

CLAIMS

What is claimed is:

1. A wireless communications method, comprising:

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

characterized in that the method further comprises:

determining, ~~(S320), by a~~ terminal device, a plurality of uplink channels/signals transmitted within a target time unit, wherein the plurality of uplink channels/signals ~~at least partially overlapped in time domain; and~~

10 ~~multiplexing, by the terminal device when the plurality of uplink channels/signals fulfill a constraint condition, information carried in the plurality of uplink channels/signals in one channel/signal within the target time unit for transmission, wherein~~

~~the constraint condition comprises:~~

15 ~~a first symbol of an earliest uplink channel/signal of the plurality of uplink channels/signals is not before an A^{th} symbol after a start time or a last symbol of a target channel/signal, wherein A is a non-negative integer.~~

2. The method according to claim 1, wherein

~~the constraint condition further comprises:~~

20 ~~a start time of the earliest uplink channel/signal of the plurality of uplink channels/signals is not before a B^{th} symbol after the last symbol of the target channel/signal, wherein B is a non-negative integer.~~

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

~~each uplink channel/signal of the plurality of uplink channels/signals is a periodic uplink channel/signal.~~

25 4. The method according to any one of claims 1 to 3, wherein

~~the plurality of uplink channels/signals comprise at least one physical uplink control channel (PUCCH) used for carrying acknowledgement/negative acknowledgement (ACK/NACK) corresponding to a semi-persistent scheduled physical downlink shared channel (SPS-PDSCH); and~~

5 ~~the target channel/signal is a last SPS-PDSCH of SPS-PDSCHs corresponding to the at least one PUCCH.~~

~~5. The method according to any one of claims 1 to 3, wherein~~

10 ~~the plurality of uplink channels/signals does not comprise physical uplink control channel (PUCCH) used for carrying acknowledgement/negative acknowledgement (ACK/NACK) corresponding to a semi-persistent scheduled physical downlink shared channel (SPS-PDSCH); and~~

~~the target channel/signal is a last uplink channel/signal of the plurality of uplink channels/signals sent before the target time unit.~~

~~6. The method according to claim 4, further comprising:~~

15 ~~transmitting, by the terminal device when determining that the plurality of uplink channels/signals do not fulfill the constraint condition, a PUCCH of the at least one PUCCH.~~

~~7. The method according to claim 4 or 5, further comprising:~~

20 ~~determining, by the terminal device when determining that the plurality of uplink channels/signals do not fulfill the constraint condition, that the plurality of uplink channels/signals to be transmitted within the target time unit are in error; or~~

~~transmitting, by the terminal device when determining that the plurality of uplink channels/signals do not fulfill the constraint condition, the earliest uplink channel/signal of the plurality of uplink channels/signals.~~

25 ~~8. The method according to any one of claims 1 to 7, wherein the uplink channels/signals comprise:~~

~~a semi-persistent scheduled physical uplink shared channel (SPS-PUSCH);~~

~~a physical uplink control channel (PUCCH) for carrying acknowledgement/negative acknowledgement (ACK/NACK) corresponding to a semi-persistent scheduled physical downlink shared channel (SPS-PDSCH);~~

5 ~~a physical uplink control channel (PUCCH) for carrying periodic channel state information (P-CSI);~~

~~a physical uplink control channel (PUCCH) for carrying semi-persistent scheduled channel state information (SPS-CSI);~~

~~a physical uplink shared channel (PUSCH) for carrying semi-persistent scheduled channel state information (SPS-CSI); or~~

10 ~~a physical uplink control channel (PUCCH) for carrying a scheduling request (SR).~~

~~9. The method according to any one of claims 1 to 8, wherein $A=N2+1$, wherein $N2$ is a preparation time of a physical uplink shared channel (PUSCH).~~

15 ~~10. The method according to any one of claims 2 to 9, wherein $B=N1+1+d_{1,2}$, wherein $N1$ is a processing time of a physical downlink shared channel (PDSCH), and a value of $d_{1,2}$ is related to a PDSCH mapping manner.~~

~~11. A wireless communications method, comprising:~~

~~determining, by a network device, a plurality of uplink channels/signals transmitted within a target time unit, wherein the plurality of uplink channels/signals at least partially overlap in time domain; and~~

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

~~the constraint condition comprises:~~

25 ~~a first symbol of an earliest uplink channel/signal of the plurality of uplink channels/signals is not before an A^{th} symbol after a start time or a last symbol of a target channel/signal, wherein A is a non-negative integer.~~

- ~~12. The method according to claim 11, wherein~~
~~the constraint condition further comprises:~~
~~a start time of the earliest uplink channel/signal of the plurality of uplink~~
~~channels/signals is not before a Bth symbol after the last symbol of the target channel/signal,~~
5 ~~wherein B is a non-negative integer.~~
- ~~13. The method according to claim 11 or 12, wherein~~
~~each uplink channel/signal of the plurality of uplink channels/signals is a periodic~~
~~uplink channel/signal.~~
- ~~14. The method according to any one of claims 11 to 13, wherein~~
10 ~~the plurality of uplink channels/signals comprise at least one physical uplink control~~
~~channel (PUCCH) used for carrying acknowledgement/negative acknowledgement~~
~~(ACK/NACK) corresponding to a semi-persistent scheduled physical downlink shared~~
~~channel (SPS-PDSCH); and~~
~~the target channel/signal is a last SPS-PDSCH of SPS-PDSCHs corresponding to the~~
15 ~~at least one PUCCH.~~
- ~~15. The method according to any one of claims 11 to 13, wherein~~
~~the plurality of uplink channels/signals comprise no physical uplink control channel~~
~~(PUCCH) used for carrying acknowledgement/negative acknowledgement (ACK/NACK)~~
~~corresponding to a semi-persistent scheduled physical downlink shared channel~~
20 ~~(SPS-PDSCH); and~~
~~the target channel/signal is a last uplink channel/signal of the plurality of uplink~~
~~channels/signals received before the target time unit.~~
- ~~16. The method according to claim 14, further comprising:~~
~~receiving, by the network device when determining that the plurality of uplink~~
25 ~~channels/signals do not fulfill the constraint condition, a PUCCH of the at least one~~
~~PUCCH.~~

17. The method according to claim 14 or 15, further comprising:
- determining, by the network device when determining that the plurality of uplink channels/signals do not fulfill the constraint condition, that the plurality of uplink channels/signals to be transmitted within the target time unit are in error; or
- 5 receiving, by the network device when determining that the plurality of uplink channels/signals do not fulfill the constraint condition, the earliest uplink channel/signal of the plurality of uplink channels/signals.
18. The method according to any one of claims 11 to 17, wherein the uplink channels/signals comprise:
- 10 a semi-persistent scheduled physical uplink shared channel (SPS PUSCH);
- a physical uplink control channel (PUCCH) for carrying acknowledgement/negative acknowledgement (ACK/NACK) corresponding to a semi-persistent scheduled physical downlink shared channel (SPS PDSCH);
- a physical uplink control channel (PUCCH) for carrying periodic channel state
- 15 information (P-CSI);
- a physical uplink control channel (PUCCH) for carrying semi-persistent scheduled channel state information (SPS-CSI);
- a physical uplink shared channel (PUSCH) for carrying semi-persistent scheduled channel state information (SPS-CSI); and
- 20 a physical uplink control channel (PUCCH) for carrying a scheduling request (SR).
19. The method according to any one of claims 11 to 18, wherein $A=N_2+1$, wherein N_2 is a preparation time of a physical uplink shared channel (PUSCH).
20. The method according to any one of claims 12 to 19, wherein $B=N_1+1+d_{1,2}$, wherein N_1 is a processing time of a physical downlink shared channel (PDSCH), and a
- 25 value of $d_{1,2}$ is related to a PDSCH mapping manner.
21. A communications device, comprising:

~~a determining unit, configured to determine a plurality of uplink channels/signals transmitted within a target time unit, wherein the plurality of uplink channels/signals at least partially overlap in time domain; and~~

5 ~~a communications unit, configured to multiplex, when the plurality of uplink channels/signals fulfill a constraint condition, information carried in the plurality of uplink channels/signals in one channel/signal within the target time unit for transmission, wherein~~

~~the constraint condition comprises:~~

10 ~~a first symbol of an earliest uplink channel/signal of the plurality of uplink channels/signals is not before an A^{th} symbol after a start time or a last symbol of a target channel/signal, wherein A is a non-negative integer.~~

~~22. The communications device according to claim 21, wherein~~

~~the constraint condition further comprises:~~

15 ~~a start time of the earliest uplink channel/signal of the plurality of uplink channels/signals is not before a B^{th} symbol after the last symbol of the target channel/signal, wherein B is a non-negative integer.~~

~~23. The communications device according to claim 21 or 22, wherein~~

~~each uplink channel/signal of the plurality of uplink channels/signals is a periodic uplink channel/signal.~~

~~24. The communications device according to any one of claims 21 to 23, wherein~~

20 ~~the plurality of uplink channels/signals comprise at least one physical uplink control channel (PUCCH) used for carrying acknowledgement/negative acknowledgement (ACK/NACK) corresponding to a semi-persistent scheduled physical downlink shared channel (SPS-PDSCH); and~~

25 ~~the target channel/signal is a last SPS-PDSCH of SPS-PDSCHs corresponding to the at least one PUCCH.~~

~~25. The communications device according to any one of claims 21 to 23, wherein~~

~~the plurality of uplink channels/signals comprise no physical uplink control channel (PUCCH) used for carrying acknowledgement/negative acknowledgement (ACK/NACK) corresponding to a semi-persistent scheduled physical downlink shared channel (SPS-PDSCH); and~~

5 ~~the target channel/signal is a last uplink channel/signal of the plurality of uplink channels/signals sent before the target time unit.~~

~~26. The communications device according to claim 24, wherein when the determining unit determines that the plurality of uplink channels/signals do not fulfill the constraint condition, the communications unit is specifically configured to transmit a PUCCH of the~~
10 ~~at least one PUCCH.~~

~~27. The communications device according to claim 24 or 25, wherein when the determining unit determines that the plurality of uplink channels/signals do not fulfill the constraint condition, the determining unit is further configured to determine that the plurality of uplink channels/signals to be transmitted within the target time unit are in error;~~
15 ~~or~~

~~when the determining unit determines that the plurality of uplink channels/signals do not fulfill the constraint condition, the communications unit is specifically configured to transmit the earliest uplink channel/signal of the plurality of uplink channels/signals.~~

~~28. The communications device according to any one of claims 21 to 27, wherein the~~
20 ~~uplink channels/signals comprise:~~

~~a semi-persistent scheduled physical uplink shared channel (SPS-PUSCH);~~

~~a physical uplink control channel (PUCCH) for carrying acknowledgement/negative acknowledgement (ACK/NACK) corresponding to a semi-persistent scheduled physical downlink shared channel (SPS-PDSCH);~~

25 ~~a physical uplink control channel (PUCCH) for carrying periodic channel state information (P-CSI);~~

~~a physical uplink control channel (PUCCH) for carrying semi-persistent scheduled~~

channel state information (SPS CSI);

a physical uplink shared channel (PUSCH) for carrying semi-persistent scheduled channel state information (SPS CSI); and

a physical uplink control channel (PUCCH) for carrying a scheduling request (SR).

5 29. The communications device according to any one of claims 21 to 28, wherein $A=N2+1$, wherein $N2$ is a preparation time of a physical uplink shared channel (PUSCH).

30. The communications device according to any one of claims 22 to 29, wherein $B=N1+1+d_{1,2}$, wherein $N1$ is a processing time of a physical downlink shared channel (PDSCH), and a value of $d_{1,2}$ is related to a PDSCH mapping manner.

10 31. A communications device, comprising:

a determining unit, configured to determine a plurality of uplink channels/signals transmitted within a target time unit, wherein the plurality of uplink channels/signals at least partially overlap in time domain; and

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

the constraint condition comprises:

20 a first symbol of an earliest uplink channel/signal of the plurality of uplink channels/signals is not before an A^{th} symbol after a start time or a last symbol of a target channel/signal, wherein A is a non-negative integer.

32. The communications device according to claim 31, wherein

the constraint condition further comprises:

25 a start time of the earliest uplink channel/signal of the plurality of uplink channels/signals is not before a B^{th} symbol after the last symbol of the target channel/signal, wherein B is a non-negative integer.

~~33. The communications device according to claim 31 or 32, wherein
each uplink channel/signal of the plurality of uplink channels/signals is a periodic
uplink channel/signal.~~

~~34. The communications device according to any one of claims 31 to 33, wherein
the plurality of uplink channels/signals comprise at least one physical uplink control
channel (PUCCH) used for carrying acknowledgement/negative acknowledgement
(ACK/NACK) corresponding to a semi-persistent scheduled physical downlink shared
channel (SPS-PDSCH); and~~

~~the target channel/signal is a last SPS-PDSCH of SPS-PDSCHs corresponding to the
at least one PUCCH.~~

~~35. The communications device according to any one of claims 31 to 33, wherein
the plurality of uplink channels/signals comprise no physical uplink control channel
(PUCCH) used for carrying acknowledgement/negative acknowledgement (ACK/NACK)
corresponding to a semi-persistent scheduled physical downlink shared channel
(SPS-PDSCH); and~~

~~the target channel/signal is a last uplink channel/signal of the plurality of uplink
channels/signals received before the target time unit.~~

~~36. The communications device according to claim 34, wherein when the determining
unit determines that the plurality of uplink channels/signals do not fulfill the constraint
condition, the communications unit is specifically configured to receive a PUCCH of the at
least one PUCCH.~~

~~37. The communications device according to claim 34 or 35, wherein when the
determining unit determines that the plurality of uplink channels/signals do not fulfill the
constraint condition, the determining unit is further configured to determine that the
plurality of uplink channels/signals to be transmitted within the target time unit are in error;
or~~

~~when the determining unit determines that the plurality of uplink channels/signals do~~

not fulfill the constraint condition, the communications unit is specifically configured to receive the earliest uplink channel/signal of the plurality of uplink channels/signals.

38. The communications device according to any one of claims 31 to 37, wherein the uplink channels/signals comprise:

5 a semi-persistent scheduled physical uplink shared channel (SPS-PUSCH);

a physical uplink control channel (PUCCH) for carrying acknowledgement/negative acknowledgement (ACK/NACK) corresponding to a semi-persistent scheduled physical downlink shared channel (SPS-PDSCH);

10 a physical uplink control channel (PUCCH) for carrying periodic channel state information (P-CSI);

a physical uplink control channel (PUCCH) for carrying semi-persistent scheduled channel state information (SPS-CSI);

a physical uplink shared channel (PUSCH) for carrying semi-persistent scheduled channel state information (SPS-CSI); and

15 a physical uplink control channel (PUCCH) for carrying a scheduling request (SR).

39. The communications device according to any one of claims 31 to 38, wherein $A=N_2+1$, wherein N_2 is a preparation time of a physical uplink shared channel (PUSCH).

20 40. The communications device according to any one of claims 32 to 39, wherein $B=N_1+1+d_{1,2}$, wherein N_1 is a processing time of a physical downlink shared channel (PDSCH), and a value of $d_{1,2}$ is related to a PDSCH mapping manner.

41. A communications device, comprising:

a processor, configured to invoke a computer program from a memory and run the computer program, wherein the computer program comprises an instruction used to perform the method according to any one of claims 1 to 20.

25 42. A chip, comprising:

a processor, configured to invoke a computer program from a memory and run the

computer program, wherein the computer program comprises an instruction used to perform the method according to any one of claims 1 to 20.

5 43. A storage medium, wherein the storage medium is configured to store the computer program, and the computer program comprises an instruction used to perform the method according to any one of claims 1 to 20.

44. A communications system, comprising:
a terminal device and a network device, wherein
the terminal device is configured to:

10 determine a plurality of uplink channels/signals transmitted within a target time unit;
and

multiplex, when the plurality of uplink channels/signals fulfill a constraint condition, information carried in the plurality of uplink channels/signals in one channel/signal within the target time unit for transmission, wherein the plurality of uplink channels/signals at least partially overlap in time domain; and

15 the network device is configured to:
determine the plurality of uplink channels/signals; and
receive one channel/signal within the target time unit when the plurality of uplink channels/signals fulfill the constraint condition, wherein

20 the constraint condition comprises:
a first symbol of an earliest uplink channel/signal of the plurality of uplink channels/signals is not before an A^{th} symbol after a start time or a last symbol of a target channel/signal, wherein A is a non-negative integer.

45. A wireless communications method, comprising:
receiving, by a terminal device, at least one piece of downlink control information
25 (DCI);
determining, by the terminal device, a plurality of uplink channels/signals transmitted

within a target time unit, wherein the plurality of uplink channels/signals at least partially overlap in time domain, and the at least one piece of DCI is used for indicating at least one uplink channel/signal of the plurality of uplink channels/signals; and

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

the constraint condition comprises:

~~the constraint condition comprises:~~

10 a first symbol of an earliest uplink channel/signal of the plurality of uplink channels/signals 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;

~~46. The method according to claim 45, wherein~~

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

wherein the constraint condition further comprises:

20 the first symbol of the earliest uplink channel/signal of the plurality of uplink channels/signals is not before a B^{th} symbol after a last symbol of the ~~at least one~~ target PDSCH, wherein B is a non-negative integer; and

~~47. The method according to claim 45, 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.~~

25 2. The method according to claim 45 or 46, 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/signals comprise the PUSCH; ~~and/or~~

DCI used for indicating downlink semi-persistent scheduled (~~DL SPS~~)₂ resource release, wherein the plurality of uplink channels/signals comprise a PUCCH carrying ACK/NACK corresponding to the DCI for indicating DL SPS resource release; and/or

5 DCI used for scheduling a ~~physical downlink shared channel (PDSCH)~~₂ wherein the plurality of uplink channels/signals comprise a PUCCH carrying ACK/NACK corresponding to the PDSCH.

483. The method according to ~~any one of claims 45 to 47~~claim 1 or 2, wherein the uplink channels/signals further comprise:

- 10 a dynamic scheduled ~~physical uplink shared channel (PUSCH)~~₂;
- a semi-persistent scheduled physical uplink shared channel (SPS PUSCH);
- a ~~physical uplink control channel (PUCCH)~~ for carrying acknowledgement/negative acknowledgement (ACK/NACK);
- a ~~physical uplink control channel (PUCCH)~~ for carrying periodic channel state information (P-CSI);
- 15 a ~~physical uplink control channel (PUCCH)~~ for carrying semi-persistent scheduled channel state information (SPS-CSI);
- a ~~physical uplink shared channel (PUSCH)~~ for carrying semi-persistent scheduled channel state information (SPS-CSI); and
- a ~~physical uplink control channel (PUCCH)~~ for carrying a scheduling request (SR).

20 494. 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.

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

25 6. The method according to any one of claims 45 to 48, wherein $A=N2+1$, wherein N2 is a preparation time of scheduling a physical uplink shared channel (PUSCH). 2 to 5, wherein

50if 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

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 46 to 49, wherein $B=N1+1+d_{1,2}$, wherein N1 is a processing time of a PDSCH, and a value of $d_{1,2}$ is related to a physical downlink shared channel (PDSCH) mapping manner.

51. A wireless communications method, 1 to 6, further comprising:

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. sending, by a network device, A communications device, comprising:

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

determining, by characterized in that the network device, further comprises:

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

receiving, by the network device when responsive to determining that the plurality of uplink channels/signals fulfill a constraint condition, one channel/signal within the target time communications unit, and multiplexing (620) is further configured to multiplex information carried in the plurality of uplink channels/signals in the one channel/signal within the target time unit for transmission, wherein

the constraint condition comprises:

5 a first symbol of an earliest uplink channel/signal of the plurality of uplink channels/signals is not before an A^{th} symbol after a last symbol of a physical downlink control channel—(, PDCCH)₂ carrying the at least one piece of DCI, wherein A is a non-negative integer₂

~~52. The method according to claim 51, wherein~~

~~the plurality of uplink channels/signals comprise at least one physical uplink control channel—(, PUCCH)₂ carrying acknowledgement/negative-acknowledgement—(, ACK/NACK)₂ corresponding to a target physical downlink shared channel—(, PDSCH)₂; and,~~

10 wherein the constraint condition further comprises:

~~the first symbol of the earliest uplink channel/signal of the plurality of uplink channels/signals is not before a B^{th} symbol after a last symbol of the at least one target PDSCH, wherein B is a non-negative integer₂, and~~

15 ~~53 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.~~

~~9. The method~~communications device according to claim 51 ~~or 52~~8, wherein the at least one piece of DCI comprises at least one of:

DCI used for scheduling a physical uplink shared channel—(, PUSCH)₂ wherein the plurality of uplink channels/signals comprise the PUSCH; ~~and/or~~

20 DCI used for indicating downlink semi-persistent scheduled—(, DL SPS) resource release, wherein the plurality of uplink channels/signals comprise a PUCCH carrying ACK/NACK corresponding to the DCI for indicating DL SPS resource release; ~~and/or~~

25 DCI used for scheduling a ~~physical downlink shared channel—(PDSCH)₂~~ wherein the plurality of uplink channels/signals comprise a PUCCH carrying ACK/NACK corresponding to the PDSCH.

~~54~~10. The ~~method~~communications device according to ~~any one of claims 51 to 53~~claim 8 or 9, wherein the uplink channels/signals further comprise:

a dynamic scheduled physical uplink shared channel (PUSCH);

a semi-persistent scheduled physical uplink shared channel (SPS-PUSCH);

a physical uplink control channel (PUCCH) for carrying acknowledgement/negative acknowledgement (ACK/NACK);

5 a physical uplink control channel (PUCCH) for carrying periodic channel state information (P-CSI);

a physical uplink control channel (PUCCH) for carrying semi-persistent scheduled channel state information (SPS-CSI);

10 a physical uplink shared channel (PUSCH) for carrying semi-persistent scheduled channel state information (SPS-CSI); and

a physical uplink control channel (PUCCH) for carrying a scheduling request (SR).

5511. The methodcommunications device according to any one of claims 518 to 5410, wherein $A = \lfloor \frac{N}{N_2 + 1} \rfloor$ is obtained based on $N_2 + 1$, wherein, and N_2 is a preparation time of scheduling a physical uplink shared channel (PUSCH);.

15 12. The communications device according to claim 11, wherein $A = N_2 + 1$.

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

if the PDSCH mapping manner is mapping type B 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 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.

25 14. 56. The methodThe communications device according to any one of claims 528 to 55, wherein $B = N_1 + 1 + d_{1,2}$, wherein N_1 is a processing time of a PDSCH, and a value of $d_{1,2}$ is related to a physical downlink shared channel (PDSCH) mapping manner.the determining unit is further configured to:

57determine, 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.

15. A wireless communications device~~method~~, comprising:

~~a communications unit, configured to receive~~sending, by a network device, at least one
5 ~~piece of downlink control information (DCI); and, DCI, to a terminal device;~~

~~a determining unit, configured to determine, by the network device, a plurality of~~
uplink channels/signals transmitted within a target time unit, wherein the plurality of uplink
channels/signals at least partially overlap in time domain, and the at least one piece of DCI
is used for indicating at least one uplink channel/signal of the plurality of uplink
10 channels/signals; and

receiving, by the network device when the plurality of uplink channels/signals fulfill a
constraint condition, one channel within the communication~~target time unit is further~~
~~configured to multiplex, and multiplexing~~ information carried in the plurality of uplink
channels/signals in ~~one~~the channel/signal ~~within the target time unit~~ for transmission,
15 wherein

the constraint condition comprises:

~~the constraint condition comprises:~~

a first symbol of an earliest uplink channel/signal of the plurality of uplink
channels/signals is not before an Ath symbol after a last symbol of a physical downlink
20 control channel—(PDCCH)₁ carrying the at least one piece of DCI, wherein A is a
non-negative integer₁

~~58. The communications device according to claim 57, wherein~~

the plurality of uplink channels/signals comprise at least one physical uplink control
channel—(PUCCH)₁ carrying acknowledgement/negative-acknowledgement—(ACK/NACK)₁
25 corresponding to a target physical downlink shared channel—(PDSCH)₁; and;

wherein the constraint condition further comprises:

the first symbol of the earliest uplink channel/signal of the plurality of uplink

channels/signals is not before a Bth symbol after a last symbol of the at least one target PDSCH, wherein B is a non-negative integer;

59. The communications device according to claim 57 or 58, wherein the at least one piece of DCI comprises:

5 DCI used for scheduling a physical uplink shared channel (PUSCH), wherein the plurality of uplink channels/signals comprise the PUSCH; and/or

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

10 DCI used for scheduling a physical downlink shared channel (PDSCH), wherein the plurality of uplink channels/signals comprise a PUCCH carrying ACK/NACK corresponding to the PDSCH.

60. The communications device according to any one of claims 57 to 59, wherein the uplink channels/signals comprise:

15 a dynamic-scheduled physical uplink shared channel (PUSCH);

a semi-persistent scheduled physical uplink shared channel (SPS-PUSCH);

a physical uplink control channel (PUCCH) for carrying acknowledgement/negative acknowledgement (ACK/NACK);

20 a physical uplink control channel (PUCCH) for carrying periodic channel state information (P-CSI);

a physical uplink control channel (PUCCH) for carrying semi-persistent scheduled channel state information (SPS-CSI);

a physical uplink shared channel (PUSCH) for carrying semi-persistent scheduled channel state information (SPS-CSI); and

25 a physical uplink control channel (PUCCH) for carrying a scheduling request (SR).

61. The communications device according to any one of claims 57 to 60, wherein

$A=N2+1$, wherein $N2$ is a preparation time of scheduling a physical uplink shared channel (PUSCH).

62. The communications device according to any one of claims 58 to 61, wherein $B=N1+1+d_{1,2}$, ~~wherein~~ where $N1$ is a PDSCH processing time of a PDSCH, and a value of $d_{1,2}$ is related to a physical downlink shared channel (PDSCH) PDSCH mapping manner.

~~63~~ 16. A communications device, comprising:

a communications unit, configured to send at least one piece of downlink control information—($_2$ DCI) $_2$ to a terminal device; and

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

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

the constraint condition comprises:

20 a first symbol of an earliest uplink channel/signal of the plurality of uplink channels/signals is not before an A^{th} symbol after a last symbol of a physical downlink control channel—($_2$ PDCCH) $_2$ carrying the at least one piece of DCI, wherein A is a non-negative integer— $_2$

~~64. The communications device according to claim 63, wherein~~

25 ~~the plurality of uplink channels/signals comprise at least one physical uplink control channel—($_2$ PUCCH) $_2$ carrying acknowledgement/negative-acknowledgement—($_2$ ACK/NACK) $_2$ corresponding to a target physical downlink shared channel—($_2$ PDSCH); and~~

wherein the constraint condition further comprises:

the first symbol of the earliest uplink channel/signal of the plurality of uplink

channels/signals is not before a Bth symbol after a last symbol of the at least one target PDSCH, wherein B is a non-negative integer; and

~~65. The communications device according to claim 63 or 64, wherein the at least one piece of DCI comprises:~~

5 ~~DCI used for scheduling a physical uplink shared channel (PUSCH), wherein the plurality of uplink channels/signals comprise the PUSCH; and/or~~

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

10 ~~DCI used for scheduling a physical downlink shared channel (PDSCH), wherein the plurality of uplink channels/signals comprise a PUCCH carrying ACK/NACK corresponding to the PDSCH.~~

~~66. The communications device according to any one of claims 63 to 65, wherein the uplink channels/signals comprise:~~

15 ~~a dynamic scheduled physical uplink shared channel (PUSCH);~~

~~a semi persistent scheduled physical uplink shared channel (SPS PUSCH);~~

~~a physical uplink control channel (PUCCH) for carrying acknowledgement/negative acknowledgement (ACK/NACK);~~

20 ~~a physical uplink control channel (PUCCH) for carrying periodic channel state information (P-CSI);~~

~~a physical uplink control channel (PUCCH) for carrying semi persistent scheduled channel state information (SPS-CSI);~~

~~a physical uplink shared channel (PUSCH) for carrying semi persistent scheduled channel state information (SPS-CSI); and~~

25 ~~a physical uplink control channel (PUCCH) for carrying a scheduling request (SR).~~

~~67. The communications device according to any one of claims 63 to 66, wherein~~

$A=N2+1$, wherein $N2$ is a preparation time of scheduling a physical uplink shared channel (PUSCH).

5 68. The communications device according to any one of claims 64 to 67, wherein $B=N1+1+d_{1,2}$, wherein where $N1$ is a PDSCH processing time of a PDSCH, and a value of $d_{1,2}$ is related to a physical downlink shared channel (PDSCH) PDSCH mapping manner.

69. A communications device, comprising:

a processor, configured to invoke a computer program from a memory and run the computer program, wherein the computer program comprises an instruction used to perform the method according to any one of claims 45 to 56.

10 70. A chip, comprising:

a processor, configured to invoke a computer program from a memory and run the computer program, wherein the computer program comprises an instruction used to perform the method according to any one of claims 45 to 56.

15 71. A storage medium, wherein the storage medium is configured to store the computer program, and the computer program comprises an instruction used to perform the method according to any one of claims 1 to 20.

72. A communications system, comprising:

a terminal device and a network device, wherein

the terminal device is configured to:

20 receive at least one piece of downlink control information (DCI);

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

25 multiplex, when the plurality of uplink channels/signals fulfill a constraint condition, information carried in the plurality of uplink channels/signals in one channel/signal within

~~the target time unit for transmission; and~~

~~the network device is configured to:~~

~~send the at least one piece of DCI to the terminal device;~~

~~determine the plurality of uplink channels/signals; and~~

5 ~~receive one channel/signal within the target time unit when the plurality of uplink channels/signals fulfill the constraint condition, wherein~~

~~the constraint condition comprises:~~

10 ~~a first symbol of an earliest uplink channel/signal of the plurality of uplink channels/signals 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.~~