

CLAIMS

1. A method for transmitting an uplink control signal, comprising:

5 determining, by a terminal, a plurality of time-frequency resources for transmitting the uplink control signal in a time-domain scheduling unit; and

 transmitting, by the terminal, the uplink control signal to a network device on the plurality of time-frequency resources, the uplink control signal being transmitted by use of a Cyclic Prefix-Orthogonal Frequency Division Multiplexing (CP-OFDM) waveform;

10 wherein the time-domain scheduling unit comprises different physical resource regions used to transmit uplink control signals of different types and the plurality of time-frequency resources for transmitting the uplink control signal in the time-domain scheduling unit are arranged into one or more of the different physical resource regions;

15 the one or more physical resource regions comprise a first physical resource region for transmitting uplink control signals of the type Acknowledgement (ACK)/Negative Acknowledgement (NACK) and a second physical resource region for transmitting uplink control signals of the type Channel State Information (CSI) feedback;

20 wherein time-frequency resources for transmitting uplink control signals of the type reference signal are configured into multiple resource groups, wherein the multiple resource groups are allocated in one of the first physical resource region or the second physical resource region of the time-domain scheduling unit; wherein each resource group includes one or more time-frequency resources; wherein the multiple resource groups are non-continuously allocated in time domain of the time-domain scheduling unit, and the time-domain scheduling unit is a slot.

2. The method of claim 1, wherein the at least one physical resource region further comprises a third physical resource region,

30 wherein the first, second, and third physical resource regions are overlapped, or wherein the first, second, and third physical resource regions are continuous in time domain.

3. The method of claim 1, wherein the second physical resource region and the first

physical resource region are continuous in time domain.

4. The method of claim 3, wherein a last OFDM symbol of the third physical resource region in the time domain is a last OFDM symbol in the time-domain scheduling unit.

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5. The method of any one of claims 2-4, wherein the uplink control signal comprises multiple Acknowledgement (ACK)/Negative Acknowledgement (NACK) signals, and when physical resources for transmitting the reference signals are configured in the first physical resource region, in the first physical resource region, physical resources for transmitting the multiple ACK/NACK signals and the physical resources for transmitting the reference signals are not overlapped, and the physical resources in a resource group for transmitting the multiple ACK/NACK signals and the physical resources for transmitting the reference signals are staggered and continuously arranged in a same OFDM symbol.

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6. The method of any one of claims 2-4, wherein the uplink control signal further comprises a Channel State Information (CSI) feedback signal, and when physical resources for transmitting the reference signals are configured in the second physical resource region, in the second physical resource transmission region, a physical resource for transmitting the CSI feedback signal and the physical resources for transmitting the reference signals are not overlapped, and the physical resources in the resource group for transmitting the reference signals are continuous in the time domain.

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7. The method of any one of claims 2-4, wherein the uplink control signal comprises the multiple ACK/NACK signals, in the third physical resource region, the physical resources for transmitting the multiple ACK/NACK signals and physical resources for transmitting the reference signals are not overlapped.

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8. The method of any one of claims 5-7, wherein the multiple ACK/NACK signals correspond to downlink data blocks in different time-domain scheduling units respectively, or

the multiple ACK/NACK signals correspond to different codewords of a same downlink data block.

9. The method of any one of claims 1-8, wherein determining, by the terminal, the physical resource for transmitting the uplink control signal in the time-domain scheduling unit comprises:

receiving, by the terminal, indication information transmitted by the network device, the indication information being used to indicate the physical resource for transmitting the uplink control signal in the time-domain scheduling unit.

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10. The method of claim 9, wherein the indication information is further used to indicate a physical resource used by the terminal for transmitting uplink data in the time-domain scheduling unit.

11. The method of any one of claims 1-10, wherein the physical resources comprise resource elements, REs.

12. The method of any one of claims 1-10, wherein each of the physical resource regions comprises resource elements, REs, continuous in frequency region, and a plurality of Orthogonal Frequency Division Multiplexing (OFDM) signals.

13. A device for transmitting an uplink control signal, comprising:

a first determination module, configured to determine a plurality of time-frequency resources for transmitting the uplink control signal in a time-domain scheduling unit; and

a transmitting module, configured to transmit the uplink control signal to a network device on the plurality of time-frequency resources, the uplink control signal being transmitted by use of a Cyclic Prefix-Orthogonal Frequency Division Multiplexing (CP-OFDM) waveform;

wherein the time-domain scheduling unit comprises different physical resource regions used to transmit uplink control signals of different types and the plurality of time-frequency resources for transmitting the uplink control signal in the time-domain scheduling unit are arranged into one or more of the different physical resource regions;

the one or more physical resource regions comprise a first physical resource region for transmitting uplink control signals of the type Acknowledgement (ACK)/Negative Acknowledgement (NACK) and a second physical resource region for transmitting uplink control signals of the type Channel State Information (CSI) feedback;

wherein time-frequency resources for transmitting uplink control signals of the type reference signal are configured into multiple resource groups, wherein the multiple resource groups are allocated in one of the first physical resource region or the second physical resource region of the time-domain scheduling unit; wherein each resource group includes one or more time-frequency resources; wherein the multiple resource groups are non-continuously allocated in time domain of the time-domain scheduling unit, and the time-domain scheduling unit is a slot.

14. The device of claim 13, wherein the at least one physical resource region further comprises a third physical resource region,

wherein the first, second, and third physical resource regions are overlapped, or wherein the first, second, and third physical resource regions are continuous in time domain.

15. The device of claim 14, wherein the second physical resource region and the first physical resource region are continuous in time domain.

16. The device of claim 15, wherein a last OFDM symbol of the third physical resource region in the time domain is a last OFDM symbol in the time-domain scheduling unit.

17. The device of any one of claims 13-16, wherein the uplink control signal comprises multiple Acknowledgement (ACK)/Negative Acknowledgement (NACK) signals, and when physical resources for transmitting the reference signals are configured in the first physical resource region, in the first physical resource region, physical resources for transmitting the multiple ACK/NACK signals and the physical resources for transmitting the reference signals are not overlapped, and the physical resources in a resource group for transmitting the multiple ACK/NACK signals and the physical resources for transmitting the reference signals are staggered and continuously arranged

in a same OFDM symbol.

18. The device of any one of claims 13-16, wherein the uplink control signal further comprises a Channel State Information (CSI) feedback signal, and

5 when physical resources for transmitting the reference signals are configured in the second physical resource region, in the second physical resource transmission region, a physical resource for transmitting the CSI feedback signal and the physical resources for transmitting the reference signals are not overlapped, and the physical resources in the resource group for transmitting the reference signals are continuous in
10 the time domain.

19. The device of any one of claims 13-16, wherein the uplink control signal comprises the multiple ACK/NACK signals,

 in the third physical resource region, the physical resources for transmitting the
15 multiple ACK/NACK signals and physical resources for transmitting the reference signals are not overlapped.

20. The device of any one of claims 13-19, wherein the multiple ACK/NACK signals correspond to downlink data blocks in different time-domain scheduling units
20 respectively, or

 the multiple ACK/NACK signals correspond to different codewords of a same downlink data block.

21. The device of any one of claims 13-20, wherein the first determination module is
25 configured to:

 receive indication information transmitted by the network device, the indication information being used to indicate the physical resource for transmitting the uplink control signal in the time-domain scheduling unit.

30 22. The device of claim 21, wherein the indication information is further used to indicate a physical resource used by the terminal for transmitting uplink data in the time-domain scheduling unit.

23. The device of any one of claims 13-22, wherein the physical resources comprise resource elements (REs).

24. The device of any one of claims 14-22, wherein each of the physical resource
5 regions comprises resource elements (REs), continuous in frequency region, and a plurality of Orthogonal Frequency Division Multiplexing (OFDM) signals.