

CLAIMS

What is claimed is:

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

5 generating a physical layer protocol data unit (PPDU) over a target channel, wherein the PPDU comprises a short training field, wherein a bandwidth of the target channel is 320 MHz, and a frequency domain sequence of the short training field is

$\{c_1 * \text{HES}_{-496:16:496}', a_1, c_2 * \text{HES}_{-496:16:496}', 0, c_3 * \text{HES}_{-496:16:496}', a_2, c_4 * \text{HES}_{-496:16:496}'\} * (1+j)/\sqrt{2},$

10 wherein a value of a_i is one of $\{-1, 0, 1\}$, $i = 1$ and 2 ; and

a value of c_j is one of $\{-1, 1\}$, and $j = 1, 2, 3$ and 4 ; and

$\text{HES}_{-496:16:496}'$ represented as $\{M, 1, -M, 0, -M, 1, -M\}$; and

$M = \{-1, -1, -1, 1, 1, 1, -1, 1, 1, 1, -1, 1, 1, -1, 1\}$; and

sending the PPDU over the target channel.

15 2. The method according to claim 1, wherein $a_1=0$, $a_2=0$, $c_1=1$, $c_3=-1$, $c_4=-1$.

3. The method according to claim 1 or claim 2, a period length of the frequency domain sequence of the short training field is $0.8 \mu\text{s}$.

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

20 receiving a physical layer protocol data unit (PPDU) over a target channel; and

performing automatic gain control (AGC) based on a parsed frequency domain sequence of a short training field of the PPDU, the parsed frequency domain sequence of a short training field of the PPDU relates to a defined sequence;

wherein a bandwidth of the target channel is 320 MHz, the defined sequence is

25 $\{c_1 * \text{HES}_{-496:16:496}', a_1, c_2 * \text{HES}_{-496:16:496}', 0, c_3 * \text{HES}_{-496:16:496}', a_2, c_4 * \text{HES}_{-496:16:496}'\} * (1+j)/\sqrt{2},$

wherein a value of a_i is one of $\{-1, 0, 1\}$, $i = 1$ and 2 ; and

a value of c_j is one of $\{-1, 1\}$, and $j=1, 2, 3$ and 4 ; and

$HES_{-496:16:496}'$ represented as $\{M, 1, -M, 0, -M, 1, -M\}$; and

$M = \{-1, -1, -1, 1, 1, 1, -1, 1, 1, 1, -1, 1, 1, -1, 1\}$.

5. The method according to claim 4, wherein $a_1=0, a_2=0, c_1=1, c_3=-1, c_4=-1$.

5 6. The method according to claim 4 or claim 5, a period length of the defined frequency domain sequence of the short training field for a bandwidth of 320 MHz is 0.8 μs .

7. A method for sending a physical layer protocol data unit, comprising:

10 generating a physical layer protocol data unit (PPDU) over a target channel, wherein the PPDU comprises a short training field, wherein the bandwidth of the target channel is 320 MHz, and a frequency domain sequence of the short training field is

15
$$\{c_1 * HES_{-504:8:504}', a_1, c_2 * HES_{-504:8:504}', 0, c_3 * HES_{-504:8:504}', a_2, c_4 * HES_{-504:8:504}'\} * (1+j)/\sqrt{2},$$

wherein a value of a_i is one of $\{-1, 0, 1\}$, $i=1$ and 2 ; and

a value of c_j is one of $\{-1, 1\}$, and $j=1, 2, 3$ and 4 ; and

$HES_{-504:8:504}'$ represented as $\{M, -1, M, -1, -M, -1, M, 0, -M, 1, M, 1, -M, 1, -M\}$; and

$M = \{-1, -1, -1, 1, 1, 1, -1, 1, 1, 1, -1, 1, 1, -1, 1\}$;

20 sending the PPDU over the target channel.

8. The method according to claim 7, wherein $a_1=0, a_2=0, c_1=1, c_3=-1, c_4=-1$.

9. The method according to claim 7 or claim 8, a period length of the frequency domain sequence of the short training field is 1.6 μs .

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

receiving a physical layer protocol data unit (PPDU) over a target channel; and

30 performing automatic gain control (AGC) based on a parsed frequency domain sequence of a short training field of the PPDU, the parsed frequency domain sequence of a short training field of the PPDU relates to a defined sequence;

wherein a bandwidth of the target channel is 320 MHz, a defined sequence is

$\{c_1 * \text{HES}_{-504:8:504}', a_1, c_2 * \text{HES}_{-504:8:504}', 0, c_3 * \text{HES}_{-504:8:504}', a_2, c_4 * \text{HES}_{-504:8:504}'\} *$

$(1+j)/\sqrt{2},$

wherein a value of a_i is one of $\{-1, 0, 1\}$, $i = 1$ and 2 ; and

5 a value of c_j is one of $\{-1, 1\}$, and $j = 1, 2, 3$ and 4 ; and

$\text{HES}_{-504:8:504}'$ represented as $\{M, -1, M, -1, -M, -1, M, 0, -M, 1, M, 1, -M, 1, -M\}$; and

$M = \{-1, -1, -1, 1, 1, 1, -1, 1, 1, 1, -1, 1, 1, -1, 1\}$.

11. The method according to claim 10, wherein $a_1=0$, $a_2=0$, $c_1=1$, $c_3=-1$, $c_4=-1$.

10 12. The method according to claim 10 or claim 11, a period length of the defined frequency domain sequence of the short training field for a bandwidth of 320 MHz is 1.6 μs .

13. A communications apparatus, configured to perform a method as claimed in any one of claims 1 to 12.

15 14. A computer-readable storage medium, wherein the computer-readable storage medium stores a computer program, and when the computer program is executed by a communications apparatus, the communications apparatus is enabled to perform a method as claimed in any one of claims 1 to 12.

20 15. A computer program product, wherein the computer program product comprises instructions, and when the instructions are executed by a communications apparatus, the communications apparatus is enabled to perform a method as claimed in any one of claims 1 to 12.

1. A method for sending a physical layer protocol data unit, comprising:
generating a physical layer protocol data unit PPDU, wherein the PPDU comprises a short
training field, a length of a frequency domain sequence of the short training field is greater than a
first length, and the first length is a length of a frequency domain sequence of a short training field
that is transmitted over a 160 MHz bandwidth channel; and
sending the PPDU over a target channel, wherein a bandwidth of the target channel is greater
than 160 MHz.

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 short training field, a length of a frequency domain sequence of the short training field
is greater than a first length, the first length is a length of a frequency domain sequence of a short
training field that is transmitted over a 160 MHz bandwidth channel, and a bandwidth 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 short training field is any one of the following:

$$\{\text{HES}_{-496:16:496}', 1, -\text{HES}_{-496:16:496}', 0, -\text{HES}_{-496:16:496}'\} * \frac{(1+j)/\sqrt{2}}{2};$$

$$\{-\text{HES}_{-496:16:496}', -1, \text{HES}_{-496:16:496}', 0, \text{HES}_{-496:16:496}'\} * \frac{(1+j)/\sqrt{2}}{2};$$

$$\{\text{HES}_{-496:16:496}', 1, -\text{HES}_{-496:16:496}', 1, -\text{HES}_{-496:16:496}'\} * \frac{(1+j)/\sqrt{2}}{2};$$

$$\{-\text{HES}_{-496:16:496}', -1, \text{HES}_{-496:16:496}', -1, \text{HES}_{-496:16:496}'\} * \frac{(1+j)/\sqrt{2}}{2};$$

$$\{\text{HES}_{-496:16:496}', 1, -\text{HES}_{-496:16:496}', -1, -\text{HES}_{-496:16:496}'\} * \frac{(1+j)/\sqrt{2}}{2};$$

$$\{-\text{HES}_{-496:16:496}', -1, \text{HES}_{-496:16:496}', 1, \text{HES}_{-496:16:496}'\} * \frac{(1+j)/\sqrt{2}}{2};$$

$$\{\text{HES}_{-496:16:496}', 1, \text{HES}_{-496:16:496}', 1, -\text{HES}_{-496:16:496}'\} * \frac{(1+j)/\sqrt{2}}{2};$$

$$\{-\text{HES}_{-496:16:496}', -1, -\text{HES}_{-496:16:496}', -1, \text{HES}_{-496:16:496}'\} * \frac{(1+j)/\sqrt{2}}{2};$$

$$\{\text{HES}_{-496:16:496}', 0, \text{HES}_{-496:16:496}', 1, -\text{HES}_{-496:16:496}'\} * \frac{(1+j)/\sqrt{2}}{2}; \text{ or}$$

$$\{-\text{HES}_{-496:16:496}', 0, -\text{HES}_{-496:16:496}', -1, \text{HES}_{-496:16:496}'\} * \frac{(1+j)/\sqrt{2}}{2}; \text{ wherein}$$

$\text{HES}_{-496:16:496}'$ is represented as $\{M, 1, -M, 0, -M, 1, -M\}$, and $M = \{-1, -1, -1, 1, 1, 1, -1, 1, 1, 1, -1, 1, 1, -1, 1, 1\}$.

4. 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 short training field is any one of the following:

- 5 $\{\text{HES}_{-504:8:504}', 0, \text{HES}_{-504:8:504}', 0, -\text{HES}_{-504:8:504}'\} * (1+j)/\sqrt{2};$
 - $\{\text{HES}_{-504:8:504}', 0, -\text{HES}_{-504:8:504}', 0, -\text{HES}_{-504:8:504}'\} * (1+j)/\sqrt{2};$
 - $\{-\text{HES}_{-504:8:504}', 0, \text{HES}_{-504:8:504}', 0, \text{HES}_{-504:8:504}'\} * (1+j)/\sqrt{2};$
 - $\{-\text{HES}_{-504:8:504}', 0, -\text{HES}_{-504:8:504}', 0, \text{HES}_{-504:8:504}'\} * (1+j)/\sqrt{2};$
 - $\{\text{HES}_{-504:8:504}', -1, \text{HES}_{-504:8:504}', 0, -\text{HES}_{-504:8:504}'\} * (1+j)/\sqrt{2};$
 - $\{\text{HES}_{-504:8:504}', 0, -\text{HES}_{-504:8:504}', 1, -\text{HES}_{-504:8:504}'\} * (1+j)/\sqrt{2};$
 - $\{-\text{HES}_{-504:8:504}', 0, \text{HES}_{-504:8:504}', -1, \text{HES}_{-504:8:504}'\} * (1+j)/\sqrt{2};$
 - 10 $\{-\text{HES}_{-504:8:504}', 1, -\text{HES}_{-504:8:504}', 0, \text{HES}_{-504:8:504}'\} * (1+j)/\sqrt{2};$
 - $\{\text{HES}_{-504:8:504}', 1, \text{HES}_{-504:8:504}', 0, -\text{HES}_{-504:8:504}'\} * (1+j)/\sqrt{2};$
 - $\{\text{HES}_{-504:8:504}', 0, -\text{HES}_{-504:8:504}', -1, -\text{HES}_{-504:8:504}'\} * (1+j)/\sqrt{2};$
 - $\{-\text{HES}_{-504:8:504}', 0, \text{HES}_{-504:8:504}', 1, \text{HES}_{-504:8:504}'\} * (1+j)/\sqrt{2};$
 - $\{-\text{HES}_{-504:8:504}', -1, -\text{HES}_{-504:8:504}', 0, \text{HES}_{-504:8:504}'\} * (1+j)/\sqrt{2};$
 - 15 $\{\text{HES}_{-504:8:504}', 0, \text{HES}_{-504:8:504}', 1, -\text{HES}_{-504:8:504}'\} * (1+j)/\sqrt{2};$
 - $\{\text{HES}_{-504:8:504}', -1, -\text{HES}_{-504:8:504}', 0, -\text{HES}_{-504:8:504}'\} * (1+j)/\sqrt{2};$
 - $\{-\text{HES}_{-504:8:504}', 1, \text{HES}_{-504:8:504}', 0, \text{HES}_{-504:8:504}'\} * (1+j)/\sqrt{2};$
 - $\{-\text{HES}_{-504:8:504}', 0, -\text{HES}_{-504:8:504}', -1, \text{HES}_{-504:8:504}'\} * (1+j)/\sqrt{2};$
 - $\{\text{HES}_{-504:8:504}', -1, \text{HES}_{-504:8:504}', -1, -\text{HES}_{-504:8:504}'\} * (1+j)/\sqrt{2};$
 - 20 $\{\text{HES}_{-504:8:504}', 1, -\text{HES}_{-504:8:504}', 1, -\text{HES}_{-504:8:504}'\} * (1+j)/\sqrt{2};$
 - $\{-\text{HES}_{-504:8:504}', -1, \text{HES}_{-504:8:504}', -1, \text{HES}_{-504:8:504}'\} * (1+j)/\sqrt{2};$ or
 - $\{-\text{HES}_{-504:8:504}', 1, -\text{HES}_{-504:8:504}', 1, \text{HES}_{-504:8:504}'\} * (1+j)/\sqrt{2};$ wherein
- $\text{HES}_{-504:8:504}'$ is represented as $\{M, -1, M, -1, -M, -1, M, 0, -M, 1, M, 1, -M, 1, -M\}$, and $M = \{-1, -1, -1, 1, 1, 1, -1, 1, 1, 1, -1, 1, 1, -1, 1\}$.

5. 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 short training field is any one of the following:

$$\begin{aligned}
 & \{\text{HES}_{-496:16:496}', 1, -\text{HES}_{-496:16:496}', 0, -\text{HES}_{-496:16:496}', 0, -\text{HES}_{-496:16:496}'\} * (1+j)/\sqrt{2}; \\
 & \{-\text{HES}_{-496:16:496}', -1, \text{HES}_{-496:16:496}', 0, \text{HES}_{-496:16:496}', 0, \text{HES}_{-496:16:496}'\} * (1+j)/\sqrt{2}; \\
 & \{\text{HES}_{-496:16:496}', 0, -\text{HES}_{-496:16:496}', 0, -\text{HES}_{-496:16:496}', -1, -\text{HES}_{-496:16:496}'\} * (1+j)/\sqrt{2}; \\
 & \{-\text{HES}_{-496:16:496}', 0, \text{HES}_{-496:16:496}', 0, \text{HES}_{-496:16:496}', 1, \text{HES}_{-496:16:496}'\} * (1+j)/\sqrt{2}; \\
 & \{\text{HES}_{-496:16:496}', 1, -\text{HES}_{-496:16:496}', 0, -\text{HES}_{-496:16:496}', 1, -\text{HES}_{-496:16:496}'\} * (1+j)/\sqrt{2}; \\
 & \{-\text{HES}_{-496:16:496}', -1, \text{HES}_{-496:16:496}', 0, \text{HES}_{-496:16:496}', -1, \text{HES}_{-496:16:496}'\} * (1+j)/\sqrt{2}; \\
 & \{\text{HES}_{-496:16:496}', 1, -\text{HES}_{-496:16:496}', 0, -\text{HES}_{-496:16:496}', -1, -\text{HES}_{-496:16:496}'\} * (1+j)/\sqrt{2}; \\
 & \{-\text{HES}_{-496:16:496}', -1, \text{HES}_{-496:16:496}', 0, \text{HES}_{-496:16:496}', 1, \text{HES}_{-496:16:496}'\} * (1+j)/\sqrt{2}; \\
 & \{\text{HES}_{-496:16:496}', 0, -\text{HES}_{-496:16:496}', 0, -\text{HES}_{-496:16:496}', 0, -\text{HES}_{-496:16:496}'\} * (1+j)/\sqrt{2}; \text{ or} \\
 & \{-\text{HES}_{-496:16:496}', 0, \text{HES}_{-496:16:496}', 0, \text{HES}_{-496:16:496}', 0, \text{HES}_{-496:16:496}'\} * (1+j)/\sqrt{2};
 \end{aligned}$$

wherein

$\text{HES}_{-496:16:496}'$ is represented as $\{M, 1, -M, 0, -M, 1, -M\}$, and $M = \{-1, -1, -1, 1, 1, 1, -1, 1, 1, 1, -1, 1, 1, -1, 1\}$.

6. 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 short training field is any one of the following:

$$\begin{aligned}
 & \{\text{HES}_{-496:16:496}', 0, \text{HES}_{-496:16:496}', 0, \text{HES}_{-496:16:496}', 0, -\text{HES}_{-496:16:496}'\} * (1+j)/\sqrt{2}; \text{ or} \\
 & \{-\text{HES}_{-496:16:496}', 0, -\text{HES}_{-496:16:496}', 0, -\text{HES}_{-496:16:496}', 0, \text{HES}_{-496:16:496}'\} * (1+j)/\sqrt{2};
 \end{aligned}$$

wherein

$\text{HES}_{-496:16:496}'$ is represented as $\{M, 1, -M, 0, -M, 1, -M\}$, and $M = \{-1, -1, -1, 1, 1, 1, -1, 1, 1, 1, -1, 1, 1, -1, 1\}$.

7. 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 short training field is any one of the following:

$$\begin{aligned}
 & \{\text{HES}_{-504:8:504}', 1, \text{HES}_{-504:8:504}', 0, \text{HES}_{-504:8:504}', 1, -\text{HES}_{-504:8:504}'\} * (1+j)/\sqrt{2}; \\
 & \{\text{HES}_{-504:8:504}', -1, -\text{HES}_{-504:8:504}', 0, -\text{HES}_{-504:8:504}', -1, -\text{HES}_{-504:8:504}'\} * (1+j)/\sqrt{2};
 \end{aligned}$$

$$\{\text{HES}_{-504:8:504}', 1, \text{HES}_{-504:8:504}', 0, \text{HES}_{-504:8:504}', 1, \text{HES}_{-504:8:504}'\} * (1+j)/\sqrt{2};$$

$$\{\text{HES}_{-504:8:504}', -1, \text{HES}_{-504:8:504}', 0, \text{HES}_{-504:8:504}', -1, \text{HES}_{-504:8:504}'\} * (1+j)/\sqrt{2};$$

$$\{\text{HES}_{-504:8:504}', 0, \text{HES}_{-504:8:504}', 0, \text{HES}_{-504:8:504}', 0, \text{HES}_{-504:8:504}'\} * (1+j)/\sqrt{2};$$

$$\{\text{HES}_{-504:8:504}', 0, \text{HES}_{-504:8:504}', 0, \text{HES}_{-504:8:504}', 0, \text{HES}_{-504:8:504}'\} * (1+j)/\sqrt{2};$$

$$5 \quad \{\text{HES}_{-504:8:504}', 0, \text{HES}_{-504:8:504}', 0, \text{HES}_{-504:8:504}', 0, \text{HES}_{-504:8:504}'\} * (1+j)/\sqrt{2};$$

$$\{\text{HES}_{-504:8:504}', 0, \text{HES}_{-504:8:504}', 0, \text{HES}_{-504:8:504}', 0, \text{HES}_{-504:8:504}'\} * (1+j)/\sqrt{2};$$

$$\{\text{HES}_{-504:8:504}', 0, \text{HES}_{-504:8:504}', 0, \text{HES}_{-504:8:504}', 1, \text{HES}_{-504:8:504}'\} * (1+j)/\sqrt{2};$$

$$\{\text{HES}_{-504:8:504}', -1, \text{HES}_{-504:8:504}', 0, \text{HES}_{-504:8:504}', 0, \text{HES}_{-504:8:504}'\} * (1+j)/\sqrt{2};$$

$$\{\text{HES}_{-504:8:504}', 1, \text{HES}_{-504:8:504}', 0, \text{HES}_{-504:8:504}', 0, \text{HES}_{-504:8:504}'\} * (1+j)/\sqrt{2};$$

$$10 \quad \{\text{HES}_{-504:8:504}', 0, \text{HES}_{-504:8:504}', 0, \text{HES}_{-504:8:504}', -1, \text{HES}_{-504:8:504}'\} * (1+j)/\sqrt{2};$$

$$\{\text{HES}_{-504:8:504}', -1, \text{HES}_{-504:8:504}', 0, \text{HES}_{-504:8:504}', -1, \text{HES}_{-504:8:504}'\} * (1+j)/\sqrt{2};$$

$$\{\text{HES}_{-504:8:504}', 1, \text{HES}_{-504:8:504}', 0, \text{HES}_{-504:8:504}', 1, \text{HES}_{-504:8:504}'\} * (1+j)/\sqrt{2};$$

$$\{\text{HES}_{-504:8:504}', -1, \text{HES}_{-504:8:504}', 0, \text{HES}_{-504:8:504}', -1, \text{HES}_{-504:8:504}'\} * (1+j)/\sqrt{2};$$

$$\{\text{HES}_{-504:8:504}', 1, \text{HES}_{-504:8:504}', 0, \text{HES}_{-504:8:504}', 1, \text{HES}_{-504:8:504}'\} * (1+j)/\sqrt{2};$$

$$15 \quad \{\text{HES}_{-504:8:504}', -1, \text{HES}_{-504:8:504}', 0, \text{HES}_{-504:8:504}', 0, \text{HES}_{-504:8:504}'\} * (1+j)/\sqrt{2};$$

$$\{\text{HES}_{-504:8:504}', 0, \text{HES}_{-504:8:504}', 0, \text{HES}_{-504:8:504}', 1, \text{HES}_{-504:8:504}'\} * (1+j)/\sqrt{2};$$

$$\{\text{HES}_{-504:8:504}', 0, \text{HES}_{-504:8:504}', 0, \text{HES}_{-504:8:504}', -1, \text{HES}_{-504:8:504}'\} * (1+j)/\sqrt{2}; \text{ or}$$

$$\{\text{HES}_{-504:8:504}', 1, \text{HES}_{-504:8:504}', 0, \text{HES}_{-504:8:504}', 0, \text{HES}_{-504:8:504}'\} * (1+j)/\sqrt{2};$$

wherein

20 $\text{HES}_{-504:8:504}'$ is represented as $\{M, -1, M, -1, -M, -1, M, 0, -M, 1, M, 1, -M, 1, -M\}$, and

$M = \{-1, -1, -1, 1, 1, 1, -1, 1, 1, 1, -1, 1, 1, -1, 1\}$.

8. 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 short training field is any one of the following:

$$\{\text{HES}_{-504:8:504}', 0, \text{HES}_{-504:8:504}', 0, \text{HES}_{-504:8:504}', 0, \text{HES}_{-504:8:504}'\} * (1+j)/\sqrt{2};$$

$$\{\text{HES}_{-504:8:504}', 0, -\text{HES}_{-504:8:504}', 0, -\text{HES}_{-504:8:504}', 0, -\text{HES}_{-504:8:504}'\} * (1+j)/\sqrt{2};$$

$$\{-\text{HES}_{-504:8:504}', 0, \text{HES}_{-504:8:504}', 0, \text{HES}_{-504:8:504}', 0, \text{HES}_{-504:8:504}'\} * (1+j)/\sqrt{2}; \text{ or}$$

$$\{-\text{HES}_{-504:8:504}', 0, -\text{HES}_{-504:8:504}', 0, -\text{HES}_{-504:8:504}', 0, \text{HES}_{-504:8:504}'\} * (1+j)/\sqrt{2};$$

wherein

5 $\text{HES}_{-504:8:504}'$ is represented as $\{M, -1, M, -1, -M, -1, M, 0, -M, 1, M, 1, -M, 1, -M\}$, and $M = \{-1, -1, -1, 1, 1, 1, -1, 1, 1, 1, -1, 1, 1, -1, 1\}$.

9. The method according to any one of claim 3, 5, or 6, wherein a period length of the frequency domain sequence of the short training field is 0.8 μs .

10 10. The method according to any one of claim 4, 7, or 8, wherein a period length of the frequency domain sequence of the short training field is 1.6 μs .

11. An apparatus for sending a physical layer protocol data unit, comprising: a processing unit and a communications unit, wherein

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

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

20 12. An apparatus for receiving a physical layer protocol data unit, comprising: a processing unit and a communications unit, wherein

25 the communications unit is configured to receive a physical layer protocol data unit PPDU over a target channel, wherein the PPDU comprises a short training field, a length of a frequency domain sequence of the short training field is greater than a first length, the first length is a length of a frequency domain sequence of a short training field that is transmitted over a 160 MHz bandwidth channel, and a bandwidth of the target channel is greater than 160 MHz; and

the processing unit is configured to parse the PPDU.

30 13. The apparatus according to claim 11 or 12, wherein the bandwidth of the target channel is 240 MHz, and the frequency domain sequence of the short training field is any one of the following:

$$\{\text{HES}_{-496:16:496}', 1, -\text{HES}_{-496:16:496}', 0, -\text{HES}_{-496:16:496}'\} * (1+j)/\sqrt{2};$$

$$\{-\text{HES}_{-496:16:496}', -1, \text{HES}_{-496:16:496}', 0, \text{HES}_{-496:16:496}'\} * (1+j)/\sqrt{2};$$

$$\{\text{HES}_{-496:16:496}', 1, -\text{HES}_{-496:16:496}', 1, -\text{HES}_{-496:16:496}'\} * (1+j)/\sqrt{2};$$

$$\{-\text{HES}_{-496:16:496}', -1, \text{HES}_{-496:16:496}', -1, \text{HES}_{-496:16:496}'\} * (1+j)/\sqrt{2};$$

$$5 \quad \{\text{HES}_{-496:16:496}', 1, -\text{HES}_{-496:16:496}', -1, -\text{HES}_{-496:16:496}'\} * (1+j)/\sqrt{2};$$

$$\{-\text{HES}_{-496:16:496}', -1, \text{HES}_{-496:16:496}', 1, \text{HES}_{-496:16:496}'\} * (1+j)/\sqrt{2};$$

$$\{\text{HES}_{-496:16:496}', 1, \text{HES}_{-496:16:496}', 1, -\text{HES}_{-496:16:496}'\} * (1+j)/\sqrt{2};$$

$$\{-\text{HES}_{-496:16:496}', -1, -\text{HES}_{-496:16:496}', -1, \text{HES}_{-496:16:496}'\} * (1+j)/\sqrt{2};$$

$$\{\text{HES}_{-496:16:496}', 0, \text{HES}_{-496:16:496}', 1, -\text{HES}_{-496:16:496}'\} * (1+j)/\sqrt{2}; \text{ or}$$

$$10 \quad \{-\text{HES}_{-496:16:496}', 0, -\text{HES}_{-496:16:496}', -1, \text{HES}_{-496:16:496}'\} * (1+j)/\sqrt{2}; \text{ wherein}$$

$\text{HES}_{-496:16:496}'$ is represented as $\{M, 1, -M, 0, -M, 1, -M\}$, and $M = \{-1, -1, -1, 1, 1, 1, -1, 1, 1, 1, -1, 1, 1, -1, 1, 1\}$.

14. The apparatus according to claim 11 or 12, wherein the bandwidth of the target channel is 240 MHz, and the frequency domain sequence of the short training field is any one of the following:

$$\{\text{HES}_{-504:8:504}', 0, \text{HES}_{-504:8:504}', 0, -\text{HES}_{-504:8:504}'\} * (1+j)/\sqrt{2};$$

$$\{\text{HES}_{-504:8:504}', 0, -\text{HES}_{-504:8:504}', 0, -\text{HES}_{-504:8:504}'\} * (1+j)/\sqrt{2};$$

$$\{-\text{HES}_{-504:8:504}', 0, \text{HES}_{-504:8:504}', 0, \text{HES}_{-504:8:504}'\} * (1+j)/\sqrt{2};$$

$$\{-\text{HES}_{-504:8:504}', 0, -\text{HES}_{-504:8:504}', 0, \text{HES}_{-504:8:504}'\} * (1+j)/\sqrt{2};$$

$$20 \quad \{\text{HES}_{-504:8:504}', -1, \text{HES}_{-504:8:504}', 0, -\text{HES}_{-504:8:504}'\} * (1+j)/\sqrt{2};$$

$$\{\text{HES}_{-504:8:504}', 0, -\text{HES}_{-504:8:504}', 1, -\text{HES}_{-504:8:504}'\} * (1+j)/\sqrt{2};$$

$$\{-\text{HES}_{-504:8:504}', 0, \text{HES}_{-504:8:504}', -1, \text{HES}_{-504:8:504}'\} * (1+j)/\sqrt{2};$$

$$\{-\text{HES}_{-504:8:504}', 1, -\text{HES}_{-504:8:504}', 0, \text{HES}_{-504:8:504}'\} * (1+j)/\sqrt{2};$$

$$\{\text{HES}_{-504:8:504}', 1, \text{HES}_{-504:8:504}', 0, -\text{HES}_{-504:8:504}'\} * (1+j)/\sqrt{2};$$

$$\{\text{HES}_{-504:8:504}', 0, -\text{HES}_{-504:8:504}', -1, -\text{HES}_{-504:8:504}'\} * (1+j)/\sqrt{2};$$

$$\{-\text{HES}_{-504:8:504}', 0, \text{HES}_{-504:8:504}', 1, \text{HES}_{-504:8:504}'\} * (1+j)/\sqrt{2};$$

$$\{-\text{HES}_{-504:8:504}', -1, -\text{HES}_{-504:8:504}', 0, \text{HES}_{-504:8:504}'\} * (1+j)/\sqrt{2};$$

$$\{\text{HES}_{-504:8:504}', 0, \text{HES}_{-504:8:504}', 1, -\text{HES}_{-504:8:504}'\} * (1+j)/\sqrt{2};$$

$$5 \quad \{\text{HES}_{-504:8:504}', -1, -\text{HES}_{-504:8:504}', 0, -\text{HES}_{-504:8:504}'\} * (1+j)/\sqrt{2};$$

$$\{-\text{HES}_{-504:8:504}', 1, \text{HES}_{-504:8:504}', 0, \text{HES}_{-504:8:504}'\} * (1+j)/\sqrt{2};$$

$$\{-\text{HES}_{-504:8:504}', 0, -\text{HES}_{-504:8:504}', -1, \text{HES}_{-504:8:504}'\} * (1+j)/\sqrt{2};$$

$$\{\text{HES}_{-504:8:504}', -1, \text{HES}_{-504:8:504}', -1, -\text{HES}_{-504:8:504}'\} * (1+j)/\sqrt{2};$$

$$\{\text{HES}_{-504:8:504}', 1, -\text{HES}_{-504:8:504}', 1, -\text{HES}_{-504:8:504}'\} * (1+j)/\sqrt{2};$$

$$10 \quad \{-\text{HES}_{-504:8:504}', -1, \text{HES}_{-504:8:504}', -1, \text{HES}_{-504:8:504}'\} * (1+j)/\sqrt{2}; \text{ or}$$

$$\{-\text{HES}_{-504:8:504}', 1, -\text{HES}_{-504:8:504}', 1, \text{HES}_{-504:8:504}'\} * (1+j)/\sqrt{2}; \text{ wherein}$$

$\text{HES}_{-504:8:504}'$ is represented as $\{M, -1, M, -1, -M, -1, M, 0, -M, 1, M, 1, -M, 1, -M\}$, and

$M = \{-1, -1, -1, 1, 1, 1, -1, 1, 1, 1, -1, 1, 1, -1, 1\}$.

15. The apparatus according to claim 11 or 12, wherein the bandwidth of the target channel is 320 MHz, and the frequency domain sequence of the short training field is any one of the following:

$$\{\text{HES}_{-496:16:496}', 1, -\text{HES}_{-496:16:496}', 0, -\text{HES}_{-496:16:496}', 0, -\text{HES}_{-496:16:496}'\} * (1+j)/\sqrt{2};$$

$$\{-\text{HES}_{-496:16:496}', -1, \text{HES}_{-496:16:496}', 0, \text{HES}_{-496:16:496}', 0, \text{HES}_{-496:16:496}'\} * (1+j)/\sqrt{2};$$

$$\{\text{HES}_{-496:16:496}', 0, -\text{HES}_{-496:16:496}', 0, -\text{HES}_{-496:16:496}', -1, -\text{HES}_{-496:16:496}'\} * (1+j)/\sqrt{2};$$

$$20 \quad \{-\text{HES}_{-496:16:496}', 0, \text{HES}_{-496:16:496}', 0, \text{HES}_{-496:16:496}', 1, \text{HES}_{-496:16:496}'\} * (1+j)/\sqrt{2};$$

$$\{\text{HES}_{-496:16:496}', 1, -\text{HES}_{-496:16:496}', 0, -\text{HES}_{-496:16:496}', 1, -\text{HES}_{-496:16:496}'\} * (1+j)/\sqrt{2};$$

$$\{-\text{HES}_{-496:16:496}', -1, \text{HES}_{-496:16:496}', 0, \text{HES}_{-496:16:496}', -1, \text{HES}_{-496:16:496}'\} * (1+j)/\sqrt{2};$$

$$\{\text{HES}_{-496:16:496}', 1, -\text{HES}_{-496:16:496}', 0, -\text{HES}_{-496:16:496}', -1, -\text{HES}_{-496:16:496}'\} * (1+j)/\sqrt{2};$$

$$\{-\text{HES}_{-496:16:496}', -1, \text{HES}_{-496:16:496}', 0, \text{HES}_{-496:16:496}', 1, \text{HES}_{-496:16:496}'\} * (1+j)/\sqrt{2};$$

$$\{\text{HES}_{-496:16:496}', 0, -\text{HES}_{-496:16:496}', 0, -\text{HES}_{-496:16:496}', 0, -\text{HES}_{-496:16:496}'\} * (1+j)/\sqrt{2}; \text{ or}$$

$$\{-\text{HES}_{-496:16:496}', 0, \text{HES}_{-496:16:496}', 0, \text{HES}_{-496:16:496}', 0, \text{HES}_{-496:16:496}'\} * (1+j)/\sqrt{2};$$

wherein

$\text{HES}_{-496:16:496}'$ is represented as $\{M, 1, -M, 0, -M, 1, -M\}$, and $M = \{-1, -1, -1, 1, 1, 1, -1, 1, 1, 1, -1, 1, 1, -1, 1, 1\}$.

16. The apparatus according to claim 11 or 12, wherein the bandwidth of the target channel is 320 MHz, and the frequency domain sequence of the short training field is any one of the following:

$$\{\text{HES}_{-496:16:496}', 0, \text{HES}_{-496:16:496}', 0, \text{HES}_{-496:16:496}', 0, -\text{HES}_{-496:16:496}'\} * (1+j)/\sqrt{2}; \text{ or}$$

$$\{-\text{HES}_{-496:16:496}', 0, -\text{HES}_{-496:16:496}', 0, -\text{HES}_{-496:16:496}', 0, \text{HES}_{-496:16:496}'\} * (1+j)/\sqrt{2};$$

wherein

$\text{HES}_{-496:16:496}'$ is represented as $\{M, 1, -M, 0, -M, 1, -M\}$, and $M = \{-1, -1, -1, 1, 1, 1, -1, 1, 1, 1, -1, 1, 1, -1, 1, 1\}$.

17. The apparatus according to claim 11 or 12, wherein the bandwidth of the target channel is 320 MHz, and the frequency domain sequence of the short training field is any one of the following:

$$\{\text{HES}_{-504:8:504}', 1, \text{HES}_{-504:8:504}', 0, \text{HES}_{-504:8:504}', 1, -\text{HES}_{-504:8:504}'\} * (1+j)/\sqrt{2};$$

$$\{\text{HES}_{-504:8:504}', -1, -\text{HES}_{-504:8:504}', 0, -\text{HES}_{-504:8:504}', -1, -\text{HES}_{-504:8:504}'\} * (1+j)/\sqrt{2};$$

$$\{-\text{HES}_{-504:8:504}', 1, \text{HES}_{-504:8:504}', 0, \text{HES}_{-504:8:504}', 1, \text{HES}_{-504:8:504}'\} * (1+j)/\sqrt{2};$$

$$\{-\text{HES}_{-504:8:504}', -1, -\text{HES}_{-504:8:504}', 0, -\text{HES}_{-504:8:504}', -1, \text{HES}_{-504:8:504}'\} * (1+j)/\sqrt{2};$$

$$\{\text{HES}_{-504:8:504}', 0, \text{HES}_{-504:8:504}', 0, \text{HES}_{-504:8:504}', 0, -\text{HES}_{-504:8:504}'\} * (1+j)/\sqrt{2};$$

$$\{\text{HES}_{-504:8:504}', 0, -\text{HES}_{-504:8:504}', 0, -\text{HES}_{-504:8:504}', 0, -\text{HES}_{-504:8:504}'\} * (1+j)/\sqrt{2};$$

$$\{-\text{HES}_{-504:8:504}', 0, \text{HES}_{-504:8:504}', 0, \text{HES}_{-504:8:504}', 0, \text{HES}_{-504:8:504}'\} * (1+j)/\sqrt{2};$$

$$\{-\text{HES}_{-504:8:504}', 0, -\text{HES}_{-504:8:504}', 0, -\text{HES}_{-504:8:504}', 0, \text{HES}_{-504:8:504}'\} * (1+j)/\sqrt{2};$$

$$\{\text{HES}_{-504:8:504}', 0, \text{HES}_{-504:8:504}', 0, \text{HES}_{-504:8:504}', 1, -\text{HES}_{-504:8:504}'\} * (1+j)/\sqrt{2};$$

$$\{\text{HES}_{-504:8:504}', -1, -\text{HES}_{-504:8:504}', 0, -\text{HES}_{-504:8:504}', 0, -\text{HES}_{-504:8:504}'\} * (1+j)/\sqrt{2};$$

$$\{\text{HES}_{-504:8:504}', 1, \text{HES}_{-504:8:504}', 0, \text{HES}_{-504:8:504}', 0, \text{HES}_{-504:8:504}'\} * (1+j)/\sqrt{2};$$

$$\{\text{HES}_{-504:8:504}', 0, \text{HES}_{-504:8:504}', 0, \text{HES}_{-504:8:504}', -1, \text{HES}_{-504:8:504}'\} * (1+j)/\sqrt{2};$$

$$\{\text{HES}_{-504:8:504}', -1, \text{HES}_{-504:8:504}', 0, \text{HES}_{-504:8:504}', -1, \text{HES}_{-504:8:504}'\} * (1+j)/\sqrt{2};$$

$$\{\text{HES}_{-504:8:504}', 1, \text{HES}_{-504:8:504}', 0, \text{HES}_{-504:8:504}', 1, \text{HES}_{-504:8:504}'\} * (1+j)/\sqrt{2};$$

$$5 \quad \{\text{HES}_{-504:8:504}', -1, \text{HES}_{-504:8:504}', 0, \text{HES}_{-504:8:504}', -1, \text{HES}_{-504:8:504}'\} * (1+j)/\sqrt{2};$$

$$\{\text{HES}_{-504:8:504}', 1, \text{HES}_{-504:8:504}', 0, \text{HES}_{-504:8:504}', 1, \text{HES}_{-504:8:504}'\} * (1+j)/\sqrt{2};$$

$$\{\text{HES}_{-504:8:504}', -1, \text{HES}_{-504:8:504}', 0, \text{HES}_{-504:8:504}', 0, \text{HES}_{-504:8:504}'\} * (1+j)/\sqrt{2};$$

$$\{\text{HES}_{-504:8:504}', 0, \text{HES}_{-504:8:504}', 0, \text{HES}_{-504:8:504}', 1, \text{HES}_{-504:8:504}'\} * (1+j)/\sqrt{2};$$

$$\{\text{HES}_{-504:8:504}', 0, \text{HES}_{-504:8:504}', 0, \text{HES}_{-504:8:504}', -1, \text{HES}_{-504:8:504}'\} * (1+j)/\sqrt{2}; \text{ or}$$

$$10 \quad \{\text{HES}_{-504:8:504}', 1, \text{HES}_{-504:8:504}', 0, \text{HES}_{-504:8:504}', 0, \text{HES}_{-504:8:504}'\} * (1+j)/\sqrt{2};$$

wherein

$\text{HES}_{-504:8:504}'$ is represented as $\{M, -1, M, -1, -M, -1, M, 0, -M, 1, M, 1, -M, 1, -M\}$, and $M = \{-1, -1, -1, 1, 1, 1, -1, 1, 1, 1, -1, 1, 1, -1, 1\}$.

18. The apparatus according to claim 11 or 12, wherein the bandwidth of the target channel is 320 MHz, and the frequency domain sequence of the short training field is any one of the following:

$$\{\text{HES}_{-504:8:504}', 0, \text{HES}_{-504:8:504}', 0, \text{HES}_{-504:8:504}', 0, \text{HES}_{-504:8:504}'\} * (1+j)/\sqrt{2};$$

$$\{\text{HES}_{-504:8:504}', 0, \text{HES}_{-504:8:504}', 0, \text{HES}_{-504:8:504}', 0, \text{HES}_{-504:8:504}'\} * (1+j)/\sqrt{2};$$

$$\{\text{HES}_{-504:8:504}', 0, \text{HES}_{-504:8:504}', 0, \text{HES}_{-504:8:504}', 0, \text{HES}_{-504:8:504}'\} * (1+j)/\sqrt{2}; \text{ or}$$

$$20 \quad \{\text{HES}_{-504:8:504}', 0, \text{HES}_{-504:8:504}', 0, \text{HES}_{-504:8:504}', 0, \text{HES}_{-504:8:504}'\} * (1+j)/\sqrt{2};$$

wherein

$\text{HES}_{-504:8:504}'$ is represented as $\{M, -1, M, -1, -M, -1, M, 0, -M, 1, M, 1, -M, 1, -M\}$, and $M = \{-1, -1, -1, 1, 1, 1, -1, 1, 1, 1, -1, 1, 1, -1, 1\}$.

19. The apparatus according to any one of claim 13, 15, or 16, wherein a period length of the frequency domain sequence of the short training field is 0.8 μ s.

20. The apparatus according to any one of claim 14, 17, or 18, wherein a period length of the

frequency domain sequence of the short training field is 1.6 μ s.

21. A communications apparatus, comprising:

a memory, configured to store computer instructions; and

a processor, configured to execute the computer instructions stored in the memory, to enable

5 the apparatus to perform the method according to any one of claims 1 to 10.

22. A processing apparatus, comprising at least one processor, wherein the at least one processor is configured to execute a computer program stored in a memory, to enable the apparatus to implement the method according to any one of claims 1 to 10.

23. A processing apparatus, comprising:

10 a communications interface, configured to input and/or output information; and

a processor, configured to execute a computer program, to enable the apparatus to implement the method according to any one of claims 1 to 10.

24. A computer-readable storage medium, wherein the computer-readable storage medium stores a computer program, and when the computer program is executed by an apparatus for
15 sending a physical layer protocol data unit, the apparatus is enabled to perform the method according to any one of claims 1 to 10.

25. A computer program product, wherein the computer program product comprises instructions, and when the instructions are executed by a computer, a communications apparatus is enabled to perform the method according to any one of claims 1 to 10.

20