

CLAIMS

What is claimed is:

1. A wireless communications method, comprising:

receiving (S310), by a terminal device, at least one piece of downlink control
5 information, DCI;

characterized in that the method further comprises:

determining (S320), by the terminal device, a plurality of uplink channels transmitted
within a target time unit, wherein the plurality of uplink channels at least partially overlap
in time domain, and the at least one piece of DCI is used for indicating at least one uplink
10 channel of the plurality of uplink channels; and

multiplexing (S340), by the terminal device responsive to determining that the
plurality of uplink channels fulfill a constraint condition, information carried in the
plurality of uplink channels in one channel within the target time unit for transmission,
wherein

15 the constraint condition comprises:

a first symbol of an earliest uplink channel of the plurality of uplink channels is not
before an Ath symbol after a last symbol of a physical downlink control channel, PDCCH
carrying the at least one piece of DCI, wherein A is a non-negative integer,

wherein the plurality of uplink channels comprise at least one physical uplink control
20 channel, PUCCH, carrying acknowledgement/negative-acknowledgement, ACK/NACK,
corresponding to a target physical downlink shared channel, PDSCH;

wherein the constraint condition further comprises: the first symbol of the earliest
uplink channel of the plurality of uplink channels is not before a Bth symbol after a last
symbol of the target PDSCH, wherein B is a non-negative integer, and

25 wherein $B = N1 + 1 + d_{1,2}$, where N1 is a PDSCH processing time, and a value of $d_{1,2}$ is
related to a PDSCH mapping manner.

2. The method according to claim 1, wherein the at least one piece of DCI comprises at least one of:

DCI used for scheduling a physical uplink shared channel, PUSCH, wherein the plurality of uplink channels comprise the PUSCH; or

5 DCI used for indicating downlink semi-persistent scheduled, DL SPS, resource release, wherein the plurality of uplink channels comprise a PUCCH carrying ACK/NACK corresponding to the DCI for indicating DL SPS resource release; or

DCI used for scheduling a PDSCH, wherein the plurality of uplink channels comprise a PUCCH carrying ACK/NACK corresponding to the PDSCH.

10 3. The method according to claim 1 or 2, wherein the uplink channels further comprise:

a dynamic scheduled PUSCH.

4. The method according to any one of claims 1 to 3, wherein A is obtained based on N2, and N2 is a preparation time of a PUSCH.

15 5. The method according to claim 4, wherein $A=N2+1$.

6. The method according to any one of claims 2 to 5, wherein

if the PDSCH mapping manner is mapping type B as given in subclause 7.4.1.1 of 3GPP technical specification, TS, 38.211, and a quantity of PDSCH symbols allocated is 4, then $d_{1,2}=3$; and

20 if the PDSCH mapping manner is the mapping type B as given in subclause 7.4.1.1 of the 3GPP TS 38.211, and the quantity of PDSCH symbols allocated is 2, then $d_{1,2}=3+d$, where d is a number of overlapping symbols of a scheduling PDCCH and a scheduled PDSCH.

7. The method according to any one of claims 1 to 6, further comprising:

25 determining, by the terminal device when determining that the plurality of uplink channels do not fulfill the constraint condition, that the plurality of uplink channels to be

transmitted within the target time unit are in error.

8. A communications device, comprising:

a communications unit (620), configured to receive at least one piece of downlink control information, DCI;

5 characterized in that the device further comprises:

a determining unit (610), configured to determine a plurality of uplink channels transmitted within a target time unit, wherein the plurality of uplink channels at least partially overlap in time domain, and the at least one piece of DCI is used for indicating at least one uplink channel of the plurality of uplink channels; and

10 responsive to determining that the plurality of uplink channels fulfill a constraint condition, the communications unit (620) is further configured to multiplex information carried in the plurality of uplink channels in one channel within the target time unit for transmission, wherein

the constraint condition comprises:

15 a first symbol of an earliest uplink channel of the plurality of uplink channels is not before an A^{th} symbol after a last symbol of a physical downlink control channel, PDCCH, carrying the at least one piece of DCI, wherein A is a non-negative integer,

wherein the plurality of uplink channels comprise at least one physical uplink control channel, PUCCH, carrying acknowledgement/negative-acknowledgement, ACK/NACK,
20 corresponding to a target physical downlink shared channel, PDSCH;

wherein the constraint condition further comprises: the first symbol of the earliest uplink channel of the plurality of uplink channels is not before a B^{th} symbol after a last symbol of the target PDSCH, wherein B is a non-negative integer, and

wherein $B = N1 + 1 + d_{1,2}$, where N1 is a PDSCH processing time, and a value of $d_{1,2}$ is
25 related to a PDSCH mapping manner.

9. The communications device according to claim 8, wherein the at least one piece of DCI comprises at least one of:

DCI used for scheduling a physical uplink shared channel, PUSCH, wherein the plurality of uplink channels comprise the PUSCH; or

DCI used for indicating downlink semi-persistent scheduled. DL SPS resource release, wherein the plurality of uplink channels comprise a PUCCH carrying ACK/NACK
5 corresponding to the DCI for indicating DL SPS resource release; or

DCI used for scheduling a PDSCH, wherein the plurality of uplink channels comprise a PUCCH carrying ACK/NACK corresponding to the PDSCH.

10. The communications device according to claim 8 or 9, wherein the uplink channels further comprise:

10 a dynamic scheduled PUSCH.

11. The communications device according to any one of claims 8 to 10, wherein A is obtained based on N2, and N2 is a preparation time of a PUSCH.

12. The communications device according to claim 11, wherein $A=N2+1$.

13. The communications device according to any one of claims 8 to 12, wherein

15 if the PDSCH mapping manner is mapping type B and a quantity of PDSCH symbols allocated is 4, then $d_{1,2}=3$; and

if the PDSCH mapping manner is the mapping type B and the quantity of PDSCH symbols allocated is 2, then $d_{1,2}=3+d$, where d is a number of overlapping symbols of a scheduling PDCCH and a scheduled PDSCH.

20 14. The communications device according to any one of claims 8 to 13, wherein the determining unit is further configured to:

determine, when determining that the plurality of uplink channels do not fulfill the constraint condition, that the plurality of uplink channels to be transmitted within the target time unit are in error.

25 15. A wireless communications method, comprising:

sending, by a network device, at least one piece of downlink control information, DCI,

to a terminal device;

determining, by the network device, a plurality of uplink channels transmitted within a target time unit, wherein the plurality of uplink channels at least partially overlap in time domain, and the at least one piece of DCI is used for indicating at least one uplink channel
5 of the plurality of uplink channels; and

receiving, by the network device when the plurality of uplink channels fulfill a constraint condition, one channel within the target time unit, and multiplexing information carried in the plurality of uplink channels in the channel for transmission, wherein

the constraint condition comprises:

10 a first symbol of an earliest uplink channel of the plurality of uplink channels is not before an Ath symbol after a last symbol of a physical downlink control channel, PDCCH, carrying the at least one piece of DCI, wherein A is a non-negative integer,

wherein the plurality of uplink channels comprise at least one physical uplink control channel, PUCCH, carrying acknowledgement/negative-acknowledgement, ACK/NACK,
15 corresponding to a target physical downlink shared channel, PDSCH;

wherein the constraint condition further comprises: the first symbol of the earliest uplink channel of the plurality of uplink channels is not before a Bth symbol after a last symbol of the target PDSCH, wherein B is a non-negative integer, and

wherein $B = N1 + 1 + d_{1,2}$, where N1 is a PDSCH processing time, and a value of $d_{1,2}$ is
20 related to a PDSCH mapping manner.

16. A communications device, comprising:

a communications unit, configured to send at least one piece of downlink control information, DCI, to a terminal device; and

a determining unit, configured to determine a plurality of uplink channels transmitted
25 within a target time unit, wherein the plurality of uplink channels at least partially overlap in time domain, and the at least one piece of DCI is used for indicating at least one uplink channel of the plurality of uplink channels; and

when the plurality of uplink channels fulfill a constraint condition, the communications unit is further configured to receive one channel within the target time unit, and multiplexing information carried in the plurality of uplink channels in the channel for transmission, wherein

5 the constraint condition comprises:

a first symbol of an earliest uplink channel of the plurality of uplink channels is not before an A^{th} symbol after a last symbol of a physical downlink control channel, PDCCH, carrying the at least one piece of DCI, wherein A is a non-negative integer,

10 wherein the plurality of uplink channels comprise at least one physical uplink control channel, PUCCH, carrying acknowledgement/negative-acknowledgement, ACK/NACK, corresponding to a target physical downlink shared channel, PDSCH;

wherein the constraint condition further comprises: the first symbol of the earliest uplink channel of the plurality of uplink channels is not before a B^{th} symbol after a last symbol of the target PDSCH, wherein B is a non-negative integer, and

15 wherein $B=N1+1+d_{1,2}$, where N1 is a PDSCH processing time, and a value of $d_{1,2}$ is related to a PDSCH mapping manner.