

WHAT IS CLAIMED IS:

1. A data transmission method, applicable to a base station, the method comprising:
when performing resource mapping on a physical downlink channel, mapping (S11) data symbols to a data transmission symbol and an adjustment symbol of a target sub-frame containing the adjustment symbol; wherein, the target sub-frame is a last sub-frame before performing a frequency adjustment or an uplink/downlink switching and/or a first sub-frame after performing the frequency adjustment or the uplink/downlink switching, the data transmission symbol is an orthogonal frequency division multiplexing (OFDM) symbol for transmitting data, and the adjustment symbol is an OFDM symbol used for a narrowband frequency adjustment or the uplink/downlink switching without data transmission.
2. The method of claim 1, wherein the last sub-frame before performing the frequency adjustment or the uplink/downlink switching is configured as the target sub-frame, and the adjustment symbol is configured as last two OFDM symbols of the last sub-frame; or
the first sub-frame after performing the frequency adjustment or the uplink/downlink switching is configured as the target sub-frame, and the adjustment symbol is configured as first two OFDM symbols of the first sub-frame; or
both the last sub-frame before performing the frequency adjustment or the uplink/downlink switching and the first sub-frame after performing the frequency adjustment or the uplink/downlink switching are configured as the target sub-frame, and the adjustment symbol is configured as a last OFDM symbol of the last sub-frame and a first OFDM symbol of the first sub-frame.
3. The method of claim 1, wherein the method further comprises:
determining (S13) the adjustment symbol based on first information carried in the last sub-frame before performing the frequency adjustment or the uplink/downlink switching and second information carried in the first sub-frame after performing the frequency adjustment or the uplink/downlink switching.
4. The method of claim 3, wherein when information types of the first information and the second information are different, determining (S13) the adjustment symbol based on the first information carried in the last sub-frame before performing the frequency adjustment or

the uplink/downlink switching and the second information carried in the first sub-frame after performing the frequency adjustment or the uplink/downlink switching comprises:

determining the last sub-frame as the target sub-frame and last two OFDM symbols of the last sub-frame as the adjustment symbol when the first information is data information and the second information is control information; or

determining the first sub-frame as the target sub-frame and first two OFDM symbols of the first sub-frame as the adjustment symbol when the first information is control information and the second information is data information.

5. The method of claim 3, wherein when information types of the first information and the second information are identical, determining (S13) the adjustment symbol based on the information carried in the last sub-frame before performing the frequency adjustment or the uplink/downlink switching and the information carried in the first sub-frame after performing the frequency adjustment or the uplink/downlink switching comprises:

determining the last sub-frame as the target sub-frame and last two OFDM symbols of the last sub-frame as the adjustment symbol; or

determining the first sub-frame as the target sub-frame and first two OFDM symbols of the first sub-frame as the adjustment symbol; or

determining the last sub-frame and the first sub-frame as the target sub-frame and a last OFDM symbol of the last sub-frame and a first OFDM symbol of the first sub-frame as the adjustment symbol.

6. The method of claim 3, wherein determining (S13) the adjustment symbol based on the first information carried in the last sub-frame before performing the frequency adjustment or the uplink/downlink switching and the second information carried in the first sub-frame after performing the frequency adjustment or the uplink/downlink switching comprises:

determining the adjustment symbol based on a first symbol setting strategy corresponding to the first information and the second information; where the first symbol setting strategy is preset, and all combinations of the first information and the second information correspond to the first symbol setting strategy;

wherein the first symbol setting strategy includes:

the last sub-frame being the target sub-frame and the adjustment symbol being the last two OFDM symbols of the last sub-frame; or

the first sub-frame being the target sub-frame and the adjustment symbol being the first two OFDM symbols of the first sub-frame; or

the last sub-frame and the first sub-frame being the target sub-frame and the adjustment symbol being a last OFDM symbol of the last sub-frame and a first OFDM symbol of the first sub-frame.

7. The method of claim 3, wherein determining (S13) the adjustment symbol based on the information carried in the last sub-frame before performing the frequency adjustment or the uplink/downlink switching and the information carried in the first sub-frame after performing the frequency adjustment or the uplink/downlink switching comprises:

determining the adjustment symbol based on a first symbol setting strategy corresponding to the first information and the second information; where the first symbol setting strategy is preset, different combinations of the first information and the second information correspond to different symbol setting strategies respectively, and the first symbol setting strategy is any one of the different symbol setting strategies;

wherein the first symbol setting strategy includes:

the last sub-frame being the target sub-frame and the adjustment symbol being the last two OFDM symbols of the last sub-frame; or

the first sub-frame being the target sub-frame and the adjustment symbol being the first two OFDM symbols of the first sub-frame; or

the last sub-frame and the first sub-frame being the target sub-frame and the adjustment symbol being a last OFDM symbol of the last sub-frame and a first OFDM symbol of the first sub-frame.

8. A data transmission method, applicable to a user device, the method comprising:

disabling (S41) reception of a data symbol in an adjustment symbol in a target sub-frame when performing data reception of the target sub-frame containing the adjustment symbol; wherein, the target sub-frame is a last sub-frame before performing a frequency adjustment or an uplink/downlink switching and/or a first sub-frame after performing the frequency

adjustment or the uplink/downlink switching, and the adjustment symbol is an orthogonal frequency division multiplexing (OFDM) symbol used for a narrowband frequency adjustment or the uplink/downlink switching without data transmission; and

padding (S42) with a preset value at a position in analyzed data of the target sub-frame that corresponds to the adjustment symbol during data analysis.

9. The method of claim 8, wherein the last sub-frame before performing the frequency adjustment or last uplink/downlink switching is configured as the target sub-frame, and the adjustment symbol is configured as last two OFDM symbols of the last sub-frame; or

the target sub-frame is the first sub-frame after performing the frequency adjustment or the uplink/downlink switching is configured as the target sub-frame, and the adjustment symbol is configured as first two OFDM symbols of the first sub-frame; or

both the last sub-frame before performing the frequency adjustment or the uplink/downlink switching and the first sub-frame after performing the frequency adjustment or the uplink/downlink switching are configured as the target sub-frame, and the adjustment symbol is configured as a last OFDM symbol of the last sub-frame and a first OFDM symbol of the first sub-frame.

10. The method of claim 8, wherein the method further comprises:

determining (S43) the adjustment symbol based on first information carried in the last sub-frame before performing the frequency adjustment or the uplink/downlink switching and second information carried in the first sub-frame after performing the frequency adjustment or the uplink/downlink switching.

11. The method of claim 10, wherein when information types of the first information and the second information are different, determining (S43) the adjustment symbol based on the first information carried in the last sub-frame before performing the frequency adjustment or the uplink/downlink switching and the second information carried in the first sub-frame after performing the frequency adjustment or the uplink/downlink switching comprises:

determining the last sub-frame as the target sub-frame and last two OFDM symbols of the last sub-frame as the adjustment symbol when the first information is data information and the second information is control information; or

determining the first sub-frame as the target sub-frame and as first two OFDM symbols of the first sub-frame as the adjustment symbol when the first information is control information and the second information is data information.

12. The method of claim 10, wherein when information types of the first information and the second information are identical, determining (S43) the adjustment symbol based on the information carried in the last sub-frame before performing the frequency adjustment or the uplink/downlink switching and the information carried in the first sub-frame after performing the frequency adjustment or the uplink/downlink switching comprises:

determining the last sub-frame as the target sub-frame and last two OFDM symbols of the last sub-frame as the adjustment symbol; or

determining the first sub-frame as the target sub-frame and first two OFDM symbols of the first sub-frame as the adjustment symbol; or

determining the last sub-frame and the first sub-frame as the target sub-frame and a last OFDM symbol of the last sub-frame and a first OFDM symbol of the first sub-frame as the adjustment symbol.

13. The method of claim 10, wherein determining (S43) the adjustment symbol based on the first information carried in the last sub-frame before performing the frequency adjustment or the uplink/downlink switching and the second information carried in the first sub-frame after performing the frequency adjustment or the uplink/downlink switching comprises:

determining the adjustment symbol based on a first symbol setting strategy corresponding to the first information and the second information; where the first symbol setting strategy is preset, and all combinations of the first information and the second information correspond to the first symbol setting strategy;

wherein the first symbol setting strategy includes:

the last sub-frame being the target sub-frame and the adjustment symbol being last two OFDM symbols of the last sub-frame; or

the first sub-frame being the target sub-frame and the adjustment symbol being first two OFDM symbols of the first sub-frame; or

the last sub-frame and the first sub-frame being the target sub-frame and the

adjustment symbol being a last OFDM symbol of the last sub-frame and a first OFDM symbol of the first sub-frame.

14. The method of claim 10, wherein determining (S43) the adjustment symbol based on the information carried in the last sub-frame before performing the frequency adjustment or the uplink/downlink switching and the information carried in the first sub-frame after performing the frequency adjustment or the uplink/downlink switching comprises:

determining the adjustment symbol based on a first symbol setting strategy corresponding to the first information and the second information; where the first symbol setting strategy is preset, different combinations of the first information and the second information correspond to different symbol setting strategies respectively, and the first symbol setting strategy is any one of the different symbol setting strategies;

wherein the first symbol setting strategy includes:

the last sub-frame being the target sub-frame and the adjustment symbol being last two OFDM symbols of the last sub-frame; or

the first sub-frame being the target sub-frame and the adjustment symbol being first two OFDM symbols of the first sub-frame; or

the last sub-frame and the first sub-frame being the target sub-frame and the adjustment symbol being a last OFDM symbol of the last sub-frame and a first OFDM symbol of the first sub-frame.

15. The method of claim 8, wherein padding (S42) with a preset value at a position in analyzed data of the target sub-frame that corresponds to the adjustment symbol during data analysis comprises:

padding with zero or one at the position in the analyzed data of the target sub-frame after data analysis that corresponds to the adjustment symbol during the data analysis.

16. A data transmission apparatus (600), applicable to a base station, the apparatus (600) comprising:

a resource mapping module (601), configured to map data symbols to a data transmission symbol and an adjustment symbol of a target sub-frame containing the adjustment symbol when performing resource mapping on a physical downlink channel; wherein, the target sub-

frame is a last sub-frame before performing a frequency adjustment or an uplink/downlink switching and/or a first sub-frame after performing the frequency adjustment or the uplink/downlink switching, the data transmission symbol is an orthogonal frequency division multiplexing (OFDM) symbol for transmitting data, and the adjustment symbol is an OFDM symbol used for a narrowband frequency adjustment or the uplink/downlink switching without data transmission.

17. A data transmission apparatus (800), applicable to a user device, the apparatus (800) comprising:

a receiving module (801), configured to disable reception of a data symbol in an adjustment symbol in a target sub-frame when performing data reception of the target sub-frame containing the adjustment symbol; wherein, the target sub-frame is a last sub-frame before performing a frequency adjustment or an uplink/downlink switching and/or a first sub-frame after performing the frequency adjustment or uplink/downlink switching, and the adjustment symbol is an orthogonal frequency division multiplexing (OFDM) symbol used for a narrowband frequency adjustment or the uplink/downlink switching without data transmission; and

the receiving module is further configured to pad with a preset value at a position in analyzed data of the target sub-frame that corresponds to the adjustment symbol during data analysis.

18. A computer-readable storage medium having computer program instructions stored thereon, wherein when the program instructions are executed by a processor, the steps of the method of any one of claims 1 to 7 are implemented.

19. A computer-readable storage medium having computer program instructions stored thereon, wherein when the program instructions are executed by a processor, the steps of the method of any one of claims 8 to 15 are implemented.