second multiplexing indication parameter being in the enable state, determine a mode of jointly encoding the CG-UCI and the HARQ-ACK, as the multiplexing mode; in response to the second multiplexing indication parameter being in the unenable state, determine a state of the first multiplexing indication parameter; in response to the first multiplexing indication parameter being in the enable state, determine the mode of jointly encoding the CG-UCI and the HARQ-ACK, as the multiplexing mode; and in response to the first multiplexing indication parameter being in the unenable state, determine the multiplexing mode based on the priority of the CG-PUSCH and the priority of the HARQ-ACK.

[00202] Optionally, the transceiver module 1201 is also configured to: in response to the priority of the CG-PUSCH being the same as the priority of the HARQ-ACK, determine a mode of transmitting the HARQ-ACK and discarding or performing delay transmission on the CG-UCI, as the multiplexing mode; and in response to the priority of the CG-PUSCH being different from the priority of the HARQ-ACK, determine a mode of transmitting information with a high priority and discarding or performing delay transmission on information with a low priority as the multiplexing mode.

[00203] When the disclosure is applied to unlicensed band transmission, the appropriate multiplexing mode is determined based on the different priorities of CG-PUSCH and HARQ-ACK, which may ensure the transmission delay and reliability of UCI in the URLLC services.

[00204] When the communication apparatus 1200 is a network device, it includes a transceiver module 1201 and a processing module 1202. The transceiver module 1201 may be configured to send a multiplexing indication parameter to a terminal device. The multiplexing indication parameter indicates the terminal device to determine a multiplexing mode based on a state of the multiplexing indication parameter, or a priority of CG-UCI carried on a CG-PUSCH and a priority of a HARQ-ACK, in response to a time-domain overlap between the CG-PUSCH and the HARQ-ACK. The state includes an enable state and an unenable state.

[00205] The processing module 1202 may be configured to receive information transmitted by the terminal device based on the multiplexing mode determined. The transmitted information includes the CG-UCI and/or the HARQ-ACK.

[00206] Optionally, the transceiver module 1201 is also configured to send a multiplexing indication parameter to the terminal device via a high layer signaling. The multiplexing indication parameter includes a first multiplexing indication parameter carried in the high layer signaling.

[00207] Optionally, the transceiver module 1201 is also configured to send multiplexing

9, the step S1001 in FIG. 10, the step S1101 in FIG. 11, etc.

[00223] For the case where the chip is used to implement the functions of the network device in the embodiment of the disclosure, the interface 1402 is used to perform the step S202 in FIG. 2, the step S303 in FIG. 3, the step S404 in FIG. 4, etc.

[00224] Optionally, the chip also includes a memory 1403, which is used to store necessary computer programs and data.

[00225] Those skilled in the art may also understand that the various illustrative logical blocks and steps listed in the embodiments of the disclosure may be implemented by electronic hardware, computer software, or their combination. Whether such functionality is implemented in hardware or software depends on a specific application and overall system design requirements. Those skilled in the art may use various methods to implement the described functions for each specific application, but such implementation should not be understood as going beyond the protection scope of the embodiments of the disclosure.

[00226] The embodiments of the disclosure also provide an adjustment system with a maximum number of transmission layers, which includes a communication apparatus serving as a terminal device (such as the terminal device in the foregoing method embodiments) and a communication apparatus serving as a network device in the embodiment of FIG. 12. Alternatively, the system includes a communication apparatus serving as a terminal device (such as the terminal device in the foregoing method embodiments) and a communication apparatus serving as a network device in the embodiment of FIG. 13.

[00227] The disclosure also provides a readable storage medium on which instructions are stored, and when the instructions are executed by a computer, the functions of any one of the above method embodiments are implemented.

[00228] The disclosure also provides a computer program product, which implements the functions of any one of the above method embodiments when executed by a computer.

[00229] In the above embodiments, it may be implemented in whole or in part by software, hardware, firmware, or any combination. When implemented in software, it may be implemented in whole or in part in the form of a computer program product. The computer program product includes one or more computer programs. When the computer program is loaded and executed on a computer, the processes or functions described in the embodiments of the disclosure are

WHAT IS CLAIMED IS:

1. A method for multiplexing uplink control information (UCI)for unlicensed band transmission, performed by a terminal device, the method comprising:

in response to a time-domain overlap between a configure grant-physical uplink share channel (CG-PUSCH) and a hybrid automatic repeat request acknowledgement (HARQ-ACK) carried on a physical uplink control channel (PUCCH), determining, based on a priority of the CG-PUSCH and a priority of the HARQ-ACK, a multiplexing mode for CG-UCI carried on the CG-PUSCH and the HARQ-ACK; and

transmitting information to a network device based on the multiplexing mode, wherein the information transmitted comprises at least one of the CG-UCI or the HARQ-ACK.

2. The method according to claim 1, further comprising:

in response to the priority of the CG-PUSCH being different from the priority of the HARQ-ACK, determining a mode of transmitting information with a high priority and discarding or performing delay transmission on information with a low priority as the multiplexing mode.

3. The method according to claim 1, further comprising:

receiving a multiplexing indication parameter sent by the network device; and

determining the multiplexing mode based on at least one of a state of the multiplexing indication parameter, or the priority of the CG-PUSCH and the priority of the HARQ-ACK, wherein the state of the multiplexing indication parameter comprises an enable state and an unenable state.

4. The method according to claim 3, wherein the multiplexing indication parameter comprises a first multiplexing indication parameter carried in a high layer signaling, and determining the multiplexing mode comprises:

in response to the first multiplexing indication parameter being in the enable state, determining a mode of jointly encoding the CG-UCI and the HARQ-ACK, as the multiplexing mode; and

in response to the first multiplexing indication parameter being in the unenable state, determining the multiplexing mode based on the priority of the CG-PUSCH and the priority of the HARQ-ACK.

5. The method according to claim 3, wherein the multiplexing indication parameter comprises a first multiplexing indication parameter and a second multiplexing indication parameter carried in a high layer signaling, and determining the multiplexing mode comprises:

in response to the second multiplexing indication parameter being in the enable state,

determining a mode of jointly encoding the CG-UCI and the HARQ-ACK, as the multiplexing mode;

in response to the second multiplexing indication parameter being in the unenable state, determining a state of the first multiplexing indication parameter;

in response to the first multiplexing indication parameter being in the enable state, determining the mode of jointly encoding the CG-UCI and the HARQ-ACK, as the multiplexing mode; and

in response to the first multiplexing indication parameter being in the unenable state, determining the multiplexing mode based on the priority of the CG-PUSCH and the priority of the HARQ-ACK.

6. The method according to claim 4 or 5, wherein determining the multiplexing mode based on the priority of the CG-PUSCH and the priority of the HARQ-ACK comprises:

in response to the priority of the CG-PUSCH being the same as the priority of the HARQ-ACK, determining a mode of transmitting the HARQ-ACK and discarding or performing delay transmission on the CG-UCI, as the multiplexing mode; and

in response to the priority of the CG-PUSCH being different from the priority of the HARQ-ACK, determining a mode of transmitting information with a high priority and discarding or performing delay transmission on information with a low priority as the multiplexing mode.

7. A method for multiplexing uplink control information (UCI) for unlicensed band transmission, performed by a network device, the method comprising:

sending a multiplexing indication parameter to a terminal device, wherein the multiplexing indication parameter indicates the terminal device to determine a multiplexing mode based on at least one of a state of the multiplexing indication parameter, or a priority of CG-UCI carried on a configure grant-physical uplink share channel (CG-PUSCH) and a priority of a hybrid automatic repeat request acknowledgement (HARQ-ACK), in response to a time-domain overlap between the CG-PUSCH and the HARQ-ACK, wherein the state comprises an enable state and an unenable state; and

receiving information transmitted by the terminal device based on the multiplexing mode determined, wherein the information transmitted comprises at least one of the CG-UCI or the HARQ-ACK.

8. The method according to claim 7, further comprising:

sending the multiplexing indication parameter to the terminal device via a high layer signaling, wherein the multiplexing indication parameter comprises a first multiplexing indication

parameter carried in the high layer signaling.

9. The method according to claim 7, further comprising:

sending the multiplexing indication parameter to the terminal device via a high layer signaling, wherein the multiplexing indication parameter comprises a first multiplexing indication parameter and a second multiplexing indication parameter carried in the high layer signaling.

10. The method according to claim 7, further comprising:

in response to the multiplexing mode being a mode of jointly encoding the CG-UCI and the HARQ-ACK, decoding the information received to obtain the CG-UCI and the HARQ-ACK.

11. A terminal device, comprising: a processor and a memory for storing a computer program, wherein when the computer program is executed by the processor, the terminal device is caused to execute the method according to any one of claims 1 to 6.

12. A network device, comprising: a processor and a memory for storing a computer program, wherein when the computer program is executed by the processor, the device is caused to execute the method according to any one of claims 7 to 10.

13. A communication device, comprising:

an interface circuit for receiving and transmitting code instructions to a processor; and

the processor for executing the code instructions to perform the method according to any one of claims 1 to 6.

14. A device for receiving HARQ feedback information, comprising:

an interface circuit for receiving and transmitting code instructions to a processor; and

the processor for executing the code instructions to perform the method according to any one of claims 7 to 10.

15. A non-transitory computer-readable storage medium storing instructions, wherein when the instructions are executed, the method according to any one of claims 1 to 6 is implemented.

16. A non-transitory computer-readable storage medium storing instructions, wherein when the instructions are executed, the method according to any one of claims 7 to 10 is implemented.