU26 and the 21st RU106; and
the 12th RU26+RU106: the 104th RU26 and the 24th RU106.

[00142] The 9th RU26+RU106 in the 240 MHz bandwidth is the 1st RU26+RU106 in the 3rd 80 MHz bandwidth. Implementation is the same for the following description.

[00143] It should be understood that, both the Xth RU26 and the Yth RU106 are represented by
20 being sequentially numbered from left to right (from a low frequency to a high frequency). This is similar to the foregoing description, and details are not described herein again.

[00144] In table A, RU242+RU484 has fixed combination or concatenation modes. There are 4 fixed combination modes in each 80 MHz, and therefore 12 combination or concatenation modes in the 240 MHz. Details are as follows:

25 **[00145]** The 1st 80 MHz in the 240 MHz bandwidth includes:

the 1st RU242+RU484: the 1st RU242 and the 2nd RU484;
the 2nd RU242+RU484: the 2nd RU242 and the 2nd RU484;
the 3rd RU242+RU484: the 3rd RU242 and the 1st RU484; and
the 4th RU242+RU484: the 4th RU242 and the 1st RU484.

30 **[00146]** The 2nd 80 MHz in the 240 MHz bandwidth includes:

the 5th RU242+RU484: the 5th RU242 and the 4th RU484;

the 6th RU242+RU484: the 6th RU242 and the 4th RU484;
the 7th RU242+RU484: the 7th RU242 and the 3rd RU484; and
the 8th RU242+RU484: the 8th RU242 and the 3rd RU484.

[00147] The 5th RU242+RU484 in the 240 MHz bandwidth is the 1st RU242+RU484 in the 2nd
5 80 MHz bandwidth. Implementation is the same for the following description.

[00148] The 3rd 80 MHz in the 240 MHz bandwidth includes:

the 9th RU242+RU484: the 9th RU242 and the 6th RU484;
the 10th RU242+RU484: the 10th RU242 and the 6th RU484;
the 11th RU242+RU484: the 11th RU242 and the 5th RU484; and
10 the 12th RU242+RU484: the 12th RU242 and the 5th RU484.

[00149] The 9th RU242+RU484 in the 240 MHz bandwidth is the 1st RU242+RU484 in the 3rd
80 MHz bandwidth. Implementation is the same for the following description.

[00150] It should be understood that, both the Zth RU242 and the Xth RU484 are represented by
being sequentially numbered from left to right (from a low frequency to a high frequency). This is
15 similar to the foregoing description, and details are not described herein again.

[00151] In table A, RU484+RU996 has fixed combination or concatenation modes. There are 8
fixed combination modes in the 240 MHz. Details are as follows:

the 1st RU484+RU996: the 2nd RU484 and the 2nd RU996;
the 2nd RU484+RU996: the 1st RU484 and the 2nd RU996;
20 the 3rd RU484+RU996: the 4th RU484 and the 1st RU996;
the 4th RU484+RU996: the 3rd RU484 and the 1st RU996;
the 5th RU484+RU996: the 4th RU484 and the 3rd RU996;
the 6th RU484+RU996: the 3rd RU484 and the 3rd RU996;
the 7th RU484+RU996: the 6th RU484 and the 2nd RU996; and
25 the 8th RU484+RU996: the 5th RU484 and the 2nd RU996.

[00152] It should be understood that, both the Xth RU484 and the Yth RU996 are represented by
being sequentially numbered from left to right (from a low frequency to a high frequency). This is
similar to the foregoing description, and details are not described herein again.

[00153] When modes of RU242+RU484+RU996 need to be considered during design of a 240
30 MHz sequence, there are 16 modes in the 240 MHz. Details are as follows:

the 1st RU242+RU484+RU996: the 2nd RU242, the 2nd RU484, and the 2nd RU996;

the 2nd RU242+RU484+RU996: the 1st RU242, the 2nd RU484, and the 2nd RU996;
the 3rd RU242+RU484+RU996: the 4th RU242, the 1st RU484, and the 2nd RU996;
the 4th RU242+RU484+RU996: the 3rd RU242, the 1st RU484, and the 2nd RU996;
the 5th RU242+RU484+RU996: the 6th RU242, the 4th RU484, and the 1st RU996;
5 the 6th RU242+RU484+RU996: the 5th RU242, the 4th RU484, and the 1st RU996;
the 7th RU242+RU484+RU996: the 8th RU242, the 3rd RU484, and the 1st RU996;
the 8th RU242+RU484+RU996: the 7th RU242, the 3rd RU484, and the 1st RU996;
the 9th RU242+RU484+RU996: the 6th RU242, the 4th RU484, and the 3rd RU996;
the 10th RU242+RU484+RU996: the 5th RU242, the 4th RU484, and the 3rd RU996;
10 the 11th RU242+RU484+RU996: the 8th RU242, the 3rd RU484, and the 3rd RU996;
the 12th RU242+RU484+RU996: the 7th RU242, the 3rd RU484, and the 3rd RU996;
the 13th RU242+RU484+RU996: the 10th RU242, the 6th RU484, and the 2nd RU996;
the 14th RU242+RU484+RU996: the 9th RU242, the 6th RU484, and the 2nd RU996;
the 15th RU242+RU484+RU996: the 12th RU242, the 5th RU484, and the 2nd RU996;

15 and

the 16th RU242+RU484+RU996: the 11th RU242, the 5th RU484, and the 2nd RU996.

[00154] It should be understood that, all of the Zth RU242, the Xth RU484, and the Yth RU996 are represented by being sequentially numbered from left to right (from a low frequency to a high frequency). This is similar to the foregoing description, and details are not described herein again.

20 **[00155]** When modes of RU484+RU2*996 need to be considered during design of a 240 MHz sequence, there are 6 modes in the 240 MHz. Details are as follows:

the 1st RU484+RU2*996: the 2nd RU484, the 2nd RU996, and the 3rd RU996;
the 2nd RU484+RU2*996: the 1st RU484, the 2nd RU996, and the 3rd RU996;
the 3rd RU484+RU2*996: the 4th RU484, the 1st RU996, and the 3rd RU996;
25 the 4th RU484+RU2*996: the 3rd RU484, the 1st RU996, and the 3rd RU996;
the 5th RU484+RU2*996: the 6th RU484, the 1st RU996, and the 2nd RU996; and
the 6th RU484+RU2*996: the 5th RU484, the 1st RU996, and the 2nd RU996.

[00156] It should be understood that, both the Xth RU484 and the Yth RU996 are represented by being sequentially numbered from left to right (from a low frequency to a high frequency). This is similar to the foregoing description, and details are not described herein again.

[00157] When a mode of RU996+RU996+RU996 needs to be considered during design of a

240 MHz sequence, there is 1 mode in the 240 MHz, that is, a full-bandwidth mode, specifically, for example, a combination or concatenation of the 1st RU996, the 2nd RU996, and the 3rd RU996.

[00158] Modes considered for a 2x LTF sequence/4x LTF sequence over the 320 MHz bandwidth include content in table B below.

5

Table B

<i>RU size</i>	<i>RU 26</i>	<i>RU 52</i>	<i>RU 26+RU 52</i>	<i>RU 106</i>	<i>RU 212</i>	<i>RU 212</i>	<i>RU 424</i>	<i>RU 212</i>	<i>RU 996</i>	<i>RU 484</i>	<i>RU 212</i>	<i>RU 484+RU 212</i>	<i>RU 312</i>	<i>RU 52+RU 212</i>	<i>RU 996</i>
1	36	16*4	4*4	8*4	4*4	4*4	2*4	4*4	1*4	4*2	2	Not considered	4	8	1
2	36	16*4	4*4	8*4	4*4	4*4	2*4	4*4	1*4	4*2	2	24	4	8	1
3	36	16*4	4*4	8*4	4*4	4*4	2*4	4*4	1*4	4*2	3*4	24	4	8	1

[00159] Mode 1: a mode with a full bandwidth, puncturing, and multiple RU combination in the 320 MHz. Mode 1 does not consider transmission in which 240 MHz is obtained by performing puncturing on the 320 MHz. In other words, sequence design mainly considers the full bandwidth, puncturing, and multiple RU modes in the 320 MHz/160+160 MHz.

[00160] Each 80 MHz has thirty-six 26-tone RUs with sequence numbers from small to large and corresponding frequencies from low to high. Implementation is similar for a 52-tone RU (RU52), a 106-tone RU (RU106), a 242-tone RU (RU242), a 484-tone RU (RU484), and a 996-tone RU (RU996).

[00161] Multiple RU combination is to allocate a plurality of RUs to one STA. Each RU still uses data subcarrier locations and pilot subcarrier locations of the RU. For example, for RU26+RU52, RU26 uses its own data subcarrier locations and pilot locations, and RU52 uses its own data subcarrier locations and pilot subcarrier locations.

[00162] In table B, RU26+RU52 has fixed combination or concatenation modes. There are 4 fixed combination modes in each 80 MHz, and therefore 16 combination or concatenation modes in the 320 MHz. Details are as follows:

the 1st RU26+RU52: the 8th RU26 and the 3rd RU52;

the 2nd RU26+RU52: the 11th RU26 and the 6th RU52;

the 3rd RU26+RU52: the 26th RU26 and the 11th RU52; and

the 4th RU26+RU52: the 29th RU26 and the 14th RU52.

the 5th RU26+RU52: the 44th RU26 and the 19th RU52;

the 6th RU26+RU52: the 47th RU26 and the 22nd RU52;

the 7th RU26+RU52: the 62nd RU26 and the 27th RU52; and

the 8th RU26+RU52: the 65th RU26 and the 30th RU52;

the 9th RU26+RU52: the 80th RU26 and the 35th RU52;

the 10th RU26+RU52: the 83rd RU26 and the 38th RU52;

the 11th RU26+RU52: the 98th RU26 and the 43rd RU52; and

the 12th RU26+RU52: the 101st RU26 and the 46th RU52.

the 13th RU26+RU52: the 116th RU26 and the 51st RU52;

the 14th RU26+RU52: the 119th RU26 and the 54th RU52;

the 15th RU26+RU52: the 134th RU26 and the 59th RU52; and

the 16th RU26+RU52: the 137th RU26 and the 62nd RU52.

[00163] It should be understood that, both the Xth RU26 and the Yth RU52 are represented by being sequentially numbered from left to right (from a low frequency to a high frequency). This is similar to the foregoing description, and details are not described herein again.

[00164] In table B, RU26+RU106 has fixed combination or concatenation modes. There are 4 fixed combination modes in each 80 MHz, and therefore 16 combination or concatenation modes in the 320 MHz. Details are as follows:

the 1st RU26+RU106: the 5th RU26 and the 1st RU106;

the 2nd RU26+RU106: the 14th RU26 and the 4th RU106;

the 3rd RU26+RU106: the 23rd RU26 and the 5th RU106; and

the 4th RU26+RU106: the 32nd RU26 and the 8th RU106.

the 5th RU26+RU106: the 41st RU26 and the 9th RU106;

the 6th RU26+RU106: the 50th RU26 and the 12th RU106;

the 7th RU26+RU106: the 59th RU26 and the 13th RU106;
the 8th RU26+RU106: the 68th RU26 and the 16th RU106;
the 9th RU26+RU106: the 77th RU26 and the 17th RU106;
the 10th RU26+RU106: the 86th RU26 and the 20th RU106;
5 the 11th RU26+RU106: the 95th RU26 and the 21st RU106;
the 12th RU26+RU106: the 104th RU26 and the 24th RU106;
the 13th RU26+RU106: the 113th RU26 and the 25th RU106;
the 14th RU26+RU106: the 122nd RU26 and the 28th RU106;
the 15th RU26+RU106: the 131st RU26 and the 29th RU106; and
10 the 16th RU26+RU106: the 140th RU26 and the 32nd RU106.

[00165] It should be understood that, both the Xth RU26 and the Yth RU106 are represented by being sequentially numbered from left to right (from a low frequency to a high frequency). This is similar to the foregoing description, and details are not described herein again.

[00166] In table B, RU242+RU484 has fixed combination or concatenation modes. There are 4
15 fixed combination modes in each 80 MHz, and therefore 16 combination or concatenation modes in the 320 MHz. Details are as follows:

the 1st RU242+RU484: the 1st RU242 and the 2nd RU484;
the 2nd RU242+RU484: the 2nd RU242 and the 2nd RU484;
the 3rd RU242+RU484: the 3rd RU242 and the 1st RU484;
20 the 4th RU242+RU484: the 4th RU242 and the 1st RU484;
the 5th RU242+RU484: the 5th RU242 and the 4th RU484;
the 6th RU242+RU484: the 6th RU242 and the 4th RU484;
the 7th RU242+RU484: the 7th RU242 and the 3rd RU484;
the 8th RU242+RU484: the 8th RU242 and the 3rd RU484;
25 the 9th RU242+RU484: the 9th RU242 and the 6th RU484;
the 10th RU242+RU484: the 10th RU242 and the 6th RU484;
the 11th RU242+RU484: the 11th RU242 and the 5th RU484;
the 12th RU242+RU484: the 12th RU242 and the 5th RU484;
the 13th RU242+RU484: the 13th RU242 and the 8th RU484;
30 the 14th RU242+RU484: the 14th RU242 and the 8th RU484;
the 15th RU242+RU484: the 15th RU242 and the 7th RU484; and

the 16th RU242+RU484: the 16th RU242 and the 7th RU484.

[00167] It should be understood that, both the Xth RU242 and the Yth RU484 are represented by being sequentially numbered from left to right (from a low frequency to a high frequency). This is similar to the foregoing description, and details are not described herein again.

5 **[00168]** In table B, RU484+RU996 has fixed combination or concatenation modes. There are 4 fixed combination modes in each of primary 160 MHz and secondary 160 MHz, and therefore 8 combination or concatenation modes in the 320 MHz. Details are as follows:

the 1st RU484+RU996: the 2nd RU484 and the 2nd RU996;

the 2nd RU484+RU996: the 1st RU484 and the 2nd RU996;

10 the 3rd RU484+RU996: the 4th RU484 and the 1st RU996;

the 4th RU484+RU996: the 3rd RU484 and the 1st RU996;

the 5th RU484+RU996: the 6th RU484 and the 4th RU996;

the 6th RU484+RU996: the 5th RU484 and the 4th RU996;

the 7th RU484+RU996: the 8th RU484 and the 3rd RU996; and

15 the 8th RU484+RU996: the 7th RU484 and the 3rd RU996.

[00169] It should be understood that, both the Xth RU484 and the Yth RU996 are represented by being sequentially numbered from left to right (from a low frequency to a high frequency). This is similar to the foregoing description, and details are not described herein again.

[00170] RU2*996 covers two cases of primary 160 MHz and secondary 160 MHz. Details are
20 as follows:

the 1st RU2*996: the 1st RU996 and the 2nd RU996; and

the 2nd RU2*996: the 3rd RU996 and the 4th RU996.

[00171] It should be understood that, the Xth RU996 is represented by being sequentially numbered from left to right (from a low frequency to a high frequency). This is similar to the
25 foregoing description, and details are not described herein again.

[00172] RU3*996 refers to a combination of any three of four RU996. Details are as follows:

the 1st RU3*996: the 1st RU996, the 3rd RU996, and the 4th RU996;

the 2nd RU3*996: the 1st RU996, the 2nd RU996, and the 4th RU996;

the 3rd RU3*996: the 1st RU996, the 2nd RU996, and the 3rd RU996; and

30 the 4th RU3*996: the 2nd RU996, the 3rd RU996, and the 4th RU996.

[00173] It should be understood that, the Xth RU996 is represented by being sequentially

numbered from left to right (from a low frequency to a high frequency). This is similar to the foregoing description, and details are not described herein again.

[00174] For combination modes of RU3*996+RU484, details are as follows:

the 1st RU3*996+RU484: the 2nd RU484, the 2nd RU996, the 3rd RU996, and the 4th RU996;

the 2nd RU3*996+RU484: the 1st RU484, the 2nd RU996, the 3rd RU996, and the 4th RU996;

the 3rd RU3*996+RU484: the 1st RU996, the 4th RU484, the 3rd RU996, and the 4th RU996;

the 4th RU3*996+RU484: the 1st RU996, the 3rd RU484, the 3rd RU996, and the 4th RU996;

the 5th RU3*996+RU484: the 1st RU996, the 2nd RU996, the 6th RU484, and the 4th RU996;

the 6th RU3*996+RU484: the 1st RU996, the 2nd RU996, the 5th RU484, and the 4th RU996;

the 7th RU3*996+RU484: the 1st RU996, the 2nd RU996, the 3rd RU996, and the 8th RU484; and

the 8th RU3*996+RU484: the 1st RU996, the 2nd RU996, the 3rd RU996, and the 7th RU484.

[00175] It should be understood that, the Xth RU996 and the Yth RU484 are represented by being sequentially numbered from left to right (from a low frequency to a high frequency). This is similar to the foregoing description, and details are not described herein again.

[00176] A combination mode of RU4*996+RU484 is a full-bandwidth mode of the 320 MHz.

Details are as follows: the 1st RU996, the 2nd RU996, the 3rd RU996, and the 4th RU996.

[00177] It should be understood that, the Xth RU996 is represented by being sequentially numbered from left to right (from a low frequency to a high frequency). This is similar to the foregoing description, and details are not described herein again.

[00178] Mode 2: a mode with a full bandwidth, puncturing, and multiple RU combination modes in the 320 MHz, considering compatibility with RU2*996+ RU484 in the 240 MHz.

[00179] Mode 2 considers compatibility with some circumstances in the 240 MHz. That is,

when any 80 MHz is punctured from the 320 MHz or is not considered, a remaining RU2*996+RU484 formed by not considering one RU484 in RU3*996 is not considered. A puncturing scenario thereof is similar to patterns 14 to 49 (24 in total) in the puncturing scenario (A) of the 320 MHz.

5 **[00180]** Mode 3: a mode with a full bandwidth, puncturing, and multiple RU combination modes in the 320 MHz, considering compatibility with a full bandwidth, puncturing, and multiple RU combination in the 240 MHz.

[00181] Mode 3 considers compatibility with all circumstances with an MRU and puncturing in the 240 MHz. That is, when any 80 MHz is punctured from the 320 MHz or is not considered,
10 a remaining RU2*996+RU484 formed by not considering one RU484 in RU3*996 is not considered. A puncturing scenario thereof is similar to patterns 14 to 49 in the puncturing scenario (A) of the 320 MHz. In addition, the 240 MHz puncturing scenario is considered. Therefore, a quantity of cases of RU2*996 in mode 3 changes to 12 from 2 in mode 2.

[00182] When modes of RU242+RU484+RU996 need to be considered during design of a 320
15 MHz sequence, there are 16 modes in the 320 MHz. Details are as follows:

the 1st RU242+RU484+RU996: the 2nd RU242, the 2nd RU484, and the 2nd RU996;
the 2nd RU242+RU484+RU996: the 1st RU242, the 2nd RU484, and the 2nd RU996;
the 3rd RU242+RU484+RU996: the 4th RU242, the 1st RU484, and the 2nd RU996;
the 4th RU242+RU484+RU996: the 3rd RU242, the 1st RU484, and the 2nd RU996;
20 the 5th RU242+RU484+RU996: the 6th RU242, the 4th RU484, and the 1st RU996;
the 6th RU242+RU484+RU996: the 5th RU242, the 4th RU484, and the 1st RU996;
the 7th RU242+RU484+RU996: the 8th RU242, the 3rd RU484, and the 1st RU996;
the 8th RU242+RU484+RU996: the 7th RU242, the 3rd RU484, and the 1st RU996;
the 9th RU242+RU484+RU996: the 10th RU242, the 6th RU484, and the 4th RU996;
25 the 10th RU242+RU484+RU996: the 9th RU242, the 6th RU484, and the 4th RU996;
the 11th RU242+RU484+RU996: the 12th RU242, the 5th RU484, and the 4th RU996;
the 12th RU242+RU484+RU996: the 11th RU242, the 5th RU484, and the 4th RU996;
the 13th RU242+RU484+RU996: the 14th RU242, the 8th RU484, and the 3rd RU996;
the 14th RU242+RU484+RU996: the 13th RU242, the 8th RU484, and the 3rd RU996;
30 the 15th RU242+RU484+RU996: the 16th RU242, the 7th RU484, and the 3rd RU996;

and

the 16th RU242+RU484+RU996: the 15th RU242, the 7th RU484, and the 3rd RU996.

[00183] This embodiment of this application provides a plurality of possible LTF sequences. Some LTF sequences each have a smallest PAPR value in a full bandwidth. Some LTF sequences have a smallest maximum PAPR in comprehensive consideration of a full bandwidth and a plurality of puncturing patterns, and therefore they have optimal comprehensive performance in the full bandwidth and the plurality of puncturing patterns. Some LTF sequences comprehensively consider a PAPR in a full bandwidth, a plurality of puncturing patterns, and a plurality of multiple RUs, and therefore the LTF sequences have optimal comprehensive performance in the full bandwidth, the plurality of puncturing patterns, and the plurality of multiple RUs.

[00184] **4. After the content related to the embodiments of this application is described, the following describes details of the embodiments of this application.**

[00185] As shown in FIG. 5, an embodiment of this application provides a method for transmitting a physical layer protocol data unit. The method includes the following steps.

[00186] S101: Generate a physical layer protocol data unit (physical protocol data unit, PPDU), where the PPDU includes a long training field (long training field, LTF), a length of a frequency-domain sequence of the LTF is greater than a first length, and the first length is a length of a frequency-domain sequence of an LTF of a PPDU transmitted over a channel whose bandwidth is 160 MHz.

[00187] S102: Send the PPDU over a target channel, where a bandwidth of the target channel is greater than 160 MHz.

[00188] This embodiment of this application focuses on frequency-domain sequences of LTFs of PPDUs transmitted over 240 MHz and 320 MHz. Therefore, the foregoing steps may be simplified as follows:

[00189] S201: Generate a PPDU, where the PPDU is transmitted over a channel whose bandwidth is 240 MHz/320 MHz, the PPDU includes an LTF, and a frequency-domain sequence of the LTF is any one of a plurality of possible LTF frequency-domain sequences provided below.

[00190] S202: Send the PPDU over a channel whose bandwidth is 240 MHz/320 MHz.

[00191] This embodiment of this application focuses on a plurality of possible frequency-domain sequences of LTFs (a frequency-domain sequence of an LTF is referred to as an LTF sequence for short below). Before the plurality of possible LTF sequences provided in this embodiment of this application are described, **a method for constructing an LTF sequence is**

first described. A specific method is as follows:

- i. determining a sequence structure of the LTF sequence; and
- ii. determining the LTF sequence through computer-based searching based on the

following design criteria, including:

- (1) a relatively small PAPR: a requirement on linear power amplification is reduced;
- (2) a phase rotation at a non-pilot location: a plurality of streams are considered (a size of a P matrix is 2x2, 4x4, 6x6, 8x8, 12x12, or 16x16);
- (3) consideration of a puncturing issue; and
- (4) consideration of multiple RU joint transmission or multiple RU combination (a plurality of RUs are allocated to a same STA).

[00192] Alternatively, in other words, the design criteria includes: consideration of a PAPR value in a case of a full bandwidth, a plurality of puncturing patterns, and a plurality of multiple RU combinations; and consideration of a phase rotation at a non-pilot location.

[00193] Specifically, the sequence design takes an optimal maximum PAPR in a plurality of cases (for example, a full bandwidth, puncturing, and a multiple RU) into consideration. Small RUs are concatenated into a large RU in a transmission bandwidth, and a sequence with an optimal PAPR on each type of RU (a multiple RU combination or a single RU) is selected. Because an LTF is used for MIMO channel estimation, and a quantity of streams is increased to 16 in the next-generation Wi-Fi standard, a maximum PAPR value of an obtained LTF is a result of considering a multi-stream scenario (for example, a size of a P matrix is 2x2, 4x4, 6x6, 8x8, 12x12, or 16x16) at a non-pilot location.

[00194] **The following describes the plurality of possible LTF sequences provided in this embodiment of this application.**

[00195] **1. 1x LTF sequence in the 240 MHz bandwidth (referred to as an LTF1x240M sequence for short)**

[00196] 1-1. There is a possible LTF1x240M sequence = [LTF1x80M 0_{23} LTF1x80M 0_{23} – LTF1x80M]. LTF1x80M is an 80 MHz 1x LTF sequence in the 802.11ax standard. For a specific sequence, refer to the 802.11ax standard.

[00197] The LTF1x240M sequence has relatively low PAPR values in various puncturing patterns for the 240 MHz.

[00198] Specifically, when IFFTsize in fast Fourier transform is set to 3072, PAPR values of the LTF1x240M sequence in puncturing patterns 1 to 10 for the 240 MHz are listed in table 7 below.

Table 7

Sequence: LTF1x240M sequence = [LTF1x80M 0_{23} LTF1x80M 0_{23} -LTF1x80M]	PAPR [dB]
Pattern 1: 240 MHz [1 1 1 1 1 1 1 1 1 1 1]	7.5154
Pattern 2: 200 MHz [0 0 1 1 1 1 1 1 1 1 1]	7.0253
Pattern 3: 200 MHz [1 1 0 0 1 1 1 1 1 1 1]	7.1208
Pattern 4: 200 MHz [1 1 1 1 0 0 1 1 1 1 1]	8.2661
Pattern 5: 200 MHz [1 1 1 1 1 1 0 0 1 1 1]	7.9758
Pattern 6: 200 MHz [1 1 1 1 1 1 1 1 0 0 1]	7.1286
Pattern 7: 200 MHz [1 1 1 1 1 1 1 1 1 1 0]	6.9607
Pattern 8: 160 MHz [0 0 0 0 1 1 1 1 1 1 1]	8.148
Pattern 9: 160 MHz [1 1 1 1 0 0 0 0 1 1 1]	8.3072
Pattern 10: 160 MHz [1 1 1 1 1 1 1 1 0 0 0]	7.9794
Pattern 9 has a maximum PAPR value.	8.3072

5

[00199] Specifically, when IFFTsize in fast Fourier transform is set to 4096, PAPR values of the LTF1x240M sequence in puncturing patterns 1 to 10 for the 240 MHz are listed in table 8 below.

Table 8

Sequence: LTF1x240M sequence = [LTF1x80M 0_{23} LTF1x80M 0_{23} -LTF1x80M]	PAPR [dB]
Pattern 1: 240 MHz [1 1 1 1 1 1 1 1 1 1 1]	7.5154
Pattern 2: 200 MHz [x x 1 1 1 1 1 1 1 1 1]	7.1151
Pattern 3: 200 MHz [1 1 x x 1 1 1 1 1 1 1]	7.2152
Pattern 4: 200 MHz [1 1 1 1 x x 1 1 1 1 1]	8.2661
Pattern 5: 200 MHz [1 1 1 1 1 1 x x 1 1 1]	7.9758

Sequence: LTF1x240M sequence = [LTF1x80M 0_{23} LTF1x80M 0_{23} -LTF1x80M]	PAPR [dB]
Pattern 6: 200 MHz [1 1 1 1 1 1 1 1 x x 1 1]	7.2433
Pattern 7: 200 MHz [1 1 1 1 1 1 1 1 1 1 x x]	7.0408
Pattern 8: 160 MHz [x x x x 1 1 1 1 1 1 1 1]	8.148
Pattern 9: 160 MHz [1 1 1 1 x x x x 1 1 1 1]	8.3072
Pattern 10: 160 MHz [1 1 1 1 1 1 1 1 x x x x]	8.0064
Pattern 9 has a maximum PAPR value.	8.3072

[00200] A method for obtaining the LTF1x240M sequence in 1-1 includes:

i. determining a sequence structure of the LTF1x240M sequence, where the sequence structure of the LTF1x240M sequence is [LTF1x80M 0_{23} $\pm$ LTF1x80M 0_{23} $\pm$ LTF1x80M]; and

5 ii. determining the LTF1x240M sequence = [LTF1x80M 0_{23} LTF1x80M 0_{23} -LTF1x80M] through computer-based searching based on the following design criteria, including: (1) a relatively small PAPR: a requirement on linear power amplification is reduced; (2) a phase rotation at a non-pilot location: a plurality of streams are considered (a size of a P matrix is 1x1, 2x2, 4x4, 6x6, 8x8, 12x12, or 16x16); (3) consideration of a puncturing issue; and (4) consideration
10 of multiple RU joint transmission or multiple RU combination (a plurality of RUs are allocated to a same STA).

[00201] In other words, the provided LTF1x240M sequence has a minimum PAPR value when a full bandwidth, various puncturing patterns, and a plurality of streams are considered. Based on different puncturing patterns, an LTF1x240M sequence = [LTF1x80M 0_{23} LTF1x80M 0_{23} LTF1x80M], an LTF1x240M sequence = [LTF1x80M 0_{23} -LTF1x80M 0_{23} LTF1x80M], or an
15 LTF1x240M sequence = [LTF1x80M 0_{23} -LTF1x80M 0_{23} -LTF1x80M] may alternatively be selected.

[00202] 1-2. There is another possible LTF1x240M sequence = [LTF1x160M 0_{23} -LTF1x80M]. LTF1x160M is a 160 MHz 1x LTF sequence in the 802.11ax standard. For a specific
20 sequence, refer to the 802.11ax standard. LTF1x80M is an 80 MHz 1x LTF sequence in the 802.11ax standard. For a specific sequence, refer to the 802.11ax standard.

[00203] The LTF1x240M sequence has relatively low PAPR values in various puncturing patterns for the 240 MHz.

[00204] Specifically, when IFFTsize in fast Fourier transform is set to 3072, PAPR values of the LTF1x240M sequence in puncturing patterns 1 to 10 for the 240 MHz are listed in table 9

5 below.

Table 9

Sequence: LTF1x240M sequence = [LTF1x160M 0_{23} -LTF1x80M]	PAPR [dB]
Pattern 1: 240 MHz [1 1 1 1 1 1 1 1 1 1 1]	7.7825
Pattern 2: 200 MHz [0 0 1 1 1 1 1 1 1 1 1]	7.7008
Pattern 3: 200 MHz [1 1 0 0 1 1 1 1 1 1 1]	7.0798
Pattern 4: 200 MHz [1 1 1 1 0 0 1 1 1 1 1]	8.1436
Pattern 5: 200 MHz [1 1 1 1 1 0 0 1 1 1 1]	7.9758
Pattern 6: 200 MHz [1 1 1 1 1 1 1 0 0 1 1]	7.325
Pattern 7: 200 MHz [1 1 1 1 1 1 1 1 1 0 0]	7.4913
Pattern 8: 160 MHz [0 0 0 0 1 1 1 1 1 1 1]	6.8122
Pattern 9: 160 MHz [1 1 1 1 0 0 0 0 1 1 1]	8.3072
Pattern 10: 160 MHz [1 1 1 1 1 1 1 1 0 0 0]	6.2683
Pattern 9 has a maximum PAPR value.	8.3072

[00205] Specifically, when IFFTsize in fast Fourier transform is set to 4096, PAPR values of the LTF1x240M sequence in puncturing patterns 1 to 10 for the 240 MHz are listed in table 10

10 below.

Table 10

Sequence: LTF1x240M sequence = [LTF1x160M 0_{23} -LTF1x80M]	PAPR [dB]
Pattern 1: 240 MHz [1 1 1 1 1 1 1 1 1 1 1]	7.7825
Pattern 2: 200 MHz [x x 1 1 1 1 1 1 1 1 1]	7.7565
Pattern 3: 200 MHz [1 1 x x 1 1 1 1 1 1 1]	7.0798

Sequence: LTF1x240M sequence = [LTF1x160M 0_{23} -LTF1x80M]	PAPR [dB]
Pattern 4: 200 MHz [1 1 1 1 x x 1 1 1 1 1]	8.1436
Pattern 5: 200 MHz [1 1 1 1 1 1 x x 1 1 1]	7.9758
Pattern 6: 200 MHz [1 1 1 1 1 1 1 1 x x 1]	7.325
Pattern 7: 200 MHz [1 1 1 1 1 1 1 1 1 1 x x]	7.5085
Pattern 8: 160 MHz [x x x x 1 1 1 1 1 1 1]	6.8632
Pattern 9: 160 MHz [1 1 1 1 x x x x 1 1 1]	8.3072
Pattern 10: 160 MHz [1 1 1 1 1 1 1 1 x x x]	6.2902
Pattern 9 has a maximum PAPR value.	8.3072

[00206] In a method for obtaining the LTF1x240M sequence in 1-2, a sequence structure of the LTF1x240M sequence that is determined in the method is $[\pm \text{LTF1x160M } 0_{23} \pm \text{LTF1x80M}]$. Apart from this, other methods are the same as the foregoing sequence construction method.

5 **[00207]** 1-3. There is another possible LTF1x240M sequence = [LTF1x80MHz_{left} 0 -LTF1x80MHz_{right} 0_{23} -LTF1x80MHz_{left} 0 LTF1x80MHz_{right} 0_{23} LTF1x80MHz_{left} 0 LTF1x80MHz_{right}]. LTF1x80MHz_{left} is an 80MHz_{left} 1x LTF sequence in the 802.11ax standard. For a specific sequence, refer to the 802.11ax standard. LTF1x80MHz_{right} is an 80MHz_{right} 1x LTF sequence in the 802.11ax standard. For a specific sequence, refer to the 802.11ax standard.

10 **[00208]** The LTF1x240M sequence has a relatively low PAPR value in puncturing pattern 1 for the 240 MHz. Specifically, the PAPR value of the LTF1x240M sequence in puncturing pattern 1 for the 240 MHz is 7.3553 dB.

[00209] In a method for obtaining the LTF1x240M sequence in 1-3, a sequence structure of the LTF1x240M sequence that is determined in the method is [LTF1x80MHz_{left} 0 $\pm$ LTF1x80MHz_{right} 0_{23} $\pm$ LTF1x80MHz_{left} 0 $\pm$ LTF1x80MHz_{right} 0_{23} $\pm$ LTF1x80MHz_{left} 0 $\pm$ LTF1x80MHz_{right}]. Apart from this, other methods are the same as the foregoing sequence construction method.

15 **[00210]** 1-4. There is another possible LTF1x240M sequence = [LTF1x80MHz_{left} 0 LTF1x80MHz_{right} 0_{23} LTF1x80MHz_{left} 0 LTF1x80MHz_{right} 0_{23} -LTF1x80MHz_{left} 0 -LTF1x80MHz_{right}]. LTF1x80MHz_{left} is an 80MHz_{left} 1x LTF sequence in the 802.11ax standard. For a specific sequence, refer to the 802.11ax standard. LTF1x80MHz_{right} is an 80MHz_{right} 1x LTF sequence in the 802.11ax standard. For a specific sequence, refer to the 802.11ax standard.

20

[00211] The LTF1x240M sequence has relatively low PAPR values in various puncturing patterns for the 240 MHz.

[00212] Specifically, when IFFTsize in fast Fourier transform is set to 3072, PAPR values of the LTF1x240M sequence in puncturing patterns 1 to 10 for the 240 MHz are listed in table 11

5 below.

Table 11

Sequence: LTF1x240M sequence = [LTF1x80MHz _{left} 0 LTF1x80MHz _{right} 0 ₂₃ LTF1x80MHz _{left} 0 LTF1x80MHz _{right} 0 ₂₃ -LTF1x80MHz _{left} 0 -LTF1x80MHz _{right}]	PAPR [dB]
Pattern 1: 240 MHz [1 1 1 1 1 1 1 1 1 1 1]	7.5154
Pattern 2: 200 MHz [x x 1 1 1 1 1 1 1 1 1]	7.0253
Pattern 3: 200 MHz [1 1 x x 1 1 1 1 1 1 1]	7.1208
Pattern 4: 200 MHz [1 1 1 1 x x 1 1 1 1 1]	8.2661
Pattern 5: 200 MHz [1 1 1 1 1 1 x x 1 1 1]	7.9758
Pattern 6: 200 MHz [1 1 1 1 1 1 1 1 x x 1 1]	7.1286
Pattern 7: 200 MHz [1 1 1 1 1 1 1 1 1 1 x x]	6.9607
Pattern 8: 160 MHz [x x x x 1 1 1 1 1 1 1]	8.148
Pattern 9: 160 MHz [1 1 1 1 x x x x 1 1 1]	8.3072
Pattern 10: 160 MHz [1 1 1 1 1 1 1 1 x x x x]	7.9794
Pattern 9 has a maximum PAPR value.	8.3072

[00213] Specifically, when IFFTsize in fast Fourier transform is set to 4096, PAPR values of the LTF1x240M sequence in puncturing patterns 1 to 10 for the 240 MHz are listed in table 12

10 below.

Table 12

Sequence: LTF1x240M sequence = [LTF1x80MHz _{left} 0 LTF1x80MHz _{right} 0 ₂₃ LTF1x80MHz _{left} 0 LTF1x80MHz _{right} 0 ₂₃ -LTF1x80MHz _{left} 0 -LTF1x80MHz _{right}]	PAPR [dB]
Pattern 1: 240 MHz [1 1 1 1 1 1 1 1 1 1 1]	7.5154

Sequence: LTF1x240M sequence = [LTF1x80MHz _{left} 0 LTF1x80MHz _{right} 0 ₂₃ LTF1x80MHz _{left} 0 LTF1x80MHz _{right} 0 ₂₃ -LTF1x80MHz _{left} 0 -LTF1x80MHz _{right}]	PAPR [dB]
Pattern 2: 200 MHz [x x 1 1 1 1 1 1 1 1]	7.1151
Pattern 3: 200 MHz [1 1 x x 1 1 1 1 1 1]	7.2152
Pattern 4: 200 MHz [1 1 1 1 x x 1 1 1 1]	8.2661
Pattern 5: 200 MHz [1 1 1 1 1 1 x x 1 1]	7.9758
Pattern 6: 200 MHz [1 1 1 1 1 1 1 1 x x 1]	7.2433
Pattern 7: 200 MHz [1 1 1 1 1 1 1 1 1 1 x x]	7.0408
Pattern 8: 160 MHz [x x x x 1 1 1 1 1 1]	8.148
Pattern 9: 160 MHz [1 1 1 1 x x x 1 1 1]	8.3072
Pattern 10: 160 MHz [1 1 1 1 1 1 1 1 x x x]	8.0064
Pattern 9 has a maximum PAPR value.	8.3072

[00214] In a method for obtaining the LTF1x240M sequence in 1-4, a sequence structure of the LTF1x240M sequence that is determined in the method is [LTF1x80MHz_{left} 0 $\pm$ LTF1x80MHz_{right} 0₂₃ $\pm$ LTF1x80MHz_{left} 0 $\pm$ LTF1x80MHz_{right} 0₂₃ $\pm$ LTF1x80MHz_{left} 0 $\pm$ LTF1x80MHz_{right}]. Apart from this, other methods are the same as the foregoing sequence construction method.

[00215] 2. 1x LTF sequence in the 320 MHz bandwidth (referred to as an LTF1x320M sequence for short)

[00216] 2-1. There is a possible LTF1x320M sequence = [LTF1x80M 0₂₃ LTF1x80M 0₂₃ -LTF1x80M 0₂₃ -LTF1x80M]. LTF1x80M is an 80 MHz 1x LTF sequence in the 802.11ax standard.

For a specific sequence, refer to the 802.11ax standard. Based on different puncturing patterns, an LTF1x320M sequence = [LTF1x80M 0₂₃ LTF1x80M 0₂₃ LTF1x80M 0₂₃ -LTF1x80M], an LTF1x320M sequence = [LTF1x80M 0₂₃ LTF1x80M 0₂₃ LTF1x80M 0₂₃ LTF1x80M], an LTF1x320M sequence = [LTF1x80M 0₂₃ -LTF1x80M 0₂₃ LTF1x80M 0₂₃ LTF1x80M], an LTF1x320M sequence = [LTF1x80M 0₂₃ -LTF1x80M 0₂₃ -LTF1x80M 0₂₃ LTF1x80M], an LTF1x320M sequence = [LTF1x80M 0₂₃ -LTF1x80M 0₂₃ -LTF1x80M 0₂₃ -LTF1x80M], or the like may alternatively be selected.

[00217] The LTF1x320M sequence has relatively low PAPR values in the puncturing patterns in (A) of the 320 MHz (that is, 240 MHz puncturing is compatible). For example, a PAPR value

of the LTF1x320M sequence in a puncturing pattern in the puncturing patterns in (A) of the 320 MHz is 9.0837 dB. PAPR values in the other puncturing patterns each are less than 9.0837 dB. For example, a PAPR value is 8.9944 dB in puncturing pattern 1.

[00218] Specifically, in the puncturing patterns in (A) of the 320 MHz, PAPR values of the

5 LTF1x320M sequence in puncturing patterns X to Y for the 320 MHz are listed in table 13 below.

Table 13

Pattern 1	8.9944							
Patterns 2–9	8.0424	8.223	8.8837	8.9778	9.0837	8.9009	8.2149	8.2885
Patterns 10–13	8.9613	8.9613	7.5154	7.5154				
Patterns 14–19	8.2709	8.3622	8.7755	8.5458	8.6197	8.5826		
Patterns 23–28	8.5199	8.4525	8.7406	8.6802	8.1251	8.2758		
Patterns 32–37	7.1151	7.2152	8.2661	7.9758	7.2433	7.0408		
Patterns 41–46	7.2055	6.9584	8.1436	8.0593	7.5331	6.9584		
Patterns 20–22	8.0064	8.148	8.3072					
Patterns 29–31	8.3072	8.148	8.0064					
Patterns 38–40	8.148	8.3072	8.0064					
Patterns 47–49	8.0064	8.3072	8.148					

[00219] PAPR values of the LTF1x320M sequence in the puncturing patterns in (B) of the 320 MHz (that is, 240 MHz puncturing is incompatible) are listed in table 14 below.

10

Table 14

Sequence: LTF1x320M = [LTF1x80M 0 ₂₃ LTF1x80M 0 ₂₃ –LTF1x80M 0 ₂₃ –LTF1x80M]	PAPR [dB]
Pattern 1: 320 MHz [1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1]	8.9944
Pattern 2: 280 MHz [x x 1 1 1 1 1 1 1 1 1 1 1 1 1 1]	8.0424
Pattern 3: 280 MHz [1 1 x x 1 1 1 1 1 1 1 1 1 1 1 1]	8.2230
Pattern 4: 280 MHz [1 1 1 1 x x 1 1 1 1 1 1 1 1 1 1]	8.8837
Pattern 5: 280 MHz [1 1 1 1 1 1 x x 1 1 1 1 1 1 1 1]	8.9778

Sequence: LTF1x320M = [LTF1x80M 0 ₂₃ LTF1x80M 0 ₂₃ –LTF1x80M 0 ₂₃ –LTF1x80M]	PAPR [dB]
Pattern 6: 280 MHz [1 1 1 1 1 1 1 x x 1 1 1 1 1]	9.0837
Pattern 7: 280 MHz [1 1 1 1 1 1 1 1 1 x x 1 1 1]	8.9009
Pattern 8: 280 MHz [1 1 1 1 1 1 1 1 1 1 1 x x 1 1]	8.2149
Pattern 9: 280 MHz [1 1 1 1 1 1 1 1 1 1 1 1 1 x x]	8.2885
Pattern 10: 240 MHz [1 1 1 1 x x x x 1 1 1 1 1 1 1]	8.9613
Pattern 11: 240 MHz [1 1 1 1 1 1 1 x x x x 1 1 1 1]	8.9613
Pattern 12: 240 MHz [1 1 1 1 1 1 1 1 1 1 1 x x x x]	7.5154
Pattern 13: 240 MHz [x x x x 1 1 1 1 1 1 1 1 1 1 1]	7.5154
Pattern 6 has a maximum PAPR value.	9.0837

[00220] A method for obtaining the LTF1x320M sequence in 2-1 includes:

i. determining a sequence structure of the LTF1x320M sequence, where the sequence structure of the LTF1x320M sequence is [LTF1x80M 0₂₃ ±LTF1x80M 0₂₃ ±LTF1x80M 0₂₃ ±LTF1x80M]; and

ii. determining the LTF1x320M sequence = [LTF1x80M 0₂₃ LTF1x80M 0₂₃ –LTF1x80M 0₂₃ –LTF1x80M] through computer-based searching based on the following design criteria, including: (1) a relatively small PAPR: a requirement on linear power amplification is reduced; (2) a phase rotation at a non-pilot location: a plurality of streams are considered (a size of a P matrix is 2x2, 4x4, 6x6, 8x8, 12x12, or 16x16); (3) consideration of a puncturing issue; and (4) consideration of multiple RU joint transmission or multiple RU combination (a plurality of RUs are allocated to a same STA).

[00221] 2-2. There is another possible LTF1x320M sequence = [LTF1x80M 0₂₃ LTF1x80M 0₂₃ –LTF1x80M 0₂₃ LTF1x80M]. LTF1x80M is an 80 MHz 1x LTF sequence in the 802.11ax standard.

For a specific sequence, refer to the 802.11ax standard.

[00222] The LTF1x320M sequence has relatively low PAPR values in the puncturing patterns in (B) of the 320 MHz (that is, 240 MHz puncturing is incompatible). Specifically, a PAPR value of the LTF1x320M sequence in puncturing pattern 1 for the 320 MHz is 7.5364 dB.

[00223] 2-3. There is another possible LTF1x320M sequence = [LTF1x160M 0₂₃ –

LTF1x160M]. LTF1x160M is a 160 MHz 1x LTF sequence in the 802.11ax standard. For a specific sequence, refer to the 802.11ax standard.

[00224] The LTF1x320M sequence has relatively low PAPR values in various puncturing patterns for the 320 MHz.

5 **[00225]** For example, a PAPR value of the LTF1x320M sequence in a puncturing pattern in the puncturing patterns in (A) of the 320 MHz is 9.4002 dB. PAPR values in the other puncturing patterns each are less than 9.4002 dB. For example, a PAPR value is 8.4364 dB in puncturing pattern 1.

[00226] For another example, in the puncturing patterns in (B) of the 320 MHz (that is, 240 MHz puncturing is incompatible), PAPR values of the LTF1x320M sequence in puncturing patterns 1 to 13 for the 320 MHz are listed in table 15 below.

Table 15

Sequence:	PAPR [dB]
LTF1x320M = [LTF1x160M 0 ₂₃ -LTF1x160M]	
Pattern 1: 320 MHz [1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1]	8.4364
Pattern 2: 280 MHz [x x 1 1 1 1 1 1 1 1 1 1 1 1 1 1]	8.6954
Pattern 3: 280 MHz [1 1 x x 1 1 1 1 1 1 1 1 1 1 1 1]	8.3911
Pattern 4: 280 MHz [1 1 1 1 x x 1 1 1 1 1 1 1 1 1 1]	8.6469
Pattern 5: 280 MHz [1 1 1 1 1 1 x x 1 1 1 1 1 1 1 1]	8.1835
Pattern 6: 280 MHz [1 1 1 1 1 1 1 1 x x 1 1 1 1 1 1]	8.202
Pattern 7: 280 MHz [1 1 1 1 1 1 1 1 1 1 x x 1 1 1 1]	8.1564
Pattern 8: 280 MHz [1 1 1 1 1 1 1 1 1 1 1 1 x x 1 1]	8.9977
Pattern 9: 280 MHz [1 1 1 1 1 1 1 1 1 1 1 1 1 1 x x]	8.2719
Pattern 10: 240 MHz [1 1 1 1 x x x x 1 1 1 1 1 1 1 1]	7.7825
Pattern 11: 240 MHz [1 1 1 1 1 1 1 1 x x x x 1 1 1 1]	8.0355
Pattern 12: 240 MHz [1 1 1 1 1 1 1 1 1 1 1 1 x x x x]	7.7825
Pattern 13: 240 MHz [x x x x 1 1 1 1 1 1 1 1 1 1 1 1]	7.8234
Pattern 8 has a maximum PAPR value.	8.9977

[00227] 2-4. There is another possible LTF1x320M sequence = [LTF1x80MHz_{left} 0 LTF1x80MHz_{right} 0₂₃ -LTF1x80MHz_{left} 0 -LTF1x80MHz_{right} 0₂₃ -LTF1x80MHz_{left} 0 -LTF1x80MHz_{right} 0₂₃ -LTF1x80MHz_{left} 0 LTF1x80MHz_{right}]. LTF1x80MHz_{left} is an 80MHz_{left} 1x LTF sequence in the 802.11ax standard. For a specific sequence, refer to the 802.11ax standard.

5 LTF1x80MHz_{right} is an 80MHz_{right} 1x LTF sequence in the 802.11ax standard. For a specific sequence, refer to the 802.11ax standard.

[00228] A PAPR value of the LTF1x320M sequence in puncturing pattern 1 in the puncturing patterns in (A) of the 320 MHz is 8.1866 dB.

[00229] 2-5. There is another possible LTF1x320M sequence = [LTF1x80MHz_{left} 0 LTF1x80MHz_{right} 0₂₃ LTF1x80MHz_{left} 0 LTF1x80MHz_{right} 0₂₃ -LTF1x80MHz_{left} 0 -LTF1x80MHz_{right} 0₂₃ -LTF1x80MHz_{left} 0 -LTF1x80MHz_{right}]. LTF1x80MHz_{left} is an 80MHz_{left} 1x LTF sequence in the 802.11ax standard. For a specific sequence, refer to the 802.11ax standard. LTF1x80MHz_{right} is an 80MHz_{right} 1x LTF sequence in the 802.11ax standard. For a specific sequence, refer to the 802.11ax standard.

15 **[00230]** A PAPR value of the LTF1x320M sequence in a puncturing pattern in the puncturing patterns in (A) of the 320 MHz is 9.0837 dB. PAPR values in the other puncturing patterns each are less than 9.0837 dB.

[00231] 2-6. There is another possible LTF1x320M sequence = [LTF1x80MHz_{left} 0 -LTF1x80MHz_{right} 0₂₃ -LTF1x80MHz_{left} 0 LTF1x80MHz_{right} 0₂₃ LTF1x80MHz_{left} 0 LTF1x80MHz_{right} 0₂₃ LTF1x80MHz_{left} 0 LTF1x80MHz_{right}]. LTF1x80MHz_{left} is an 80MHz_{left} 1x LTF sequence in the 802.11ax standard. For a specific sequence, refer to the 802.11ax standard. LTF1x80MHz_{right} is an 80MHz_{right} 1x LTF sequence in the 802.11ax standard. For a specific sequence, refer to the 802.11ax standard.

25 **[00232]** A PAPR value of the LTF1x320M sequence in puncturing pattern 1 for the 320 MHz is 6.2230 dB.

[00233] 2-7. There is another possible LTF1x320M sequence = [LTF1x80MHz_{left} 0 -LTF1x80MHz_{right} 0₂₃ LTF1x80MHz_{left} 0 LTF1x80MHz_{right} 0₂₃ LTF1x80MHz_{left} 0 LTF1x80MHz_{right} 0₂₃ -LTF1x80MHz_{left} 0 -LTF1x80MHz_{right}]. LTF1x80MHz_{left} is an 80MHz_{left} 1x LTF sequence in the 802.11ax standard. For a specific sequence, refer to the 802.11ax standard. LTF1x80MHz_{right} is an 80MHz_{right} 1x LTF sequence in the 802.11ax standard. For a specific sequence, refer to the 802.11ax standard.

[00234] PAPR values of the LTF1x320M sequence in puncturing patterns 1 to 13 in the puncturing patterns in (B) of the 320 MHz are listed in the following table.

Sequence: LTF1x320M = [LTF1x80MHz _{left} 0 –LTF1x80MHz _{right} 0 ₂₃ LTF1x80MHz _{left} 0 LTF1x80MHz _{right} 0 ₂₃ LTF1x80MHz _{left} 0 LTF1x80MHz _{right} 0 ₂₃ –LTF1x80MHz _{left} 0 – LTF1x80MHz _{right}]	PAPR [dB]
Pattern 1: 320 MHz [1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1]	7.2138
Pattern 2: 280 MHz [x x 1 1 1 1 1 1 1 1 1 1 1 1 1 1]	8.3602
Pattern 3: 280 MHz [1 1 x x 1 1 1 1 1 1 1 1 1 1 1 1]	7.1859
Pattern 4: 280 MHz [1 1 1 1 x x 1 1 1 1 1 1 1 1 1 1]	8.0696
Pattern 5: 280 MHz [1 1 1 1 1 1 x x 1 1 1 1 1 1 1 1]	6.7074
Pattern 6: 280 MHz [1 1 1 1 1 1 1 1 x x 1 1 1 1 1 1]	8.1376
Pattern 7: 280 MHz [1 1 1 1 1 1 1 1 1 1 x x 1 1 1 1]	6.7785
Pattern 8: 280 MHz [1 1 1 1 1 1 1 1 1 1 1 1 x x 1 1]	7.8276
Pattern 9: 280 MHz [1 1 1 1 1 1 1 1 1 1 1 1 1 1 x x]	7.3592
Pattern 10: 240 MHz [1 1 1 1 x x x 1 1 1 1 1 1 1 1]	8.1866
Pattern 11: 240 MHz [1 1 1 1 1 1 1 1 x x x 1 1 1 1]	7.4535
Pattern 12: 240 MHz [1 1 1 1 1 1 1 1 1 1 1 1 x x x x]	8.1341
Pattern 13: 240 MHz [x x x x 1 1 1 1 1 1 1 1 1 1 1 1]	7.5154
Pattern 2 has a maximum PAPR value.	8.3602

[00235] 3. 2x LTF sequence in the 240 MHz bandwidth (referred to as an LTF2x240M sequence for short)

[00236] 3-1. There is a possible LTF2x240M sequence = [LTF2x80M 0₂₃ LTF2x80M 0₂₃ LTF2x80M]. LTF2x80M is an 80 MHz 2x LTF sequence in the 802.11ax standard. For a specific sequence, refer to the 802.11ax standard.

[00237] The LTF2x240M sequence has relatively low PAPR values in various cases (including a full bandwidth of the 240 MHz, various puncturing patterns for the 240 MHz, and various multiple RU combinations for the 240 MHz) in table A of the 240 MHz. For example, a PAPR value of the LTF2x240M sequence in the full bandwidth, a puncturing pattern, or an RU (or a

multiple RU combination) is 10.9621 dB. PAPR values in the other puncturing patterns each are less than 10.9621 dB. For example, a PAPR value is 10.9621 dB in the full bandwidth or puncturing pattern 1.

[00238] The sequence has relatively low PAPR values in various cases (including a full bandwidth of the 240 MHz, various puncturing patterns for the 240 MHz, and various multiple RU combinations for the 240 MHz) in table A of the 240 MHz.

[00239] For example, the sequence has the following PAPR values on RUs (including a plurality of RU combinations or single RUs) in the 1st 80 MHz, the 2nd 80 MHz, and the 3rd 80 MHz.

[00240] PAPR value table for the RUs in the 1st 80 MHz, the 2nd 80 MHz, and the 3rd 80 MHz:

4.	4.	4.	4.	4.	4.	4.	4.	4.	4.	5.	6.	5.	6.	5.	4.	7.	4.	5.	5.	4.	7.	4.	5.	6.	5.	6.	5.	4.	4.	4.	4.	4.	4.	4.	RU
4	4	4	4	4	4	4	4	4	4	8	9	8	9	6	7	9	7	7	8	7	9	7	6	9	8	9	8	4	4	4	4	4	4	26	
6	6	6	6	6	6	6	6	6	6	4	8	4	8	3	6	4	6	6	4	6	4	6	3	8	4	8	4	6	6	6	6	6			
0	0	0	0	0	0	0	0	0	0	9	0	9	0	7	7	5	7	2	9	7	5	7	7	0	9	0	9	0	0	0	0	0	0		
5	5	5	5	5	5	5	5	5	5	4	9	4	9	4	7	4	7	5	4	7	4	7	4	9	4	9	4	5	5	5	5	5	5		
4.69	4.69					4.69	4.69	7.43	7.43						7.43	5.93	5.87	7.43					7.43	7.43	4.69	4.69					4.69	4.69	RU		
42	42					42	42	39	39						39	01	86	39					39	39	42	42					42	42	52		
5.42						5.4108		6.4299							6.7073		6.4895						6.4299		5.4108						5.42		RU		
																																		106	
5.5768								8.2386										7.3104									5.5768							RU	
																																		242	
7.3467																																		RU	
																																		484	
6.5186																																		RU	
																																		996	
5.941								6.3682										6.3682									5.941							RU	
																																		26+	
																																		RU	
																																		52	
6.2519								6.6061										6.6438									6.2519							RU	
																																		26+	

				RU 106
8.54	8.6933	9.6745	8.1652	RU 242 +R U48 4
8.5308				RU 242 +R U24 2

[00241] As shown in FIG. 4, in a row for RU52, there is one RU26 between the 2nd RU52 and the 3rd RU52, one RU26 between the 6th RU52 and the 7th RU52, one RU26 between the 10th RU52 and the 11th RU52, and one RU26 between the 14th RU52 and the 15th RU52. Accordingly, a value at a corresponding location in the row for RU52 in the table represents a PAPR value on RU26 at the corresponding location.

[00242] Similarly, as shown in FIG. 4, in a row for RU106, there is one RU26 between the 1st RU106 and the 2nd RU106, one RU26 between the 3rd RU106 and the 4th RU106, one RU26 between the 5th RU106 and the 6th RU106, and one RU26 between the 7th RU106 and the 8th RU106. Accordingly, a value at a corresponding location in the row for RU106 in the table represents a PAPR value on RU26 at the corresponding location.

[00243] It should be noted that, values from left to right in the 1st row of the foregoing table are sequentially PAPR values on the 1st RU26 to the 36th RU26 from left to right in 80 MHz for the sequence. Values from left to right in the 2nd row of the foregoing table are sequentially PAPR values on the 1st RU52 to the 16th RU52 from left to right in 80 MHz for the sequence. Values from left to right in the 3rd row of the foregoing table are sequentially PAPR values on the 1st RU106 to the 8th RU106 from left to right in 80 MHz for the sequence. Values from left to right in the 4th row of the foregoing table are sequentially PAPR values on the 1st RU242 to the 4th RU242 from left to right in 80 MHz for the sequence. Values from left to right in the 5th row of the foregoing

table are sequentially PAPR values on the 1st RU484 and the 2nd RU484 from left to right in 80 MHz for the sequence. A value in the 6th row of the foregoing table is a PAPR value on an RU996 in 80 MHz for the sequence. Values in the 7th row of the foregoing table are PAPR values on the 1st RU26+RU52 to the 4th RU26+RU52 in each 80 MHz for the sequence. Values in the 8th row of the foregoing table are PAPR values on the 1st RU26+RU106 to the 4th RU26+RU106 in each 80 MHz for the sequence. Values in the 9th row of the foregoing table are PAPR values on the 1st RU242+RU484 to the 4th RU242+RU484 in each 80 MHz for the sequence. A value in the 10th row of the foregoing table is a PAPR value on an RU combination (the combination is RU242+RU242, which is formed by the 1st RU242 and the 4th RU242 in each 80 MHz) in the 80 MHz for the sequence.

[00244] It should be understood that, a correspondence between a PAPR value and an RU in the foregoing table is applicable to a PAPR value table for other RUs of 80 MHz in this specification. In other words, PAPR values in a PAPR value table for other RUs of 80 MHz in this specification one to one correspond to the RUs described in the previous paragraph. The following description provides only PAPR values in a table. A correspondence between a PAPR value and an RU in the table is not described again.

[00245] For another example, the sequence has the following PAPR values on other RUs in more than 80 MHz (namely, RU combinations) in table A.

7.7	9.1	7.7	9.0	7.7	9.1	7.7	9.05	RU484+RU996															
723	804	723	511	723	804	723	11																
9.8	8.7	8.9	10.	9.8	8.5	9.3	10.3	9.89	8.7	8.92	10.4	9.86	8.57	9.32	10.36	RU242+							
921	33	256	467	654	781	201	64	21	33	56	67	54	81	01	4	RU484+ RU996							
9.9264		10.716		9.9264		10.716		9.9264		10.7	RU484+RU2*996												
										16													
9.2012		9.422		9.2012				RU2*996															
10.9621								RU3*996															

[00246] It should be noted that, values from left to right in the 1st row of the foregoing table are sequentially PAPR values on the RU combination in the 1st mode to the RU combination in the 8th mode of RU484+RU996 in the 240 MHz described above. Values from left to right in the 2nd row

of the table are sequentially PAPR values on the RU combination in the 1st mode to the RU combination in the 16th mode of RU242+RU484+RU996 in the 240 MHz described above. Values from left to right in the 3rd row of the table are sequentially PAPR values on the RU combination in the 1st mode to the RU combination in the 6th mode of RU484+2*RU996 in the 240 MHz described above. Values from left to right in the 4th row of the table are sequentially PAPR values on the RU combination in the 1st mode to the RU combination in the 3rd mode of 2*RU996 in the 240 MHz described above. A value in the 5th row of the table is a PAPR value on 3*RU996 in the 240 MHz described above.

[00247] It should be understood that, a correspondence between a PAPR value of an RU in more than 80 MHz (namely, an RU combination) in the foregoing table and the RU combination is applicable to a PAPR value table for other RUs in more than 80 MHz in this specification. In other words, PAPR values in a PAPR value table for other RUs in more than 80 MHz (namely, RU combinations) one to one correspond to the RU combinations described in the previous paragraph. The following description provides only PAPR values in a table. A correspondence between a PAPR value and an RU combination in the table is not described again.

[00248] 3-2. There is a possible LTF2x240M sequence = [LTF2x160M $\mathbf{0}_{23}$ LTF2x80M]. LTF2x160M is a 160 MHz 2x LTF sequence in the 802.11ax standard. LTF2x80M is an 80 MHz 2x LTF sequence in the 802.11ax standard. For specific sequences, refer to the 802.11ax standard.

[00249] The LTF2x240M sequence has relatively low PAPR values in various cases (including a full bandwidth of the 240 MHz, various puncturing patterns for the 240 MHz, and various multiple RU combinations for the 240 MHz) in table A of the 240 MHz. A PAPR value of the LTF2x240M sequence in the full bandwidth or puncturing pattern 1 for the 240 MHz is 9.6089 dB.

[00250] The sequence has relatively low PAPR values in various cases (including a full bandwidth of the 240 MHz, various puncturing patterns for the 240 MHz, and various multiple RU combinations for the 240 MHz) in table A of the 240 MHz.

[00251] For example, the sequence has the following PAPR values on RUs (including a plurality of RU combinations or single RUs) in the 1st 80 MHz, the 2nd 80 MHz, and the 3rd 80 MHz.

[00252] PAPR value table for the RUs in the 1st 80 MHz and the 3rd 80 MHz:

7.071		6.8051		RU484
7.5891				RU996
5.941	6.3682	6.3682	5.941	RU26+RU5 2
6.2519	6.6438	6.6438	6.2519	RU26+RU1 06
8.2212	9.036	7.9638	7.8216	RU242+RU 484
8.4048				RU242+RU 242

[00254] The sequence has the following PAPR values on other RUs in more than 80 MHz (namely, RU combinations) in table A:

8.57	9.72	8.85	7.50	8.54	8.11	8.20	9.45	RU484+RU996								
79	42	7	67	18	22	65	54									
8.42	8.73	9.45	8.52	9.24	9.01	7.45	8.49	9.35	8.99	7.84	8.47	8.79	8.73	8.94	8.69	RU2
93	76	43	75	2	52	05	96	07	47	46	55	5	76	79	84	RU2 42+ RU4 84+ RU9 96
9.6089								RU3*996								

5 **[00255]** 3-3. There is a possible LTF2x240M sequence = [LTF2x160M $\mathbf{0}_B$ -LTF2x80M].

LTF2x160M is a 160 MHz 2x LTF sequence in the 802.11ax standard. LTF2x80M is an 80 MHz 2x LTF sequence in the 802.11ax standard. For specific sequences, refer to the 802.11ax standard.

10 **[00256]** The LTF2x240M sequence has relatively low PAPR values in various cases (including a full bandwidth of the 240 MHz, various puncturing patterns for the 240 MHz, and various multiple RU combinations for the 240 MHz) in table A of the 240 MHz. For example, a PAPR value of the LTF2x240M sequence in the full bandwidth, a puncturing pattern, or an RU (or a

multiple RU combination) is 9.7242 dB. PAPR values in the other puncturing patterns each are less than 9.7242 dB.

[00257] The sequence has relatively low PAPR values in various cases (including a full bandwidth of the 240 MHz, various puncturing patterns for the 240 MHz, and various multiple

5 RU combinations for the 240 MHz) in table A of the 240 MHz.

[00258] For example, the sequence has the following PAPR values on RUs (including a plurality of RU combinations or single RUs) in the 1st 80 MHz, the 2nd 80 MHz, and the 3rd 80 MHz.

[00259] PAPR table for the RUs in the 1st 80 MHz and the 3rd 80 MHz:

[illegible]

10 **[00260]** PAPR table for the RUs in the 2nd 80 MHz:

[illegible]

4	4	4	4	4	4	4	4	4	4	8	9	8	9	6	7	9	7	8	8	7	9	7	6	9	8	9	8	4	4	4	4	4	4	4	4	
6	6	6	6	6	6	6	6	6	6	4	8	4	8	3	6	4	6	4	4	6	4	6	3	8	4	8	4	6	6	6	6	6	6	6	6	
0	0	0	0	0	0	0	0	0	0	9	0	9	0	7	7	5	7	9	9	7	5	7	7	0	9	0	9	0	0	0	0	0	0	0	0	
5	5	5	5	5	5	5	5	5	5	4	9	4	9	4	7	4	7	4	4	7	4	7	4	9	4	9	4	5	5	5	5	5	5	5	5	
4.6	4.6				4.6	4.6	7.4	7.4		7.4	5.8	5.8	7.4		7.4	7.4	4.6	4.6			4.6	4.6			4.6	4.6									RU52	
942	942				942	942	339	339		339	786	786	339		339	339	942	942			942	942			942	942										
5.42					5.4108	6.4299				6.4895	6.4895				6.4299	5.4108							6.4299	5.4108					5.42						RU106	
5.5768						7.3876						7.3104						5.5768						RU242												
7.071										6.8051										RU484																
7.5891																		RU996																		
5.941						6.3682						6.3682						5.941						RU26+RU5 2												
6.2519						6.6438						6.6438						6.2519						RU26+RU1 06												
8.2212						9.036						7.9638						7.8216						RU242+RU 484												
8.4048																		RU242+RU 242																		

[00261] The sequence has the following PAPR values on other RUs in more than 80 MHz (namely, RU combinations or single RUs) in table A:

8.57	9.72	8.85	7.50	9.10	7.91	8.57	9.47	RU484+RU996								
79	42	7	67	64	18	79	13									
8.42	8.73	9.45	8.52	9.24	9.01	7.45	8.49	9.05	9.23	8.81	8.68	8.63	8.32	9.4	8.1	RU242
93	76	43	75	2	52	05	96	68	74	24	43	25	52	71	41	+RU48
														8	3	4+RU9
																96
8.8238		9.049		9.7195		9.5351		8.7437		9.04	RU484+RU2*996					
										9						
7.8267		9.4879		7.927				RU2*996								

98	88	96	02	48	51	05											996
8.73	8.40	9.32	9.04	8.67	7.76	8.83	8.66	8.31	7.87	8.59	8.77	8.25	8.50	9.08	8.84	RU242+RU	
17	39	31	19	62	61	47	83	35	58	74	12	48	53	97	59	484+RU996	
9.3606																RU3*996	

[00269] 3-5. There is a possible LTF2x240M sequence = [LTF2x80M_{part1} –LTF2x80M_{part2} –LTF2x80M_{part3} –LTF2x80M_{part4} LTF2x80M_{part5} 0₂₃ –LTF2x80M_{part1} LTF2x80M_{part2} –LTF2x80M_{part3} –LTF2x80M_{part4} LTF2x80M_{part5} 0₂₃ LTF2x80M_{part1} LTF2x80M_{part2} –LTF2x80M_{part3} LTF2x80M_{part4} LTF2x80M_{part5}]. LTF2x80M_{part1}, LTF2x80M_{part2}, LTF2x80M_{part3}, LTF2x80M_{part4}, and LTF2x80M_{part5} are respectively an 80MHz_{part1} 2x LTF sequence, an 80MHz_{part2} 2x LTF sequence, an 80MHz_{part3} 2x LTF sequence, an 80MHz_{part4} 2x LTF sequence, and an 80MHz_{part5} 2x LTF sequence in the 802.11ax standard. For specific sequences, refer to the 802.11ax standard.

[00270] The LTF2x240M sequence has relatively low PAPR values in various cases (including a full bandwidth of the 240 MHz, various puncturing patterns for the 240 MHz, and various multiple RU combinations for the 240 MHz) in table A of the 240 MHz. For example, a PAPR value of the LTF2x240M sequence in a puncturing pattern is 9.6179 dB. PAPR values in the other puncturing patterns each are less than 9.6179 dB.

[00271] The sequence has relatively low PAPR values in various cases (including a full bandwidth of the 240 MHz, various puncturing patterns for the 240 MHz, and various multiple RU combinations for the 240 MHz) in table A of the 240 MHz.

[00272] For example, the sequence has the following PAPR values on RUs (including a plurality of RU combinations or single RUs) in the 1st 80 MHz, the 2nd 80 MHz, and the 3rd 80 MHz.

[00273] Table for the RUs in the 1st 80 MHz:

4.4.4.4.4.4.4.4.4.5.6.5.6.5.4.7.4.5.5.4.7.4.5.6.5.6.5.4

5.42		5.4108	6.4299		6.7073	6.4895		6.4299	5.4108		5.42	RU106
5.5768			8.2386			7.3104			5.5768			RU242
7.4499						6.8051						RU484
6.6768												RU996
5.941			6.3682			6.3682			5.941			RU26+RU5 2
6.2519			6.6061			6.6438			6.2519			RU26+RU1 06
8.0772			9.6179			8.6916			8.8069			RU242+RU 484
8.5308												RU242+RU 242

[00274] Table for the RUs in the 2nd 80 MHz:

[illegible]

942	942		942	942	339	339		339	301	786	339		339	339	942	942		942	942	
5.4199			5.4109		6.4299			6.7073		6.4895			6.4299		5.4109			5.4199		RU106
5.5768					8.2385					7.3114					5.5768					RU242
7.3472										6.5837										RU484
6.5164																				RU996
5.9411					6.3682					6.3682					5.9411					RU26+RU5 2
6.2519					6.6065					6.644					6.2519					RU26+RU1 06
8.5628					8.6875					9.6763					8.1829					RU242+RU 484
8.5308																				RU242+RU 242

[00282] For another example, the sequence has the following PAPR values on other RUs in more than 80 MHz (namely, RU combinations) in table B.

7.7723		9.1539		7.7919		9.0583		7.7723		9.1539		7.7919		9.0583		RU484+RU 996
9.93 66	8.68 78	8.93 45	10.4 92	9.86 54	8.53 46	9.40 97	10.3 64	9.93 66	8.68 78	8.93 45	10.4 92	9.86 54	8.53 46	9.40 97	10.3 64	RU242+RU 484+RU996
9.0793		9.991		10.152		10.714		10.02		10.931		9.0257		9.6559		RU484+RU 3*996
10.107		10.107		8.6961		8.6961										RU3*996
8.9611		9.9059		9.5392		10.689		9.3293		10.153						RU484+RU 2*996
9.3124		10.461		9.6129		10.431		8.9207		10.027						
8.1092		9.0498		9.0633		9.8325		7.943		9.079						
7.9181		8.9584		9.0418		9.9572		8.2538		8.8582						
9.2012		9.422		9.4879												RU2*996
9.4879		9.422		9.2012												

9.422	9.4879	9.2012	
9.2012	9.4879	9.422	
10.1401			RU4*996

[00283] It should be noted that, values from left to right in the 1st row of the foregoing table are sequentially PAPR values on the RU combination in the 1st mode to the RU combination in the 8th mode of RU484+RU996 in the 320 MHz described above. Values from left to right in the 2nd row of the table are sequentially PAPR values on the RU combination in the 1st mode to the RU combination in the 16th mode of RU242+RU484+RU996 in the 320 MHz described above. Values from left to right in the 3rd row of the table are sequentially PAPR values on the RU combination in the 1st mode to the RU combination in the 8th mode of RU484+3*RU996 in the 320 MHz described above. Values from left to right in the 4th row of the table are sequentially PAPR values on the RU combination in the 1st mode to the RU combination in the 4th mode of 3*RU996 in the 320 MHz described above. Values from left to right in the 5th row of the table are sequentially PAPR values on the RU combination in the 1st mode to the RU combination in the 24th mode of RU484+2*RU996 in the 320 MHz described above. Values from left to right in each sub-row of the 5th row are sequentially PAPR values on the RU combination in the 1st mode to the RU combination in the 6th mode of RU484+2*RU996 in each 80 MHz of the 320 MHz. Values from left to right in the 6th row of the table are sequentially PAPR values on the RU combination in the 1st mode to the RU combination in the 12th mode of 2*RU996 in the 320 MHz described above. Values from left to right in each sub-row of the 6th row are sequentially PAPR values on the RU combination in the 1st mode to the RU combination in the 3rd mode of 2*RU996 in each 80 MHz of the 320 MHz. A value in the 7th row of the table is a PAPR value on the 4*RU996 combination in the 320 MHz described above.

[00284] It should be understood that, a correspondence between a PAPR value of an RU in more than 80 MHz (namely, an RU combination) in the foregoing table and the RU combination is applicable to a PAPR value table for other RUs in more than 80 MHz in this specification. In other words, PAPR values in a PAPR value table for other RUs in more than 80 MHz (namely, RU combinations) one to one correspond to the RU combinations described in the previous paragraph. The following description provides only PAPR values in a table. A correspondence between a PAPR value and an RU combination in the table is not described again.

93	76	18	75	46	86	02	44	93	76	18	75	46	86	02	44	484+RU996
9.6939		10.684		10.19		9.1133		9.6939		10.34		10.034		9.4725		RU484+RU 3*996
8.968		9.5228		8.7432		9.5228										RU3*996
8.1123		9.8583		8.441		9.1406		10.129		9.5351						RU484+RU
10.555		11.202		9.392		8.1659		9.1577		9.0528						2*996
8.8054		9.1334		9.7195		9.5351		8.9477		9.049						
9.2871		8.1322		10.555		10.932		9.1577		8.1294						
7.8599		7.6716		9.4879												RU2*996
10.382		7.6716		7.8599												
7.8147		9.4879		7.8599												
7.8599		10.382		7.8147												
10.2552																RU4*996

[00297] 4-4. There is a possible LTF2x320M sequence = [LTF2x80M_{part1} LTF2x80M_{part2} – LTF2x80M_{part3} LTF2x80M_{part4} LTF2x80M_{part5} 0_{23} LTF2x80M_{part1} LTF2x80M_{part2} – LTF2x80M_{part3} –LTF2x80M_{part4} –LTF2x80M_{part5} 0_{23} LTF2x80M_{part1} –LTF2x80M_{part2} LTF2x80M_{part3} LTF2x80M_{part4} –LTF2x80M_{part5} 0_{23} LTF2x80M_{part1} LTF2x80M_{part2} – LTF2x80M_{part3} LTF2x80M_{part4} LTF2x80M_{part5}]. LTF2x80M_{part1}, LTF2x80M_{part2}, LTF2x80M_{part3}, LTF2x80M_{part4}, and LTF2x80M_{part5} are respectively an 80MHz_{part1} 2x LTF sequence, an 80MHz_{part2} 2x LTF sequence, an 80MHz_{part3} 2x LTF sequence, an 80MHz_{part4} 2x LTF sequence, and an 80MHz_{part5} 2x LTF sequence in the 802.11ax standard. For specific sequences, refer to the 802.11ax standard.

[00298] The LTF2x320M sequence has relatively low PAPR values in various cases (including a full bandwidth of the 320 MHz, various puncturing patterns for the 320 MHz, and various multiple RU combinations for 320 MHz) in table B of the 320 MHz.

[00299] For example, the sequence has the following PAPR values on RUs (a plurality of RU combinations or single RUs) in the 1st 80 MHz to the 4th 80 MHz.

[00300] Table for the RUs in the 1st and the 4th 80 MHz:

[illegible]

[00301] Table for the RUs in the 2nd 80 MHz:

[illegible]

6	6	6	6	6	6	6	6	6	4	8	4	8	3	6	4	6	6	4	6	4	6	3	8	4	8	4	6	6	6	6	6	6	6	6	6	6	6	
0	0	0	0	0	0	0	0	0	9	0	9	0	7	7	5	7	2	9	7	5	7	7	0	9	0	9	0	0	0	0	0	0	0	0	0	0	0	
5	5	5	5	5	5	5	5	5	4	9	4	9	4	7	4	7	5	4	7	4	7	4	9	4	9	4	5	5	5	5	5	5	5	5	5	5	5	
4.6	4.6				4.6	4.6			7.4	7.4				7.4	5.9	5.8	7.4					7.4	7.4			4.6	4.6					4.6	4.6				RU52	
942	942				942	942			339	339				339	301	786	339					339	339			942	942					942	942					
5.4199					5.4109				6.4299					6.7073		6.4895						6.4299				5.4109						5.4199						RU106
5.5768					8.2385					7.3114					5.5768										RU242													
7.4499										6.8051															RU484													
6.6821																									RU996													
5.9411					6.3682					6.3682					5.9411					RU26+RU5 2																		
6.2519					6.6065					6.644					6.2519					RU26+RU1 06																		
8.0759					9.6228					8.6909					8.8288					RU242+RU 484																		
8.5308																									RU242+RU 242													

[00308] Table for the RUs in the 2nd 80 MHz:

4.	4.	4.	4.	4.	4.	4.	4.	4.	4.	5.	6.	5.	6.	5.	4.	7.	4.	5.	5.	4.	7.	4.	5.	6.	5.	6.	5.	4.	4.	4.	4.	4.	4.	4.	4.	4.	4.	RU26
4	4	4	4	4	4	4	4	4	4	4	8	9	8	9	6	7	9	7	8	8	7	9	7	6	9	8	9	8	4	4	4	4	4	4	4	4	4	
6	6	6	6	6	6	6	6	6	6	4	8	4	8	3	6	4	6	4	4	6	4	6	3	8	4	8	4	6	6	6	6	6	6	6	6	6	6	
0	0	0	0	0	0	0	0	0	0	9	0	9	0	7	7	5	7	9	9	7	5	7	7	0	9	0	9	0	0	0	0	0	0	0	0	0	0	
5	5	5	5	5	5	5	5	5	5	4	9	4	9	4	7	4	7	4	4	7	4	7	4	9	4	9	4	5	5	5	5	5	5	5	5	5	5	
4.6	4.6				4.6	4.6			7.4	7.4				7.4	5.8	5.8	7.4						7.4	7.4	4.6	4.6					4.6	4.6					RU52	
942	942				942	942			339	339				339	786	786	339						339	339	942	942					942	942						
5.4199					5.4109				6.4299					6.4895		6.4895							6.4299			5.4109					5.4199							RU106
5.5768										7.3876					7.3114					5.5768					RU242													
7.0698															6.8051															RU484								

								3*996
9.9757	8.6326	8.9312	8.9612					RU3*996
9.3369	9.5801	9.5133	9.0196	10.118	10.075			RU484+RU
8.9206	9.594	9.3901	9.6588	8.3	8.6299			2*996
9.265	8.6646	9.5535	9.4094	8.4876	9.2206			
10.213	9.2738	9.9448	9.3384	8.4989	8.9168			
9.4526	10.008	9.651						RU2*996
9.2615	10.008	7.4103						
7.4901	9.651	7.4103						
9.4526	9.2615	7.4901						
9.6608								RU4*996

[00312] 4-6. There is another possible LTF2x320M sequence = [LTF2x80M_{part1}, LTF2x80M_{part2}, $(-1)*\text{LTF2x80M}_{\text{part3}}$, LTF2x80M_{part4}, LTF2x80M_{part5}, 0₂₃, $(-1)*\text{LTF2x80M}_{\text{part1}}$, LTF2x80M_{part2}, $(-1)*\text{LTF2x80M}_{\text{part3}}$, $(-1)*\text{LTF2x80M}_{\text{part4}}$, LTF2x80M_{part5}, 0₂₃, $(-1)*\text{LTF2x80M}_{\text{part1}}$, $(-1)*\text{LTF2x80M}_{\text{part2}}$, LTF2x80M_{part3}, LTF2x80M_{part4}, LTF2x80M_{part5}, 0₂₃, LTF2x80M_{part1}, $(-1)*\text{LTF2x80M}_{\text{part2}}$, $(-1)*\text{LTF2x80M}_{\text{part3}}$, $(-1)*\text{LTF2x80M}_{\text{part4}}$, LTF2x80M_{part5}].

[00313] The sequence has relatively low PAPR values in various cases (including a full bandwidth of the 320 MHz, various puncturing patterns for the 320 MHz, and various multiple RU combinations for the 320 MHz) in table B of the 320 MHz.

[00314] Specifically, PAPR values on RUs (a plurality of RU combinations or single RUs) in the 1st 80 MHz to the 4th 80 MHz are provided below. The RUs are sorted in sequence. For example, RU26 in the 1st 80 MHz are sequentially the 1st to the 36th RU26 in the 320 MHz bandwidth based on an order in the table; and RU26 in the 2nd 80 MHz are sequentially the 37th to the 72nd RU26 in the 320 MHz bandwidth based on the order in the table.

4.	4.	4.	4.	4.	4.	4.	4.	4.	4.	5.	6.	5.	6.	5.	4.	7.	4.	5.	5.	4.	7.	4.	5.	6.	5.	6.	5.	4.	4.	4.	4.	4.	4.	4.	4.	4.	4.	RU26
4	4	4	4	4	4	4	4	4	4	8	9	8	9	6	7	9	7	8	7	7	9	7	6	9	8	9	8	4	4	4	4	4	4	4	4	4	46	
6	6	6	6	6	6	6	6	6	6	4	8	4	8	3	6	4	6	4	6	6	4	6	3	8	4	8	4	6	6	6	6	6	6	6	6	05		
0	0	0	0	0	0	0	0	0	0	9	0	9	0	7	7	5	7	9	2	7	5	7	7	0	9	0	9	0	0	0	0	0	0	0	0	0		

				RU484
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[illegible]RU52RU106RU242RU484RU996RU26+RU52RU26+RU106RU242+RU484[illegible]RU52RU106RU242RU484RU996

5.9411	6.3682	6.3682	5.9411	RU26+R U52
6.2519	6.6065	6.644	6.2519	RU26+R U106
8.0759	9.6228	8.6909	8.8288	RU242+R U484

[00315] The sequence has the following PAPR values on other RUs in more than 80 MHz (namely, RU combinations or single RUs) in table B:

8.226	9.2131	9.4269	8.0198	7.8088	8.8753	9.3779	8.3036	RU484+RU996
7.6781				7.5651				RU2*996
9.319	9.2606	8.6742	9.1361	9.4099	8.8471	9.0799	9.2767	RU484+RU3*996
9.1911	8.8715	9.4079	8.7804					RU3*996
7.7631								RU4*996

- 5 **[00316]** 4-7. There is another possible LTF2x320M sequence = [LTF2x80M_{part1}, LTF2x80M_{part2}, (−1)*LTF2x80M_{part3}, (−1)*LTF2x80M_{part4}, (−1)*LTF2x80M_{part5}, 0₂₃, (−1)*LTF2x80M_{part1}, (−1)*LTF2x80M_{part2}, (−1)*LTF2x80M_{part3}, (−1)*LTF2x80M_{part4}, (−1)*LTF2x80M_{part5}, 0₂₃, (−1)*LTF2x80M_{part1}, LTF2x80M_{part2}, LTF2x80M_{part3}, LTF2x80M_{part4}, LTF2x80M_{part5}, 0₂₃, LTF2x80M_{part1}, LTF2x80M_{part2}, LTF2x80M_{part3}, LTF2x80M_{part4},
10 LTF2x80M_{part5}].

[00317] The sequence has relatively low PAPR values in various cases (including a full bandwidth of the 320 MHz, various puncturing patterns for the 320 MHz, and various multiple RU combinations for the 320 MHz) in table B of the 320 MHz.

- 15 **[00318]** For example, the sequence has the following PAPR values on RUs (a plurality of RU combinations or single RUs) in the 1st 80 MHz to the 4th 80 MHz. Table for the RUs in the 1st 80 MHz

9.5890	RU4*996
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9.7038	9.3527	8.3182	8.8433	9.4922	9.3837	RU2*996+ RU484
9.3124	9.8853	8.8523	8.8747	8.2622	9.6814	
9.0595	10.043	8.7657	9.0575	8.9771	9.0549	
8.5889	9.4114	9.0418	9.8471	8.6334	8.8241	

[00320] 4-8. There is another possible LTF2x320M sequence = [LTF2x80M_{part1}, LTF2x80M_{part2}, (-1)*LTF2x80M_{part3}, (-1)*LTF2x80M_{part4}, (-1)*LTF2x80M_{part5}, 0₂₃, (-1)*LTF2x80M_{part1}, (-1)*LTF2x80M_{part2}, (-1)*LTF2x80M_{part3}, (-1)*LTF2x80M_{part4}, (-1)*LTF2x80M_{part5}, 0₂₃, (-1)*LTF2x80M_{part1}, LTF2x80M_{part2}, LTF2x80M_{part3}, LTF2x80M_{part4}, LTF2x80M_{part5}, 0₂₃, LTF2x80M_{part1}, LTF2x80M_{part2}, LTF2x80M_{part3}, LTF2x80M_{part4}, LTF2x80M_{part5}].

[00321] The sequence has relatively low PAPR values in various cases (including a full
10 bandwidth of the 320 MHz, various puncturing patterns for the 320 MHz, and various multiple
RU combinations for the 320 MHz) in table B of the 320 MHz.

[00322] For example, the sequence has the following PAPR values on RUs (a plurality of RU combinations or single RUs) in the 1st 80 MHz to the 4th 80 MHz. Table for the RUs in the 1st 80 MHz.

[illegible]

5.9411	6.3682	6.3682	5.9411	RU26+R U52
6.2519	6.644	6.644	6.2519	RU26+R U106
7.9972	8.0269	9.0745	8.1309	RU242+R U484

Table for the RUs in the 2nd 80 MHz[illegible]Table for the RUs in the 3rd 80 MHz

[illegible]

[00323] The sequence has the following PAPR values on other RUs in more than 80 MHz (namely, RU combinations or single RUs):

9.9503	9.4954	9.3479	9.0787	9.834	8.7716	9.4144	9.5244	RU484+RU3*996
8.7827	9.2171	8.7827	8.8965					RU3*996
9.7038	9.3527	8.3182	8.8433	9.4922	9.3837			} RU2*996+RU484
9.3124	9.8853	8.8523	8.8747	8.2622	9.3814			
9.0595	10.043	8.7657	9.0575	8.9771	9.0549			
8.5889	9.4114	9.0418	9.8471	8.6334	8.8241			
10.047	7.9376	8.9745						} RU2*996
9.4879	7.9376	7.8418						
8.6498	8.9745	7.8418						
10.047	9.4879	8.6498						
7.7723	9.0647	8.4855	9.9838	7.7723	8.0424	9.9091	7.9129	RU484+RU996
9.589								RU4*996

[00324] 5. 4x LTF sequence in the 240 MHz bandwidth (referred to as an LTF4x240M sequence for short)

[00325] 5-1. There is a possible LTF4x240M sequence = [LTF4x80M 0₂₃ LTF4x80M 0₂₃ -LTF4x80M]. LTF4x80M is an 80 MHz 4x LTF sequence in the 802.11ax standard. For a specific sequence, refer to the 802.11ax standard.

[00326] The LTF4x240M sequence has a relatively low PAPR value in a full bandwidth, a puncturing pattern, or an RU (or a multiple RU combination) in the 240 MHz. For example, a PAPR value of the sequence in the full bandwidth of 240 MHz is 9.8723 dB. PAPR values in the other puncturing patterns each are less than 9.8723 dB. The LTF4x240M sequence has relatively low PAPR values in table A of the 240 MHz. For example, a PAPR value of the sequence in a puncturing pattern or a multiple RU is 9.7535 dB. PAPR values in the other puncturing patterns each are less than 9.7535 dB.

[00327] Specifically, the sequence has the following PAPR values on RUs (a plurality of RU combinations or single RUs) in the 1st 80 MHz to the 3rd 80 MHz.

[00328] Table for the RUs in the 1st, the 2nd, and the 3rd 80 MHz:

3	3	3	3	3	3	3	3	3	6	5	6	5	6	6	7	6	6	6	5	6	5	6	6	5	6	5	3	3	3	3	3	3	3	3	RU26
7	7	7	7	7	7	7	7	7	1	9	3	2	9	1	2	3	4	0	2	0	6	5	8	2	8	6	7	7	7	7	7	7	7	7	

8	8	8	8	8	8	8	8	8	0	5	5	8	7	0	8	5	5	1	8	9	9	4	5	8	0	9	8	8	8	8	8	8	8	8	
2	2	2	2	2	2	2	2	2	7	9	6	4	7	7	8	6	6	9	4	6	9	2	3	4	0	9	2	2	2	2	2	2	2	2	
1	1	1	1	1	1	1	1	1	6	9	2	7		6	2	2	8	9	7	3	5	1	6	7	9	5	1	1	1	1	1	1	1	1	
4.96	4.43				4.96	4.43	6.79	7.14						8.47	7.41	7.49	7.00						7.80	6.92	4.96	4.43					4.96	4.43		RU52	
7	66				7	66	61	5						6	08	68	82						7	22	7	66					7	66			
5.3765					5.351		6.6952							6.4196		6.5107							5.8426		5.4753						5.4976			RU106	
5.4964					7.0805					6.9761					5.5275					RU242															
6.1863										7.3989										RU484															
6.8692															RU996																				
6.2946					6.8965					6.5092					6.4576					RU26+R U52															
6.2889					7.4226					6.9054					6.1881					RU26+R U106															
8.1143					8.522					8.1606					7.8998					RU242+ RU484															
7.4282															RU242+ RU242																				

[00329] The sequence has the following PAPR values on other RUs in more than 80 MHz (namely, RU combinations) in table A:

8.74	8.58	8.74	8.58	8.92	8.87	8.95	8.8759									RU484+R			
59	22	59	22	9	59	93										U996			
9.64	9.72	9.34	9.87	9.64	9.72	9.43	9.87	9.53	9.36	9.57	9.77	9.48	9.16	9.57	9.78	RU242+R			
77	15	63	23	77	15	33	23	75	08	95	48	69	73	95	06	U484+R			
																U996			
8.158		8.7457		9.5808		8.9032		8.158		8.698						RU484+R			
																U2*996			
9.7535		9.7047		9.5495												RU2*996			
8.9129																RU3*996			

7	7	7	7	7	7	7	7	7	7	1	9	3	2	9	1	2	3	4	0	2	0	6	5	8	2	8	6	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	
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[00334] The sequence has the following PAPR values on other RUs in more than 80 MHz (namely, RU combinations) in table A:

9.04	9.21	8.95	8.58	8.92	8.58	9.14	9.2127																														RU4 84+ RU9 96
69	27	93	22	9	22	8																															RU2 42+ RU4 84+ RU9
7.83	8.04	7.59	8.07	8.34	7.97	8.19	7.83	8.34	9.07	8.39	8.03	7.73	8.31	8.38	8.34																						
49	7	89	85	65	24	34	93	65	06	58		5	89	32	1																						

9.04 69	9.21 27	8.95 93	8.58 22	8.74 59	8.87 59	9.31 32	8.7075									RU4 84+ RU9 96
7.83 49	8.04 7	7.59 89	8.07 85	8.34 65	7.97 24	8.19 34	7.83 93	8.28 45	9.16 33	8.08 77	8.50 58	8.70 04	7.74 87	8.71 76	8.54 43	RU2 42+ RU4 84+ RU9 96
8.5636		8.5102		9.0885		8.9032		8.4782		8.6426						RU4 84+ RU2 *99 6
7.263		9.7047		7.8024												RU2 *99 6
9.219																RU3 *99 6

[00341] 5-4. There is a possible LTF4x240M sequence = [LTF4x80MHz_{left} 0 LTF4x80MHz_{right} 0₂₃ LTF4x80MHz_{left} 0 -LTF4x80MHz_{right} 0₂₃ LTF4x80MHz_{left} 0 LTF4x80MHz_{right}]. LTF4x80MHz_{left} is an 80MHz_{left} 4x LTF sequence in the 802.11ax standard. LTF4x80MHz_{right} is an 80MHz_{right} 4x LTF sequence in the 802.11ax standard. For specific sequences, refer to the 802.11ax standard.

[00342] The LTF4x240M sequence has relatively low PAPR values in table A of the 240 MHz. A PAPR value of the LTF4x240M sequence in the full bandwidth of the 240 MHz is 9.2127 dB.

[00343] The sequence has relatively low PAPR values in various cases (including a full bandwidth of the 240 MHz, various puncturing patterns for the 240 MHz, and various multiple

[00344] For example, the sequence has the following PAPR values on RUs (a plurality of RU combinations or single RUs) in the 1st 80 MHz to the 3rd 80 MHz.

[illegible]

[00346] Table for the RUs in the 2nd 80 MHz:

82

4.967	4.4366	4.967	4.4366	6.7961	7.145	8.476	7.4108	7.4968	7.0082	7.807	6.9222	4.967	4.4366	4.967	4.4366	RU52
5.3765		5.351		6.6952		6.4196		6.5107		5.8426		5.4753		5.4976		RU106
5.4964				7.0805				6.9761				5.5275				RU242
6.1863								7.3989								RU484
7.4221																RU996
6.2946				6.8965				6.5092				6.4576				RU26+RU52
6.2889				7.4226				6.9054				6.1881				RU26+RU106
8.7232				7.5843				8.369				7.94				RU242+RU484
7.7321																RU242+RU242

[00347] The sequence has the following PAPR values on other RUs in more than 80 MHz (namely, RU combinations) in table A:

9.0469	9.2127	8.9593	8.5822	8.929	8.5822	9.148	9.2127										RU484+RU996
7.8349	8.047	7.5989	8.0785	8.3465	7.9724	8.1934	7.8393	8.3465	9.0706	8.3958	8.03	7.735	8.3189	8.3832	8.341		RU242+RU484+RU996
8.9967																	RU3*996

																96
7.83 49	8.04 7	7.59 89	8.07 85	8.34 65	7.97 24	8.19 34	7.83 93	8.28 45	9.16 33	8.08 77	8.50 58	8.70 04	7.74 87	8.71 76	8.54 43	RU2 42+ RU4 84+ RU9 96
8.5636		8.5102		9.0885		8.9032		8.4782		8.6426						RU4 84+ RU2 *99 6
7.263		9.7047		7.8024												RU2 *99 6
9.219																RU3 *99 6

[00355] 6. 4x LTF sequence in the 320 MHz bandwidth (referred to as an LTF4x320M sequence for short)

[00356] 6-1. There is a possible LTF4x320M sequence = [LTF4x80M 0_{23} LTF4x80M 0_{23}

5 -LTF4x80M 0_{23} -LTF4x80M]. LTF4x80M is an 80 MHz 4x LTF sequence in the 802.11ax standard. For a specific sequence, refer to the 802.11ax standard.

[00357] The LTF4x320M sequence has relatively low PAPR values in various cases (including a full bandwidth of the 320 MHz, various puncturing patterns for the 320 MHz, and various multiple RU combinations for the 320 MHz) in table B of the 320 MHz. For example, a PAPR value of the sequence in a puncturing pattern for the 320 MHz is 10.7708 dB. PAPR values in the other puncturing patterns each are less than 10.7708 dB. For example, a PAPR value is 10.3033 dB in puncturing pattern 1.

10

[00358] Specifically, the sequence has the following PAPR values on RUs (a plurality of RU combinations or single RUs) in the 1st 80 MHz to the 4th 80 MHz.

[00359] Table for the RUs in the 1st, the 2nd, the 3rd, and the 4th 80 MHz:

3.78216676656676656656653333333333	RU26
4.9675.3767	RU52
5.37675.3516.6954	RU106
5.49647.086.9765	RU242
6.18627.4039	RU484
6.8794	RU996
6.29456.89656.50926.4576	RU26+ RU52
6.28887.42276.90536.1879	RU26+ RU106
8.11238.51818.16837.9065	RU242+ RU484
7.4446	RU242+ RU242

5 **[00360]** The sequence has the following PAPR values on other RUs in more than 80 MHz
(namely, RU combinations) in table B.

8.74	8.58	8.74	8.58	8.74	8.58	8.74	8.5822									RU484+		
59	22	59	22	59	22	59										RU996		
9.64	9.79	9.34	9.87	9.64	9.72	9.49	9.87	9.64	9.79	9.34	9.87	9.64	9.72	9.49	9.87	RU242+		
77	29	63	23	77	15	47	23	77	29	63	23	77	15	47	23	RU484+		
																RU996		

2	2	2	2	2	2	2	2	2	2	7	9	6	4	7	7	8	6	6	9	4	6	9	2	3	4	0	9	2	2	2	2	2	2	2	2	2	2	2	2	
1	1	1	1	1	1	1	1	1	1	6	9	2	7		6	2	2	8	9	7	3	5	1	6	7	9	5	1	1	1	1	1	1	1	1	1	1	1		
4.96	4.43					4.96	4.43	6.79	7.14						8.47	7.41	7.49	7.00						7.80	6.92	4.96	4.43							4.96	4.43			RU52		
7	66					7	66	62	5						6	08	68	82						7	22	7	66							7	66					
5.3767						5.351		6.6954							6.4197		6.5108							5.8427		5.4754								5.4977				RU106		
5.4964								7.08							6.9765										5.5275													RU242		
6.1862															7.4039																							RU484		
6.8794																																							RU996	
6.2945								6.8965							6.5092										6.4576													RU26+R U52		
6.2888								7.4227							6.9053										6.1879													RU26+R U106		
8.1123								8.5181							8.1683										7.9065													RU242+ RU484		
7.4446																																							RU242+ RU242	

[00365] Table for the RUs in the 2nd and the 4th 80 MHz:

3.3.3.3.3.3.3.3.3.6.5.6.5.6.6.7.6.6.6.5.6.5.6.6.5.6.5.3.
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6.2945	6.8965	6.5092	6.4576	RU26+ RU52
6.2888	7.4227	6.9053	6.1879	RU26+ RU106
8.7348	7.5746	8.369	7.9397	RU242+ RU484
7.726				RU242+ RU242

[00366] The sequence has the following PAPR values on other RUs in more than 80 MHz (namely, RU combinations) in table B.

9.04 69	9.30 05	9.02 93	8.58 22	9.04 69	9.30 05	9.02 93	8.5822									RU484+	
																RU996	
7.80 78	8.03 23	7.54 07	8.15 22	8.34 65	8.03 48	8.19 34	7.82 95	7.80 78	8.03 23	7.54 07	8.15 22	8.34 65	8.03 48	8.19 34	7.82 95	RU242+	
																RU484+	
																RU996	
9.211		9.2872		8.9967		8.7201										RU3*99	
																6	
9.961																RU4*99	
																6	

5 **[00367]** 6-3. There is a possible LTF4x320M sequence = [LTF4x160M $\mathbf{0}_B$ -LTF4x160M]. LTF4x160M is a 160 MHz 4x LTF sequence in the 802.11ax standard. For a specific sequence, refer to the 802.11ax standard.

10 **[00368]** The LTF4x320M sequence has relatively low PAPR values in various cases (including a full bandwidth of the 320 MHz, various puncturing patterns for the 320 MHz, and various multiple RU combinations for the 320 MHz) in table B of the 320 MHz. For example, a PAPR value of the sequence in a pattern for the 320 MHz is 10.2842 dB (if RU484+RU2*996 is considered) or 10.2793 dB (if RU484+RU2*996 is not considered). PAPR values in the other puncturing patterns each are less than 10.2793 dB.

7	66		7	66	62	5		6	08	68	82		7	22	7	66		7	66	
5.3767			5.351		6.6954			6.4197		6.5108			5.8427		5.4754			5.4977		RU106
5.4964					7.08					6.9765					5.5275					RU242
6.1862										7.4039										RU484
7.4087																				RU996
6.2945					6.8965					6.5092					6.4576					RU26+R U52
6.2888					7.4227					6.9053					6.1879					RU26+R U106
8.7348					7.5746					8.369					7.9397					RU242+ RU484
7.726																				RU242+ RU242

[00372] The sequence has the following PAPR values on other RUs in more than 80 MHz (namely, RU combinations) in table B.

9.04	9.30	9.02	8.58	9.04	9.30	9.02	8.5822													RU484+ RU996
69	05	93	22	69	05	93														
7.80	8.03	7.54	8.15	8.34	8.03	8.19	7.82	7.80	8.03	7.54	8.15	8.34	8.03	8.19	7.82					RU242+ RU484+ RU996
78	23	07	22	65	48	34	95	78	23	07	22	65	48	34	95					
9.6603		10.279		9.6764		9.6836		9.5247		9.7706		9.7151		9.8314						RU484+ RU3*99 6
9.219		9.4159		9.219		9.4138														RU3*99 6
8.68		9.4991		8.4782		8.481		9.8112		9.7008										RU484+ RU2*99 6
10.105		10.284		8.0493		8.812		8.8152		9.3773										
8.6518		8.5538		9.0885		8.9032		8.4782		8.7398										

6.8794				RU996
6.2945	6.8965	6.5092	6.4576	RU26+ RU52
6.2888	7.4227	6.9053	6.1879	RU26+ RU106
8.1123	8.5181	8.1683	7.9065	RU242+ RU484
7.4446				RU242+ RU242

[00377] Table for the RUs in the 2nd and the 3rd 80 MHz:

3.3.3.3.3.3.3.3.3.6.5.6.5.6.6.7.6.6.6.5.6.5.6.6.5.6.5.3.3.3.3.3.3.3.3.3.3.3.	RU26			
7 7 7 7 7 7 7 7 7 1 9 3 2 9 1 2 3 4 0 2 0 6 5 8 2 8 6 7 7 7 7 7 7 7 7 7 7 7				
8 8 8 8 8 8 8 8 8 0 5 5 8 7 0 8 5 5 1 8 9 9 4 5 8 0 9 8 8 8 8 8 8 8 8 8 8 8				
2 2 2 2 2 2 2 2 2 7 9 6 4 7 7 8 6 6 9 4 6 9 2 3 4 0 9 2 2 2 2 2 2 2 2 2 2 2				
1 1 1 1 1 1 1 1 1 6 9 2 7 6 2 2 8 9 7 3 5 1 6 7 9 5 1 1 1 1 1 1 1 1 1 1 1 1				
4.964.434.964.436.797.148.477.417.497.007.806.924.964.434.964.43	RU52			
7 667 666 62 56 08 68 827 22 7 667 66				
5.37675.3516.69546.41976.51085.84275.47545.4977	RU106			
5.49647.086.97655.5275	RU242			
6.18627.4039	RU484			
7.4087	RU996			
6.29456.89656.50926.4576	RU26+ RU52			
6.28887.42276.90536.1879	RU26+ RU106			
8.73487.57468.3697.9397	RU242+ RU484			
7.726	RU242+ RU242			

4.96	4.43		4.96	4.43	6.79	7.14		8.47	7.41	7.49	7.00		7.80	6.92	4.96	4.43		4.96	4.43	RU52	
7	66		7	66	62	5		6	08	68	82		7	22	7	66		7	66		
5.3767			5.351		6.6954			6.4197		6.5108			5.8427		5.4754			5.4977		RU106	
5.4964					7.08					6.9765					5.5275					RU242	
6.1862										7.4039										RU484	
7.4087																					RU996
6.2945					6.8965					6.5092					6.4576					RU26+	
																					RU52
6.2888					7.4227					6.9053					6.1879					RU26+	
																					RU106
8.7348					7.5746					8.369					7.9397					RU242+	
																					RU484
7.726																					RU242+
																					RU242

[00383] Table for the RUs in the 2nd and the 4th 80 MHz:

3.	3.	3.	3.	3.	3.	3.	3.	3.	3.	6.	5.	6.	5.	6.	6.	7.	6.	6.	6.	5.	6.	5.	6.	6.	5.	6.	5.	3.	3.	3.	3.	3.	3.	3.	3.	3.	RU26												
7	7	7	7	7	7	7	7	7	7	1	9	3	2	9	1	2	3	4	0	2	0	6	5	8	2	8	6	7	7	7	7	7	7	7	7	7	7												
8	8	8	8	8	8	8	8	8	8	0	5	5	8	7	0	8	5	5	1	8	9	9	4	5	8	0	9	8	8	8	8	8	8	8	8	8	8												
2	2	2	2	2	2	2	2	2	2	7	9	6	4	7	7	8	6	6	9	4	6	9	2	3	4	0	9	2	2	2	2	2	2	2	2	2	2												
1	1	1	1	1	1	1	1	1	1	6	9	2	7		6	2	2	8	9	7	3	5	1	6	7	9	5	1	1	1	1	1	1	1	1	1													
4.96		4.43				4.96		4.43		6.79		7.14				8.47		7.41		7.49		7.00				7.80		6.92		4.96		4.43				4.96		4.43		RU52									
7		66				7		66		62		5				6		08		68		82				7		22		7		66				7		66											
5.3767						5.351				6.6954						6.4197				6.5108						5.8427				5.4754						5.4977				RU106									
5.4964										7.08										6.9765										5.5275										RU242									
6.1862																				7.4039																				RU484									
6.8794																														RU996																			
6.2945										6.8965										6.5092										6.4576										RU26+									
																														RU52																			

6.2888	7.4227	6.9053	6.1879	RU26+ RU106
8.1123	8.5181	8.1683	7.9065	RU242+ RU484
7.4446				RU242+ RU242

[00384] The sequence has the following PAPR values on other RUs in more than 80 MHz (namely, RU combinations) in table B.

8.74 59	8.89 31	9.31 32	8.70 75	8.74 59	8.89 31	9.31 32	8.7075									RU484+ RU996	
8.28 16	9.16 33	8.08 77	8.47	8.70 04	7.76 02	8.76 15	8.53 55	8.28 16	9.16 33	8.08 77	8.47	8.70 04	7.76 02	8.76 15	8.53 55	RU242+ RU484+ RU996	
9.9322		9.812		9.503		9.7706		9.6764		9.6836		9.503		10.022		RU484+ RU3*99 6	
9.4138		9.219		9.4138		9.219										RU3*99 6	
8.607		8.9748		7.9331		8.7828		10.018		10.115						RU484+	
9.8472		9.8724		8.4782		8.481		8.4782		9.1452						RU2*99	
8.2135		8.7828		9.4901		9.4315		8.5842		8.7828						6	
8.6518		8.5538		9.0885		8.9032		8.4782		8.7398							
7.2484		7.8585		10.045												RU2*99	
9.7047		7.8585		7.2484												6	
7.8854		10.045		7.2484													
7.2484		9.7047		7.8854													
10.1186																RU4*99 6	

[00388] Table for the RUs in the 2nd 80 MHz:

3.7821667665667665665333333333	RU26
4.967366	RU52
5.3767	RU106
5.4964	RU242
6.5676	RU484
8.5171	RU996
6.2945	RU26+RU52
6.2888	RU26+RU106
8.7348	RU242+RU484

[00389] Table for the RUs in the 3rd 80 MHz:

3.	3.	3.	3.	3.	3.	3.	3.	3.	6.	5.	6.	5.	6.	6.	7.	6.	6.	6.	5.	6.	5.	6.	6.	5.	3.	3.	3.	3.	3.	3.	3.	3.	RU26
7	7	7	7	7	7	7	7	7	1	9	3	2	9	1	2	3	4	6	2	0	6	5	8	2	8	6	7	7	7	7	7	7	7
8	8	8	8	8	8	8	8	8	0	5	5	8	7	0	8	5	5	5	8	9	9	4	5	8	0	9	8	8	8	8	8	8	
2	2	2	2	2	2	2	2	2	7	9	6	4	7	7	8	6	6	4	4	6	9	2	3	4	0	9	2	2	2	2	2	2	2
1	1	1	1	1	1	1	1	1	6	9	2	7		6	2	2	8		7	3	5	1	6	7	9	5	1	1	1	1	1	1	
4.9	4.4				4.9	4.4	6.7	7.1						8.4	7.4	7.3	7.0					7.8	6.9	4.9	4.4				4.9	4.4	RU52		
67	366				67	366	962	45						76	108	888	082					07	222	67	366				67	366			
5.3767					5.351		6.6954							6.4197		7.2059						5.8427		5.4754					5.4977		RU106		
5.4964							7.08										6.7514								5.5275							RU242	

7	7	7	7	7	7	7	7	7	7	1	9	3	2	9	1	2	3	4	6	2	0	6	5	8	2	8	6	7	7	7	7	7	7	7	7	7	7	7											
8	8	8	8	8	8	8	8	8	8	0	5	5	8	7	0	8	5	5	5	8	9	9	4	5	8	0	9	8	8	8	8	8	8	8	8	8	8	8	8										
2	2	2	2	2	2	2	2	2	2	7	9	6	4	7	7	8	6	6	4	4	6	9	2	3	4	0	9	2	2	2	2	2	2	2	2	2	2	2	2										
1	1	1	1	1	1	1	1	1	1	6	9	2	7		6	2	2	8		7	3	5	1	6	7	9	5	1	1	1	1	1	1	1	1	1	1	1											
4.9	4.4				4.9	4.4	6.7	7.1							8.4	7.4	7.3	7.0						7.8	6.9	4.9	4.4					4.9	4.4					RU52											
67	366				67	366	962	45							76	108	888	082						07	222	67	366					67	366																
5.3767					5.351		6.6954								6.4197		7.2059							5.8427		5.4754						5.4977						RU106											
5.4964										7.08										6.7514										5.5275										RU242									
6.1862																		7.5709																						RU484									
8.5169																												RU996																					
6.2945										6.8965										6.5092										6.4576										RU26+RU5 2									
6.2888										7.4227										7.1131										6.1879										RU26+RU1 06									
8.3704										8.6496										8.1399										7.9065										RU242+RU 484									

[00397] Table for the RUs in the 4th 80 MHz:

3	3	3	3	3	3	3	3	3	3	6	5	6	5	6	6	7	6	6	6	5	6	5	6	6	5	6	5	3	3	3	3	3	3	3	3	3	3	RU26
7	7	7	7	7	7	7	7	7	7	1	9	3	2	9	1	2	3	4	0	2	0	6	5	8	2	8	6	7	7	7	7	7	7	7	7	7	7	
8	8	8	8	8	8	8	8	8	8	0	5	5	8	7	0	8	5	5	1	8	9	9	4	5	8	0	9	8	8	8	8	8	8	8	8	8		
2	2	2	2	2	2	2	2	2	2	7	9	6	4	7	7	8	6	6	9	4	6	9	2	3	4	0	9	2	2	2	2	2	2	2	2	2		
1	1	1	1	1	1	1	1	1	1	6	9	2	7		6	2	2	8	9	7	3	5	1	6	7	9	5	1	1	1	1	1	1	1	1			
4.9	4.4					4.9	4.4	6.7	7.1						8.4	7.4	7.4	7.0						7.8	6.9	4.9	4.4					4.9	4.4			RU52		
67	366					67	366	962	45						76	108	968	082						07	222	67	366					67	366					
5.3767						5.351		6.6954							6.4197		6.5108							5.8427		5.4754						5.4977				RU106		
5.4964								7.08										6.9765									5.5275									RU242		
6.5676																																					RU484	
8.5171																																					RU996	

6.2945	6.8965	6.5092	6.4576	RU26+RU5 2
6.2888	7.4227	6.9053	6.1879	RU26+RU1 06
8.7348	8.5181	8.785	8.2684	RU242+RU 484

[00398] The sequence has the following PAPR values on other RUs in more than 80 MHz (namely, RU combinations) in table B.

8.9343	8.6465	8.5522	8.5916	9.1014	8.8633	8.7064	8.5212	RU484+RU 3*996
8.1749	8.0833	7.6735	7.5209					RU3*996
8.9955	9.1127	8.8001	9.0116	8.6311	8.2547			RU484+RU 2*996
7.9955	8.1148	8.8918	9.1084	9.28	9.3565			
9.3434	8.9411	8.2429	8.4809	8.976	9.3289			
9.0578	8.7656	8.6615	8.6002	8.7009	9.2907			
8.033	7.8186	8.1121						RU2*996
7.8759	7.8186	8.6111						
7.7247	8.1121	8.6111						
8.033	7.8759	7.7247						
8.2088	8.5858	8.2269	7.7352	8.5368	7.7126	8.1287	8.5686	RU484+RU 996
8.1534								RU4*996

- 5 **[00399]** 6-8. There is a possible LTF4x320M sequence = [LTF4x80M_{part1}, LTF4x80M_{part2}, (−1)*LTF4x80M_{part3}, LTF4x80M_{part4}, (−1)*LTF4x80M_{part5}, 0₂₃, (−1)*LTF4x80M_{part1}, LTF4x80M_{part2}, (−1)*LTF4x80M_{part3}, (−1)*LTF4x80M_{part4}, (−1)*LTF4x80M_{part5}, 0₂₃, (−1)*LTF4x80M_{part1}, (−1)*LTF4x80M_{part2}, (−1)*LTF4x80M_{part3}, LTF4x80M_{part4}, (−1)*LTF4x80M_{part5}, 0₂₃, (−1)*LTF4x80M_{part1}, LTF4x80M_{part2}, LTF4x80M_{part3}, LTF4x80M_{part4}, LTF4x80M_{part5}]. LTF4x80MHz_{part1}, LTF4x80MHz_{part2}, LTF4x80MHz_{part3}, LTF4x80MHz_{part4},
- 10

and LTF4x80MHz_part5 are sequences obtained by dividing an 80 MHz 4x LTF sequence based on sizes of 5 parts of an 80 MHz 2x LTF sequence in the 802.11ax standard. LTF4x80MHz is an 80MHz 4x LTF sequence in the 802.11ax standard. For specific sequences, refer to the 802.11ax standard.

- 5 **[00400]** Specifically, the sequence has the following PAPR values on RUs (a plurality of RU combinations or single RUs) in the 1st 80 MHz to the 4th 80 MHz.

[00401] Table for the RUs in the 1st 80 MHz:

[illegible]

[00402] Table for the RUs in the 2nd 80 MHz:

3	3	3	3	3	3	3	3	3	3	6	5	6	5	6	6	7	6	6	6	5	6	5	6	5	6	5	3	3	3	3	3	3	3	3	3	RU26
7	7	7	7	7	7	7	7	7	7	1	9	3	2	9	1	2	3	5	0	2	0	6	5	8	2	8	6	7	7	7	7	7	7	7	7	
8	8	8	8	8	8	8	8	8	8	0	5	5	8	7	0	8	5	3	1	8	9	9	4	5	8	0	9	8	8	8	8	8	8	8	8	
2	2	2	2	2	2	2	2	2	2	7	9	6	4	7	7	8	6	8	9	4	6	9	2	3	4	0	9	2	2	2	2	2	2	2	2	

1	1	1	1	1	1	1	1	1	6	9	2	7		6	2	2	3	9	7	3	5	1	6	7	9	5	1	1	1	1	1	1	1	1	1	
4.9	4.4				4.9	4.4	6.7	7.1						8.4	7.3	7.4	7.0					7.8	6.9	4.9	4.4						4.9	4.4			RU52	
67	366				67	366	962	45						76	79	968	082					07	222	67	366						67	366				
5.3767					5.351	6.6954								6.4813	6.5108							5.8427	5.4754							5.4977				RU106		
5.4964						6.6944						6.9765						5.5275						RU242												
6.9069												7.4039												RU484												
8.0086																				RU996																
6.2945						6.8965						6.5092						6.4576						RU26+RU5 2												
6.2888						7.4722						6.9053						6.1879						RU26+RU1 06												
8.1123						7.4883						8.0242						8.3487						RU242+RU 484												

[00403] Table for the RUs in the 3rd 80 MHz:

3.3.3.3.3.3.3.3.6.5.6.5.6.6.7.6.6.6.5.6.5.6.6.5.6.5.3

5.4964	7.0800	7.8327	5.5275	RU242
6.1862		7.4646		RU484
7.9629				RU996
6.2945	6.8965	6.5092	6.4576	RU26+RU5 2
6.2888	7.4227	6.9053	6.1879	RU26+RU1 06
8.5993	7.3482	8.6760	7.9397	RU242+RU 484

[00414] The sequence has the following PAPR values on other RUs in more than 80 MHz (namely, RU combinations) in table B.

[00415] For a specific RU combination form, a bitmap is used to indicate a puncturing pattern.

5 Each bit indicates whether one 20 MHz is punctured. For example, "0" indicates that the 20 MHz corresponding to the bit is punctured or the 20 MHz is not considered for combination during multiple RU combination, and "1" indicates that the 20 MHz corresponding to the bit is not punctured. Optionally, bits from left to right sequentially correspond to 20 MHz with channel frequencies from low to high.

10 **[00416]** RU484+RU3*996: [0 0 1 1 1 1 1 1 1 1 1 1 1 1 1], [1 1 0 0 1 1 1 1 1 1 1 1 1 1 1], [1 1 1 1 0 0 1 1 1 1 1 1 1 1 1], [1 1 1 1 1 1 0 0 1 1 1 1 1 1 1], [1 1 1 1 1 1 1 1 0 0 1 1 1 1 1], [1 1 1 1 1 1 1 1 1 0 0 1 1 1 1], [1 1 1 1 1 1 1 1 1 1 0 0 1 1], [1 1 1 1 1 1 1 1 1 1 1 1 0 0 1], [1 1 1 1 1 1 1 1 1 1 1 1 1 0 0].

[00417] RU3*996: [1 1 1 1 0 0 0 0 1 1 1 1 1 1 1], [1 1 1 1 1 1 1 1 0 0 0 0 1 1 1], [1 1 1 1 1 1 1 1 1 1 0 0 0 0], [0 0 0 0 1 1 1 1 1 1 1 1 1 1 1].

15 **[00418]** RU2*996+RU484: [0 0 1 1 1 1 1 1 1 1 1 1 0 0 0 0], [1 1 0 0 1 1 1 1 1 1 1 1 0 0 0 0], [1 1 1 1 0 0 1 1 1 1 1 1 0 0 0 0], [1 1 1 1 1 1 0 0 1 1 1 1 0 0 0 0], [1 1 1 1 1 1 1 1 0 0 1 1 0 0 0 0], [1 1 1 1 1 1 1 1 1 0 0 0 0 0 0], [0 0 0 0 0 0 1 1 1 1 1 1 1 1 1], [0 0 0 0 1 1 0 0 1 1 1 1 1 1 1], [0 0 0 0 1 1 1 1 0 0 1 1 1 1 1], [0 0 0 0 1 1 1 1 1 1 0 0 1 1 1], [0 0 0 0 1 1 1 1 1 1 1 1 0 0 1 1], [0 0 0 0 1 1 1 1 1 1 1 1 1 0 0].

20 **[00419]** RU2*996: [1 1 1 1 1 1 1 1 0 0 0 0 0 0 0 0], [0 0 0 0 0 0 0 0 1 1 1 1 1 1 1 1], [0 0 0 0 1 1 1 1 1 1 1 1 0 0 0 0].

70	66		70	66	62	50		60	90	68	82		70	22	70	66		70	66	
5.3767			5.3510		6.6954			6.4813		6.5108			5.8427		5.4754			5.4977		RU106
5.4964					6.6944					6.9765					5.5275					RU242
6.9069										7.4039										RU484
8.0086																				RU996
6.2945					6.8965					6.5092					6.4576					RU26+RU5 2
6.2888					7.4722					6.9053					6.1879					RU26+RU1 06
8.1123					7.4883					8.0242					8.3487					RU242+RU 484

[00426] Table for the RUs in the 2nd 80 MHz:

[illegible]

5.4964	7.0800	6.9765	5.5275	RU242
6.1862		6.9741		RU484
8.0200				RU996
6.2945	6.8965	6.5092	6.4576	RU26+RU5 2
6.2888	7.4227	6.9053	6.1879	RU26+RU1 06
8.2679	7.2817	8.1683	7.9397	RU242+RU 484

[00429] The sequence has the following PAPR values on other RUs in more than 80 MHz (namely, RU combinations) in table B.

[00430] For a specific RU combination form, a bitmap is used to indicate a puncturing pattern.

5 Each bit indicates whether one 20 MHz is punctured. For example, "0" indicates that the 20 MHz corresponding to the bit is punctured or the 20 MHz is not considered for combination during multiple RU combination, and "1" indicates that the 20 MHz corresponding to the bit is not punctured. Optionally, bits from left to right sequentially correspond to 20 MHz with channel frequencies from low to high.

10 **[00431]** RU484+RU3*996: [0 0 1 1 1 1 1 1 1 1 1 1 1 1 1 1], [1 1 0 0 1 1 1 1 1 1 1 1 1 1 1 1], [1 1 1 1 0 0 1 1 1 1 1 1 1 1 1 1], [1 1 1 1 1 1 0 0 1 1 1 1 1 1 1 1], [1 1 1 1 1 1 1 1 0 0 1 1 1 1 1 1], [1 1 1 1 1 1 1 1 1 0 0 1 1 1 1 1], [1 1 1 1 1 1 1 1 1 1 0 0 1 1], [1 1 1 1 1 1 1 1 1 1 1 1 0 0 1 1], [1 1 1 1 1 1 1 1 1 1 1 1 1 0 0 1].

[00432] RU3*996: [1 1 1 1 0 0 0 0 1 1 1 1 1 1 1 1], [1 1 1 1 1 1 1 1 0 0 0 0 1 1 1 1], [1 1 1 1 1 1 1 1 1 1 0 0 0 0], [0 0 0 0 1 1 1 1 1 1 1 1 1 1 1 1].

15 **[00433]** RU2*996+RU484: [0 0 1 1 1 1 1 1 1 1 1 1 0 0 0 0], [1 1 0 0 1 1 1 1 1 1 1 1 0 0 0 0], [1 1 1 1 0 0 1 1 1 1 1 1 0 0 0 0], [1 1 1 1 1 1 0 0 1 1 1 1 0 0 0 0], [1 1 1 1 1 1 1 1 0 0 1 1 0 0 0 0], [1 1 1 1 1 1 1 1 1 0 0 0 0 0 0], [0 0 0 0 0 0 1 1 1 1 1 1 1 1 1 1], [0 0 0 0 1 1 0 0 1 1 1 1 1 1 1 1], [0 0 0 0 1 1 1 1 0 0 1 1 1 1 1 1], [0 0 0 0 1 1 1 1 1 1 0 0 1 1 1 1], [0 0 0 0 1 1 1 1 1 1 1 1 0 0 1 1], [0 0 0 0 1 1 1 1 1 1 1 1 1 0 0 0].

20 **[00434]** RU2*996: [1 1 1 1 1 1 1 1 0 0 0 0 0 0 0 0], [0 0 0 0 0 0 0 0 1 1 1 1 1 1 1 1], [0 0 0 0 1 1 1 1 1 1 1 0 0 0 0 0].

[00435] RU484+RU996: [0 0 1 1 1 1 1 1 0 0 0 0 0 0 0], [1 1 0 0 1 1 1 1 0 0 0 0 0 0 0], [1 1 1 1 0 0 1 1 0 0 0 0 0 0 0], [1 1 1 1 1 1 0 0 0 0 0 0 0 0 0], [0 0 0 0 0 0 0 0 0 0 1 1 1 1 1], [0 0 0 0 0 0 0 1 1 0 0 1 1 1 1], [0 0 0 0 0 0 0 0 1 1 1 1 0 0 1], [0 0 0 0 0 0 0 0 1 1 1 1 1 1 0].

[00436] RU4*996: [1 1 1 1 1 1 1 1 1 1 1 1 1 1 1].

8.4770	8.5099	8.9070	8.3513	8.7749	8.5241	8.1845	8.3446	RU484+RU3*996
8.8353	8.3823	8.0460	8.8380					RU3*996
8.9507	8.8980	8.1672	8.3486	9.0054	8.8998			RU484+RU2*996
8.6050	8.6700	8.8844	8.0479	9.1028	8.9502			
8.3520	8.1134	8.0330						RU2*996
8.5088	8.4279	8.4613	8.7239	7.8484	8.3722	7.9702	7.9343	RU484+RU996
7.8967								RU4*996

5

[00437] The foregoing describes the method for transmitting/receiving a physical layer protocol data unit provided in the embodiments of this application. The following describes a product in the embodiments of this application.

[00438] An embodiment of this application provides an apparatus for transmitting a physical layer protocol data unit, including:

a generation unit, configured to generate a physical layer protocol data unit (physical protocol data unit, PPDU), where the PPDU includes a long training field (long training field, LTF), a length of a frequency-domain sequence of the LTF is greater than a first length, and the first length is a length of a frequency-domain sequence of an LTF of a PPDU transmitted over a channel whose bandwidth is 160 MHz; and

a sending unit, configured to send the PPDU over a target channel, where a bandwidth of the target channel is greater than 160 MHz.

[00439] The apparatus for transmitting a physical layer protocol data unit provided in this embodiment of this application considers a phase rotation at a non-pilot location, a plurality of puncturing patterns for 240 MHz/320 MHz, and multiple RU combination, so that a finally provided frequency-domain sequence of an LTF has a relatively small PAPR value on a multiple RU in the plurality of puncturing patterns for 240 MHz/320 MHz.

[00440] An embodiment of this application provides an apparatus for receiving a physical layer

protocol data unit, including:

a receiving unit, configured to receive a physical layer protocol data unit PPDU over a target channel, where the PPDU includes a long training field, a length of a frequency-domain sequence of the long training field is greater than a first length, the first length is a length of a frequency-domain sequence of a long training field of a PPDU transmitted over a channel whose bandwidth is 160 MHz, and a bandwidth of the target channel is greater than 160 MHz; and

a processing unit, configured to parse the PPDU.

[00441] According to the apparatus for receiving a physical layer protocol data unit provided in this embodiment of this application, a frequency-domain sequence of an LTF parsed by the apparatus has a relatively small PAPR value on a multiple RU in a plurality of puncturing patterns for 240 MHz/320 MHz.

[00442] It should be understood that, the apparatus for transmitting/receiving a physical layer protocol data unit provided in the embodiments of this application has all functions and all technical details of the foregoing method for transmitting/receiving a physical layer protocol data unit. For specific technical details, refer to the foregoing method. Details are not described herein again.

[00443] The foregoing describes the apparatus for transmitting/receiving a physical layer protocol data unit in the embodiments of this application. The following describes a possible product form of the apparatus for transmitting/receiving a physical layer protocol data unit. It should be understood that, any form of product having the functions of the foregoing apparatus for transmitting/receiving a physical layer protocol data unit falls within the protection scope of the embodiments of this application. It should be further understood that, the following description is merely an example, and does not limit a product form of the apparatus for transmitting/receiving a physical layer protocol data unit in the embodiments of this application.

[00444] In a possible product form, the apparatus for transmitting/receiving a physical layer protocol data unit described in the embodiments of this application may be implemented by using a general bus architecture.

[00445] The apparatus for transmitting a physical layer protocol data unit includes a processor and a transceiver. The processor is configured to generate a physical layer protocol data unit (physical protocol data unit, PPDU), where the PPDU includes a long training field (long training field, LTF), a length of a frequency-domain sequence of the LTF is greater than a first length, and

the first length is a length of a frequency-domain sequence of an LTF of a PPDU transmitted over a channel whose bandwidth is 160 MHz. The transceiver is configured to send the PPDU over a target channel, where a bandwidth of the target channel is greater than 160 MHz.

[00446] It should be understood that, the apparatus for transmitting a physical layer protocol data unit has all functions and all technical details of the foregoing method for transmitting a physical layer protocol data unit. For specific technical details, refer to the foregoing method. Details are not described herein again.

[00447] Optionally, the apparatus for transmitting a physical layer protocol data unit may further include a memory. The memory is configured to store instructions executable by the processor.

[00448] The apparatus for receiving a physical layer protocol data unit includes a processor and a transceiver. The transceiver is configured to receive a physical layer protocol data unit PPDU over a target channel, where the PPDU includes a long training field, a length of a frequency-domain sequence of the long training field is greater than a first length, the first length is a length of a frequency-domain sequence of a long training field of a PPDU transmitted over a channel whose bandwidth is 160 MHz, and a bandwidth of the target channel is greater than 160 MHz. The processor is configured to parse the PPDU.

[00449] It should be understood that, the apparatus for receiving a physical layer protocol data unit has all functions and all technical details of the foregoing method for receiving a physical layer protocol data unit. For specific technical details, refer to the foregoing method. Details are not described herein again.

[00450] Optionally, the apparatus for receiving a physical layer protocol data unit may further include a memory. The memory is configured to store instructions executable by the processor.

[00451] In a possible product form, the apparatus for transmitting/receiving a physical layer protocol data unit in the embodiments of this application may be implemented by a general-purpose processor.

[00452] The apparatus for transmitting a physical layer protocol data unit includes a processing circuit and a transceiver interface. The processing circuit is configured to generate a physical layer protocol data unit (physical protocol data unit, PPDU), where the PPDU includes a long training field (long training field, LTF), a length of a frequency-domain sequence of the LTF is greater than a first length, and the first length is a length of a frequency-domain sequence of an LTF of a PPDU

transmitted over a channel whose bandwidth is 160 MHz. The transceiver interface is configured to send the PPDU over a target channel, where a bandwidth of the target channel is greater than 160 MHz.

[00453] Optionally, the apparatus for transmitting a physical layer protocol data unit may further include a storage medium. The storage medium is configured to store instructions executable by the processing circuit.

[00454] It should be understood that, the apparatus for transmitting a physical layer protocol data unit has all functions and all technical details of the foregoing method for transmitting a physical layer protocol data unit. For specific technical details, refer to the foregoing method.

Details are not described herein again.

[00455] The apparatus for receiving a physical layer protocol data unit includes a processing circuit and a transceiver interface. The transceiver interface is configured to receive a physical layer protocol data unit PPDU over a target channel, where the PPDU includes a long training field, a length of a frequency-domain sequence of the long training field is greater than a first length, the first length is a length of a frequency-domain sequence of a long training field of a PPDU transmitted over a channel whose bandwidth is 160 MHz, and a bandwidth of the target channel is greater than 160 MHz. The processing circuit is configured to parse the PPDU.

[00456] Optionally, the apparatus for receiving a physical layer protocol data unit may further include a storage medium. The storage medium is configured to store instructions executable by the processing circuit.

[00457] It should be understood that, the apparatus for receiving a physical layer protocol data unit has all functions and all technical details of the foregoing method for receiving a physical layer protocol data unit. For specific technical details, refer to the foregoing method. Details are not described herein again.

[00458] In a possible product form, the apparatus for transmitting/receiving a physical layer protocol data unit described in the embodiments of this application may be further implemented by using the following: any combination of one or more FPGAs (field programmable gate arrays), PLDs (programmable logic devices), controllers, state machines, gate logic, and discrete hardware components, any other suitable circuit, or a circuit capable of performing the various functions described throughout this application.

[00459] An embodiment of this application further provides a computer program product. The

computer program product includes computer program code. When the computer program code is run on a computer, the computer is enabled to perform the method in the embodiment shown in FIG. 5.

[00460] An embodiment of this application further provides a computer-readable medium. The computer-readable medium stores program code. When the program code is run on a computer, the computer is enabled to perform the method in the embodiment shown in FIG. 5.

[00461] In the several embodiments provided in this application, it should be understood that the disclosed systems, apparatuses, and methods may be implemented in other manners. For example, the described apparatus embodiment is merely an example. For example, division into the units is merely logical function division and may be other division during actual implementation. For example, a plurality of units or components may be combined or integrated into another system, or some features may be ignored or not performed. In addition, the displayed or discussed mutual couplings or direct couplings or communication connections may be implemented by using some interfaces. The indirect couplings or communication connections between the apparatuses or units may be implemented in electronic, mechanical, or other forms.

[00462] The units described as separate parts may or may not be physically separate, and parts displayed as units may or may not be physical units, may be located in one position, or may be distributed on a plurality of network units. Some or all of the units may be selected based on actual requirements to achieve the objectives of the solutions of the embodiments.

[00463] In addition, functional units in the embodiments of this application may be integrated into one processing unit, or each of the units may exist alone physically, or two or more units are integrated into one unit.

[00464] When the functions are implemented in the form of a software functional unit and sold or used as an independent product, the functions may be stored in a computer-readable storage medium. Based on such an understanding, the technical solutions of this application essentially, or the part contributing to the conventional technologies, or some of the technical solutions may be implemented in a form of a software product. The computer software product is stored in a storage medium, and includes several instructions for instructing a computer device (which may be a personal computer, a server, a network device, or the like) to perform all or some of the steps of the methods described in the embodiments of this application. The foregoing storage medium includes: any medium that can store program code, such as a USB flash drive, a removable hard

disk, a read-only memory (read-only memory, ROM), a random access memory (random access memory, RAM), a magnetic disk, or an optical disc.

[00465] The foregoing descriptions are merely specific implementations of this application, but are not intended to limit the protection scope of this application. Any variation or replacement
5 readily figured out by a person skilled in the art within the technical scope disclosed in this application shall fall within the protection scope of this application. Therefore, the protection scope of this application shall be subject to the protection scope of the claims.

CLAIMS

What is claimed is:

1. A method for transmitting a physical layer protocol data unit, comprising:

generating a physical layer protocol data unit PPDU, wherein the PPDU comprises a long
5 training field, a length of a frequency-domain sequence of the long training field is greater than a first length, and the first length is a length of a frequency-domain sequence of a long training field of a PPDU transmitted over a channel whose bandwidth is 160 MHz; and

sending the PPDU over a target channel, wherein a bandwidth of the target channel is greater than 160 MHz.

10 2. A method for receiving a physical layer protocol data unit, comprising:

receiving a physical layer protocol data unit PPDU over a target channel, wherein the PPDU comprises a long training field, a length of a frequency-domain sequence of the long training field is greater than a first length, the first length is a length of a frequency-domain sequence of a long training field of a PPDU transmitted over a channel whose bandwidth is 160 MHz, and a bandwidth
15 of the target channel is greater than 160 MHz; and

parsing the PPDU.

3. The method according to claim 1 or 2, wherein the bandwidth of the target channel is 240 MHz, and the frequency-domain sequence of the long training field is any one of the following:

$[LTF1 \times 80M \ 0_{23} \ LTF1 \times 80M \ 0_{23} \ -LTF1 \times 80M];$ or

20 $[LTF1 \times 160M \ 0_{23} \ -LTF1 \times 80M];$ or

$[LTF1 \times 80MHz_{left} \ 0 \ -LTF1 \times 80MHz_{right} \ 0_{23} \ -LTF1 \times 80MHz_{left} \ 0 \ LTF1 \times 80MHz_{right} \ 0_{23} \ LTF1 \times 80MHz_{left} \ 0 \ LTF1 \times 80MHz_{right}];$ or

$[LTF1 \times 80MHz_{left} \ 0 \ LTF1 \times 80MHz_{right} \ 0_{23} \ LTF1 \times 80MHz_{left} \ 0 \ LTF1 \times 80MHz_{right} \ 0_{23} \ -LTF1 \times 80MHz_{left} \ 0 \ -LTF1 \times 80MHz_{right}].$

25 4. The method according to claim 1 or 2, wherein the bandwidth of the target channel is 320 MHz, and the frequency-domain sequence of the long training field is any one of the following:

$[LTF1 \times 80M \ 0_{23} \ LTF1 \times 80M \ 0_{23} \ -LTF1 \times 80M \ 0_{23} \ -LTF1 \times 80M];$ or

$[LTF1 \times 80M \ 0_{23} \ LTF1 \times 80M \ 0_{23} \ -LTF1 \times 80M \ 0_{23} \ LTF1 \times 80M];$ or

$[LTF1 \times 160M \ 0_{23} \ -LTF1 \times 160M];$ or

[LTF1x80MHz_{left} 0 LTF1x80MHz_{right} 0₂₃ -LTF1x80MHz_{left} 0 -LTF1x80MHz_{right} 0₂₃ -
LTF1x80MHz_{left} 0 -LTF1x80MHz_{right} 0₂₃ -LTF1x80MHz_{left} 0 LTF1x80MHz_{right}]; or

[LTF1x80MHz_{left} 0 LTF1x80MHz_{right} 0₂₃ LTF1x80MHz_{left} 0 LTF1x80MHz_{right} 0₂₃ -
LTF1x80MHz_{left} 0 -LTF1x80MHz_{right} 0₂₃ -LTF1x80MHz_{left} 0 -LTF1x80MHz_{right}]; or

5 [LTF1x80MHz_{left} 0 -LTF1x80MHz_{right} 0₂₃ -LTF1x80MHz_{left} 0 LTF1x80MHz_{right} 0₂₃
LTF1x80MHz_{left} 0 LTF1x80MHz_{right} 0₂₃ LTF1x80MHz_{left} 0 LTF1x80MHz_{right}]; or

[LTF1x80MHz_{left} 0 -LTF1x80MHz_{right} 0₂₃ LTF1x80MHz_{left} 0 LTF1x80MHz_{right} 0₂₃
LTF1x80MHz_{left} 0 LTF1x80MHz_{right} 0₂₃ -LTF1x80MHz_{left} 0 -LTF1x80MHz_{right}].

5. An apparatus for transmitting a physical layer protocol data unit, comprising:

10 a processing unit, configured to generate a physical layer protocol data unit PPDU, wherein
the PPDU comprises a long training field, a length of a frequency-domain sequence of the long
training field is greater than a first length, and the first length is a length of a frequency-domain
sequence of a long training field of a PPDU transmitted over a channel whose bandwidth is 160
MHz; and

15 a sending unit, configured to send the PPDU over a target channel, where a bandwidth of the
target channel is greater than 160 MHz.

6. An apparatus for receiving a physical layer protocol data unit, comprising:

a receiving unit, configured to receive a physical layer protocol data unit PPDU over a target
channel, wherein the PPDU comprises a long training field, a length of a frequency-domain
20 sequence of the long training field is greater than a first length, the first length is a length of a
frequency-domain sequence of a long training field of a PPDU transmitted over a channel whose
bandwidth is 160 MHz, and a bandwidth of the target channel is greater than 160 MHz; and

a processing unit, configured to parse the PPDU.

7. The apparatus according to claim 5 or 6, wherein the bandwidth of the target channel is
25 240 MHz, and a frequency-domain sequence of the long training field is any one of the following:

[LTF1x80M 0₂₃ LTF1x80M 0₂₃ -LTF1x80M]; or

[LTF1x160M 0₂₃ -LTF1x80M]; or

[LTF1x80MHz_{left} 0 -LTF1x80MHz_{right} 0₂₃ -LTF1x80MHz_{left} 0 LTF1x80MHz_{right} 0₂₃
LTF1x80MHz_{left} 0 LTF1x80MHz_{right}]; or

30 [LTF1x80MHz_{left} 0 LTF1x80MHz_{right} 0₂₃ LTF1x80MHz_{left} 0 LTF1x80MHz_{right} 0₂₃ -

LTF1x80MHz_{left} 0 –LTF1x80MHz_{right}].

8. The apparatus according to claim 5 or 6, wherein the bandwidth of the target channel is 320 MHz, and a frequency-domain sequence of the long training field is any one of the following:

[LTF1x80M 0₂₃ LTF1x80M 0₂₃ –LTF1x80M 0₂₃ –LTF1x80M]; or

[LTF1x80M 0₂₃ LTF1x80M 0₂₃ –LTF1x80M 0₂₃ LTF1x80M]; or

[LTF1x160M 0₂₃ –LTF1x160M]; or

[LTF1x80MHz_{left} 0 LTF1x80MHz_{right} 0₂₃ –LTF1x80MHz_{left} 0 –LTF1x80MHz_{right} 0₂₃ –
LTF1x80MHz_{left} 0 –LTF1x80MHz_{right} 0₂₃ –LTF1x80MHz_{left} 0 LTF1x80MHz_{right}]; or

[LTF1x80MHz_{left} 0 LTF1x80MHz_{right} 0₂₃ LTF1x80MHz_{left} 0 LTF1x80MHz_{right} 0₂₃ –
LTF1x80MHz_{left} 0 –LTF1x80MHz_{right} 0₂₃ –LTF1x80MHz_{left} 0 –LTF1x80MHz_{right}]; or

[LTF1x80MHz_{left} 0 –LTF1x80MHz_{right} 0₂₃ –LTF1x80MHz_{left} 0 LTF1x80MHz_{right} 0₂₃
LTF1x80MHz_{left} 0 LTF1x80MHz_{right} 0₂₃ LTF1x80MHz_{left} 0 LTF1x80MHz_{right}]; or

[LTF1x80MHz_{left} 0 –LTF1x80MHz_{right} 0₂₃ LTF1x80MHz_{left} 0 LTF1x80MHz_{right} 0₂₃
LTF1x80MHz_{left} 0 LTF1x80MHz_{right} 0₂₃ –LTF1x80MHz_{left} 0 –LTF1x80MHz_{right}].

9. A computer-readable storage medium, configured to store a computer program, wherein the computer program comprises instructions used to perform the method according to any one of claims 1 to 4.

10. A computer product, wherein the computer product comprises instructions for implementing the method according to any one of claims 1 to 4.