

CLAIMS

1. A communication method, applied to a transmit device, wherein the method comprises:
obtaining a first carrier spacing, wherein the first carrier spacing is N times a second carrier spacing corresponding to a first low-frequency channel, and $N > 1$;

5 modulating a to-be-sent high-frequency physical layer signal based on the first carrier spacing, to generate a first physical layer protocol data unit (PPDU); and
sending the first PPDU to a receive device through a first high-frequency channel.

2. The method according to claim 1, wherein

10 a value range of the first carrier spacing comprises any one of the following: [3.55 MHz, 4.03 MHz], [7.11 MHz, 8.05 MHz], [3.46 MHz, 3.92 MHz], [6.92 MHz, 7.85 MHz], [3.31 MHz, 3.75 MHz], [6.61 MHz, 7.5 MHz], [3.23 MHz, 3.67 MHz], [3.313 MHz, 3.755 MHz], [7.19 MHz, 7.98 MHz], [7.36 MHz, 8.18 MHz], [3.6 MHz, 4 MHz], [7.79 MHz, 8.59 MHz], or [3.85 MHz, 4.25 MHz], wherein MHz represents megabyte, and is a unit of the first carrier spacing.

3. The method according to claim 1 or 2, wherein

15 a value of the first carrier spacing comprises any one of the following: 3.75 MHz, 7.8125 MHz, 3.5156 MHz, 7.03125 MHz, 7.93 MHz, 3.91 MHz, 8.2 MHz, or 4.05 MHz.

4. The method according to any one of claims 1 to 3, wherein the modulating a to-be-sent high-frequency physical layer signal based on the first carrier spacing comprises:

20 in a process of modulating the high-frequency physical layer signal based on the first carrier spacing, for data part processing, skipping performing inverse discrete Fourier transform (IDFT) on the high-frequency physical layer signal, and setting signal values carried on a direct current subcarrier and a guard subcarrier in a signal of a long training field (LTF) in the first PPDU to non-zero values.

5. The method according to claim 4, wherein

25 in the signal of the LTF, signal values whose indexes are -32, -31, -30, -29, 0, 29, 30, and 31 are successively -1, 1, 1, 1, -1, -1, 1, and 1; or

in the signal of the LTF, signal values whose indexes are -64, -63, -62, -61, -60, -59, -1, 0, 1, 59, 60, 61, 62, and 63 are successively -1, 1, 1, -1, 1, 1, 1, -1, 1, -1, -1, 1, -1, and 1; or

30 in the signal of the LTF, signal values whose indexes are -128, -127, -126, -125, -124, -123, -1, 0, 1, 123, 124, 125, 126, and 127 are successively -1, -1, -1, 1, 1, 1, -1, -1, 1, -1, -1, 1, 1, and 1; or

in the signal of the LTF, signal values whose indexes are -128, -127, -126, -125, -124, -123, -1, 0, 1, 123, 124, 125, 126, and 127 are successively -1, -1, 1, 1, 1, -1, -1, 1, -1, -1, 1, 1, 1, and -1; or

in the signal of the LTF, signal values whose indexes are -256, -255, -254, -253, -252, -251, -129, -128, -127, -5, -4, -3, -2, -1, 0, 1, 2, 3, 4, 5, 127, 128, 129, 251, 252, 253, 254, and 255 are successively -1, -1, 1, 1, 1, 1, 1, 1, -1, 1, -1, 1, 1, 1, -1, -1, -1, -1, -1, 1, -1, 1, -1, 1, 1, 1, and 1; or

5 in the signal of the LTF, signal values whose indexes are -256, -255, -254, -253, -252, -251, -250, -249, -248, -247, -246, -245, -2, -1, 0, 1, 2, 245, 246, 247, 248, 249, 250, 251, 252, 253, 254, and 255 are successively -1, 1, -1, -1, 1, -1, -1, -1, -1, -1, 1, 1, -1, -1, -1, 1, 1, -1, -1, -1, 1, -1, -1, -1, -1, and 1; or

10 in the signals of the LTF, signal values whose indexes are -512, -511, -510, -509, -508, -507, -506, -505, -504, -503, -502, -501, -2, -1, 0, 1, 2, 501, 502, 503, 504, 505, 506, 507, 508, 509, 510, and 511 are successively 1, 1, 1, -1, -1, -1, -1, 1, 1, 1, 1, -1, -1, -1, 1, -1, -1, -1, -1, 1, -1, 1, 1, -1, and -1.

6. The method according to claim 1 or 2, wherein

the first carrier spacing is determined in the following manner:

15 determining a high-frequency effective bandwidth in a channel bandwidth of the first high-frequency channel, wherein the high-frequency effective bandwidth comprises a bandwidth corresponding to a data subcarrier, a bandwidth corresponding to a pilot subcarrier, and a bandwidth corresponding to a direct current subcarrier; and

20 determining the first carrier spacing based on the high-frequency effective bandwidth and a quantity of effective subcarriers corresponding to a channel bandwidth of the first low-frequency channel.

7. The method according to claim 3, wherein

the first carrier spacing is determined in the following manner:

25 determining, based on a channel bandwidth of the first high-frequency channel and a channel bandwidth of the first low-frequency channel, a sample rate of a signal carried on the first high-frequency channel, wherein the sample rate is M times a minimum sample rate of a signal carried on the first low-frequency channel, and M is a positive integer greater than 1; and

determining the first carrier spacing based on the sample rate and a discrete Fourier transform (DFT) size of the first PPDU.

30 8. The method according to claim 7, wherein the determining, based on a channel bandwidth of the first high-frequency channel and a channel bandwidth of the first low-frequency channel, a sample rate of a signal carried on the first high-frequency channel comprises:

35 determining a high-frequency effective bandwidth in the channel bandwidth of the first high-frequency channel, wherein the high-frequency effective bandwidth comprises a bandwidth corresponding to a data subcarrier, a bandwidth corresponding to a pilot subcarrier, and a

bandwidth corresponding to a direct current subcarrier; and

determining, based on the high-frequency effective bandwidth, a quantity of effective subcarriers corresponding to the channel bandwidth of the first low-frequency channel, and the DFT size of the first PPDU, the sample rate of the signal carried on the first high-frequency channel.

5 9. A communication method, applied to a receive device, wherein the method comprises:

obtaining a first carrier spacing, wherein the first carrier spacing is N times a second carrier spacing corresponding to a first low-frequency channel, and $N > 1$;

receiving a first physical layer protocol data unit (PPDU) from a transmit device through a first high-frequency channel, wherein the first PPDU is a high-frequency physical layer signal;

10 and

demodulating the first PPDU based on the first carrier spacing.

10. The method according to claim 9, wherein

a value range of the first carrier spacing comprises any one of the following:

15 [3.55 MHz, 4.03 MHz], [7.11 MHz, 8.05 MHz], [3.46 MHz, 3.92 MHz], [6.92 MHz, 7.85 MHz], [3.31 MHz, 3.75 MHz], [6.61 MHz, 7.5 MHz], [3.23 MHz, 3.67 MHz], [3.313 MHz, 3.755 MHz], [7.19 MHz, 7.98 MHz], [7.36 MHz, 8.18 MHz], [3.6 MHz, 4 MHz], [7.79 MHz, 8.59 MHz], or [3.85 MHz, 4.25 MHz], wherein MHz represents megabyte, and is a unit of the first carrier spacing.

11. The method according to claim 9 or 10, wherein

20 a value of the first carrier spacing comprises any one of the following: 3.75 MHz, 7.8125 MHz, 3.5156 MHz, 7.03125 MHz, 7.93 MHz, 3.91 MHz, 8.2 MHz, or 4.05 MHz.

12. The method according to any one of claims 9 to 11, wherein

25 in a process of modulating the signal by the transmit device, for data part processing, no inverse discrete Fourier transform (IDFT) is performed on the high-frequency physical layer signal, and signal values carried on a direct current subcarrier and a guard subcarrier in a signal of a long training field (LTF) in the first PPDU are non-zero values.

13. The method according to claim 12, wherein

in the signal of the LTF, signal values whose indexes are -32, -31, -30, -29, 0, 29, 30, and 31 are successively -1, 1, 1, 1, -1, -1, 1, and 1; or

30 in the signal of the LTF, signal values whose indexes are -64, -63, -62, -61, -60, -59, -1, 0, 1, 59, 60, 61, 62, and 63 are successively -1, 1, 1, -1, 1, 1, 1, -1, 1, -1, -1, 1, -1, and 1; or

in the signal of the LTF, signal values whose indexes are -128, -127, -126, -125, -124, -123, -1, 0, 1, 123, 124, 125, 126, and 127 are successively -1, -1, -1, 1, 1, 1, -1, -1, 1, -1, -1, 1, 1, and 1; or

35 in the signal of the LTF, signal values whose indexes are -128, -127, -126, -125, -124, -123,

determining, based on a channel bandwidth of the first high-frequency channel and a channel bandwidth of the first low-frequency channel, a sample rate of a signal carried on the first high-frequency channel, wherein the sample rate is M times a minimum sample rate of a signal carried on the first low-frequency channel, and M is a positive integer greater than 1; and

5 determining the first carrier spacing based on the sample rate and a discrete Fourier transform (DFT) size of the first PPDU.

17. The method according to claim 16, wherein the determining, based on a channel bandwidth of the first high-frequency channel and a channel bandwidth of the first low-frequency channel, a sample rate of a signal carried on the first high-frequency channel comprises:

10 determining a high-frequency effective bandwidth in the channel bandwidth of the first high-frequency channel, wherein the high-frequency effective bandwidth comprises a bandwidth corresponding to a data subcarrier, a bandwidth corresponding to a pilot subcarrier, and a bandwidth corresponding to a direct current subcarrier; and

15 determining, based on the high-frequency effective bandwidth, a quantity of effective subcarriers corresponding to the channel bandwidth of the first low-frequency channel, and the DFT size of the first PPDU, the sample rate of the signal carried on the first high-frequency channel.

18. A transmit device, configured to perform a method as claimed in any one of claims 1 to 8.

19. A receive device, configured to perform a method as claimed in any one of claims 9 to 17.

20 20. A transmit device, comprising a memory and at least one processor connected to the memory, wherein the memory is configured to store instructions, and after the instructions are read by the at least one processor, the method according to any one of claims 1 to 8 is performed.

21. A receive device, comprising a memory and at least one processor connected to the memory, wherein the memory is configured to store instructions, and after the instructions are read 25 by the at least one processor, the method according to any one of claims 9 to 17 is performed.

22. A computer-readable storage medium, wherein the computer-readable storage medium stores a computer program, and the computer program is executed by a processor to implement the method according to any one of claims 1 to 8.

23. A computer-readable storage medium, wherein the computer-readable storage medium stores a computer program, and the computer program is executed by a processor to implement 30 the method according to any one of claims 9 to 17.

24. A program which makes a computer to perform a method as claimed in any one of claims 1 to 8.

25. A program which makes a computer to perform a method as claimed in any one of claims 35 9 to 17.