COMMUNICATION METHOD AND APPARATUS

CROSS-REFERENCE TO RELATED APPLICATIONS

[0001] This application claims priority to Chinese Patent Application No. 202410290900.8, filed with the China National Intellectual Property Administration on March 12, 2024 and entitled "COMMUNICATION METHOD AND APPARATUS", which is incorporated herein by reference in its entirety.

TECHNICAL FIELD

[0002] Embodiments of this application relate to the field of wireless communication technologies, and in particular, to a communication method and apparatus.

BACKGROUND

[0003] A current communication device is usually equipped with a plurality of wireless communication technologies, for example, a 4G/5G cellular communication technology, a wireless fidelity (wireless fidelity, Wi-Fi) communication technology, a Bluetooth communication technology, and an ultra wide band (ultra wide band, UWB) communication technology, and a NearLink communication technology. Some of the technologies (for example, the Wi-Fi communication technology, the Bluetooth communication technology, and the NearLink communication technology) may operate on a same frequency band, and may share a set of same antennas for transmitting and receiving operations. However, technologies that share same antennas and frequency domain resources may not operate simultaneously.

[0004] For example, the Wi-Fi communication technology is used as an example. To implement coexistence of the plurality of wireless communication technologies in the communication device, the communication device may transmit indication information to a peer device in communication with the communication device to indicate a time period (this time period is reserved by the communication device for another communication technology and is used for communication by using the another communication technology). In this time period, the communication device cannot communicate by using the Wi-Fi technology, and the peer device cannot transmit Wi-Fi data to the communication device. Therefore, interference between Wi-Fi and another communication technology in the communication device is avoided, thereby implementing the coexistence of the plurality of communication technologies.

[0005] In the time period reserved by the communication device for another communication technology, the communication device may not always use the another communication technology for communication, or may occupy only a small part of time resources in this time period for communication by using the another communication technology. As a result, a waste of resources may exist. In addition, a delay of Wi-Fi communication is reduced while a resource is wasted.

SUMMARY

[0006] This application provides a communication method and apparatus, to improve resource utilization in a case of avoiding a conflict.

[0007] According to a first aspect, an embodiment of this application provides a communication method, applied to a first communication device. The method includes: transmitting a first radio frame to a second communication device, where the first radio frame is used to request the first communication device to enter a target mode; and after the first communication device enters the target mode, receiving a data frame transmitted by the second communication device, where the data frame conforms to a specified rule. The specified rule includes: The data frame is a data frame that is acknowledged by the first communication device and allowed to be transmitted; and/or, the data frame is a data frame related to a specified target parameter.

[0008] In a traditional communication mode, when the first communication device may perform communication by using another communication technology, if the second communication device still transmits the data frame to the first communication device in a conventional communication mode, communication performed by the first communication by using the another communication technology may be affected; or if the second communication device cannot transmit the data frame to the first communication device at all, a waste of resources may be caused, and a transmission delay between the second communication device and the first communication device is affected. However, in the foregoing embodiment of this application, when the first communication device has another communication requirement, the first communication device may request to enter the target mode. After the first communication device enters the target mode, if the second communication device wants to transmit the data frame to the first communication device, the second communication device needs to obtain permission of the first communication device before transmitting the data frame to the first communication device, or needs to transmit the data frame that meets the target parameter. Therefore, the foregoing embodiment helps fully utilize resources and reduce the transmission delay.

[0009] In a possible implementation, the first radio frame further includes first indication

information indicating a first time period. The receiving, after the first communication device enters the target mode, the data frame transmitted by the second communication device includes: receiving, after the first communication device enters the target mode and in the first time period, the data frame that is transmitted by the second communication device and that conforms to the specified rule.

[0010] In a possible implementation, the first communication device is a multi-link communication device, and the first communication device is capable of using M links after entering the target mode, where M is an integer greater than or equal to 1. The first indication information specifically indicates the first time periods respectively corresponding to the M links. When multi-link communication is used, the first communication device may set a corresponding first time period for each link. In other words, different links may correspond to a same first time period or different first time periods, so that communication is more flexible.

[0011] In a possible implementation, the first indication information specifically indicates that the first time period includes a periodic sub-period. The first indication information includes one or any combination of the following information: a start time of the periodic sub-period group, a duration of each sub-period in the periodic sub-period group, and an interval between two adjacent sub-periods in the periodic sub-period group. The first time period set by the first communication device may include sub-periods that arrive periodically, so that communication time periods are relatively regular, to help avoid a relatively large transmission delay.

[0012] In a possible implementation, when the data frame is a data frame that is acknowledged by the first communication device and allowed to be transmitted, before receiving the data frame transmitted by the second communication device, the method further includes: receiving a third radio frame transmitted by the second communication device, where the third radio frame is used to request to transmit the data frame; and transmitting a fourth radio frame to the second communication device, where the fourth radio frame indicates that the data frame is allowed to be transmitted. In this implementation, when the second communication device wants to transmit data to the first communication device, the second communication device first transmits the third radio frame to the first communication device, to request to transmit the data to the first communication device, and then transmits the data frame to the first communication device if the first communication device allows transmitting of the data. If the second communication device does not receive the fourth radio frame, it is considered that the first communication device does not allow the data frame to be transmitted to the first communication device. In this case, the second communication device cannot transmit the data frame to the first communication device, thereby avoiding affecting communication of the first communication device.

[0013] In a possible implementation, the third radio frame is transmitted at most N times in a

first sub-period, where N is an integer greater than 0, and the first sub-period is one of at least one sub-period included in the first sub-period. Because a length of each sub-period is usually relatively small, if the second communication device frequently transmits the third radio frame to request to transmit a data frame to the first communication device, on the one hand, communication of the first communication device may be affected; and on the other hand, because the first communication device may fail to respond to the second communication device, frequent transmitting of the third data frame by the second communication device is also a waste of resources.

[0014] In a possible implementation, the first radio frame further includes first indication information indicating the first time period. In the target mode, when the second communication device does not receive the fourth radio frame after transmitting the third radio frame in the first sub-period in the first time period, the second communication device is not allowed to transmit the third radio frame again; and the first time sub-period is one of the at least one time sub-period included in the first time period. When the second communication device transmits the third radio frame but does not receive the fourth radio frame, it indicates that the first communication device does not allow the second communication device to transmit a data frame to the first communication device. If the second communication device continues to transmit the third radio frame, communication of the first communication device may be affected, and a waste of resources may also be caused.

[0015] In a possible implementation, the fourth radio frame further indicates a duration or an end time for allowing the second communication device to transmit the data frame in the first time period. The receiving the data frame transmitted by the second communication device includes: receiving, from a time point at which the fourth radio frame is transmitted to a time point before the duration ends, the data frame transmitted by the second communication device; or receiving, before the end time, the data frame transmitted by the second communication device. When the second communication device requests to transmit the data frame to the first communication device, the first communication device may limit, according to a communication requirement of the first communication device, a time period in which the second communication device transmits the data frame, to prevent the data frame transmitted by the second communication device from affecting communication performed by the first communication device by using another communication technology.

[0016] In a possible implementation, the fourth radio frame further indicates receiving capability information of the first communication device after the first communication device enters the target mode, where the receiving capability information includes one or any combination of the following information: a maximum quantity of spatial streams that the first communication

device is capable of receiving in the first time period, a maximum modulation and coding set MCS, a maximum bandwidth, a maximum presentation protocol data unit PPDU duration, a maximum data frame length, or whether dual carrier modulation is allowed.

[0017] In a possible implementation, the first radio frame further includes second indication information, and the second indication information indicates the specified rule. In this implementation, the first communication device may limit a behavior of the second communication device in the first time period, to be specific, whether the second communication device is allowed to transmit, in the first time period, the data frame that meets the target parameter, whether the second communication device needs to obtain acknowledgment and permission from the first communication device before transmitting the data frame, or whether the second communication device is not allowed to transmit the data frame. The first communication device configures the behavior of the second communication device in the first time period, so that communication can be more flexible, thereby meeting communication requirements of the first communication device in different cases.

[0018] In a possible implementation, when the first time period includes a plurality of sub-periods, the first radio frame further indicates the specified rules respectively corresponding to the sub-periods. When the first time period includes the plurality of sub-periods, the plurality of sub-periods may correspond to a same specified rule or different specified rules, so that communication is more flexible.

[0019] In a possible implementation, when at least two sub-periods in the plurality of sub-periods have an overlapping time period, and the second indication information indicates that the at least two sub-periods correspond to different specified rules, the second communication device determines, based on a priority of each of the specified rules, a specified rule corresponding to the overlapping time period.

[0020] In a possible implementation, the first communication device is a multi-link communication device, and the first communication device is capable of using M links after entering the target mode, where M is an integer greater than or equal to 1. The second indication information specifically indicates the specified rules respectively corresponding to the M links. When multi-link communication is used, the first communication device may set a corresponding specified rule for each link. In other words, different links may correspond to a same specified rule or different specified rules, so that communication is more flexible.

[0021] In a possible implementation, the target parameter includes one or any combination of the following parameters: a maximum quantity of spatial streams, a minimum quantity of spatial streams, a maximum modulation and coding set MCS, a minimum MCS, a maximum bandwidth, a maximum presentation protocol data unit PPDU duration, a maximum data frame length, or dual

carrier modulation.

[0022] In a possible implementation, the method further includes: receiving a second radio frame transmitted by the second communication device, where the second radio frame indicates that the second communication device allows the first communication device to enter the target mode.

[0023] In a possible implementation, in a time period other than the first time period in the target mode, the second communication device is allowed to directly transmit a data frame to the first communication device, or the second communication device is not allowed to transmit a data frame to the first communication device.

[0024] According to a second aspect, an embodiment of this application provides a communication method, applied to a second communication device. The method includes: receiving a first radio frame transmitted by a first communication device, where the first radio frame is used to request the first communication device to enter a target mode; and transmitting a data frame to the first communication device after the first communication device enters the target mode, where the data frame conforms to a specified rule. The specified rule includes: The data frame is a data frame that is acknowledged by the first communication device and allowed to be transmitted; and/or, the data frame is a data frame related to a specified target parameter.

[0025] In a possible implementation, the first radio frame further includes first indication information indicating a first time period. The transmitting the data frame to the first communication device after the first communication device enters the target mode includes: transmitting, after the first communication device enters the target mode and in the first time period, the data frame that conforms to the specified rule to the first communication device.

[0026] In a possible implementation, the first communication device is a multi-link communication device, and the first communication device is capable of using M links after entering the target mode, where M is an integer greater than or equal to 1. The first indication information specifically indicates the first time periods respectively corresponding to the M links.

[0027] In a possible implementation, the first indication information specifically indicates that the first time period includes a periodic sub-period. The first indication information includes one or any combination of the following information: a start time of the periodic sub-period group, a duration of each sub-period in the periodic sub-period group, and an interval between two adjacent sub-periods in the periodic sub-period group.

[0028] In a possible implementation, when the data frame is a data frame that is acknowledged by the first communication device and allowed to be transmitted, before transmitting the data frame to the first communication device, the method further includes: transmitting a third radio frame to the first communication device, where the third radio frame is used to request to transmit the data

frame; and receiving a fourth radio frame transmitted by the first communication device, where the fourth radio frame indicates that the data frame is allowed to be transmitted.

[0029] In a possible implementation, the third radio frame is transmitted at most N times in a first sub-period, where N is an integer greater than 0, and the first sub-period is one of at least one sub-period included in the first sub-period.

[0030] In a possible implementation, the first radio frame further includes first indication information indicating a first time period. In the target mode, if the fourth radio frame is not received after the third radio frame is transmitted in the first sub-period in the first time period, the third radio frame is not allowed to be transmitted again; and the first sub-period is one of the at least one sub-period included in the first time period.

[0031] In a possible implementation, the fourth radio frame further indicates a duration or a cutoff time for allowing the second communication device to transmit the data frame in the first time period. The transmitting the data frame to the first communication device includes: transmitting the data frame to the first communication device from a time point at which the fourth radio frame is transmitted to a time point before the duration ends; or transmitting the data frame to the first communication device before the end time.

[0032] In a possible implementation, the fourth radio frame further indicates receiving capability information of the first communication device after the first communication device enters the target mode, where the receiving capability information includes one or any combination of the following information: a maximum quantity of spatial streams that the first communication device is capable of receiving in the first time period, a maximum modulation and coding set MCS, a maximum bandwidth, a maximum presentation protocol data unit PPDU duration, a maximum data frame length, or whether dual carrier modulation is allowed.

[0033] In a possible implementation, the first radio frame further includes second indication information, and the second indication information indicates the specified rule.

[0034] In a possible implementation, when the first time period includes a plurality of sub-periods, the first radio frame further indicates the specified rules respectively corresponding to the sub-periods.

[0035] In a possible implementation, when at least two sub-periods in the plurality of sub-periods have an overlapping time period, and the second indication information indicates that the at least two sub-periods correspond to different specified rules, the second communication device determines, based on a priority of each of the specified rules, a specified rule corresponding to the overlapping time period.

[0036] In a possible implementation, the first communication device is a multi-link communication device, and the first communication device is capable of using M links after

entering the target mode, where M is an integer greater than or equal to 1. The second indication information specifically indicates the specified rules respectively corresponding to the M links.

[0037] In a possible implementation, the target parameter includes one or any combination of the following parameters: a maximum quantity of spatial streams, a minimum quantity of spatial streams, a maximum modulation and coding set MCS, a minimum MCS, a maximum bandwidth, a maximum presentation protocol data unit PPDU duration, a maximum data frame length, or dual carrier modulation.

[0038] In a possible implementation, the method further includes: transmitting a second radio frame to the first communication device, where the second radio frame indicates that the first communication device is allowed to enter the target mode.

[0039] In a possible implementation, in a time period other than the first time period in the target mode, the second communication device is allowed to directly transmit a data frame to the first communication device, or the second communication device is not allowed to transmit a data frame to the first communication device.

[0040] According to a third aspect, an embodiment of this application provides a communication method, applied to a first communication device. The method includes: transmitting a first radio frame to a second communication device, where the first radio frame is used to request the first communication device to enter a target mode, and the first radio frame further indicates a first time period of the target mode; in the first time period after entering the target mode, allowing the second communication device to directly transmit a data frame, or not allowing the second communication device to transmit a data frame; and in a time period other than the first time period after entering the target mode, receiving the data frame transmitted by the second communication device, where the data frame conforms to a specified rule. The specified rule includes: The data frame is a data frame that is acknowledged by the first communication device and allowed to be transmitted; and/or, the data frame is a data frame related to a specified target parameter.

[0041] According to a fourth aspect, an embodiment of this application provides a communication method, applied to a second communication device. The method includes: receiving a first radio frame transmitted by a first communication device, where the first radio frame is used to request the first communication device to enter a target mode, and the first radio frame further indicates a first time period of the target mode; in the first time period after the first communication device enters the target mode, allowing the second communication device to directly transmit a data frame, or not allowing the second communication device to transmit a data frame; and in a time period other than the first time period after the first communication device enters the target mode, allowing the data frame to be transmitted the first communication device,

where the data frame conforms to a specified rule. The specified rule includes: The data frame is a data frame that is acknowledged by the first communication device and allowed to be transmitted; and/or the data frame is a data frame related to a specified target parameter.

[0042] According to a fifth aspect, an embodiment of this application provides a communication method, applied to a first communication device. The method includes: transmitting a first radio frame to a second communication device, where the first radio frame is used to request the first communication device to enter a target mode, and the first radio frame further indicates a first time period of the target mode; in a time period other than the first time period after entering the target mode, not allowing the second communication device to transmit a data frame to the first communication device; and after entering the target mode and in the first time period, allowing the second communication device to directly transmit a data frame to the first communication device, or allowing the second communication device to transmit a data frame that conforms to a specified rule to the first communication device. The specified rule includes: The data frame is a data frame that is acknowledged by the first communication device and allowed to be transmitted; and/or, the data frame is a data frame related to a specified target parameter.

[0043] According to a sixth aspect, an embodiment of this application provides a communication method, applied to a second communication device. The method includes: receiving a first radio frame transmitted by a first communication device, where the first radio frame is used to request the first communication device to enter a target mode, and the first radio frame further indicates a first time period of the target mode; in a time period other than the first time period after the first communication device enters the target mode, not allowing the second communication device to transmit a data frame to the first communication device; and after the first communication device enters the target mode and in the first time period, allowing the second communication device to directly transmit a data frame to the first communication device, or allowing the second communication device to transmit a data frame that conforms to a specified rule to the first communication device. The specified rule includes: The data frame is a data frame that is acknowledged by the first communication device and allowed to be transmitted; and/or, the data frame is a data frame related to a specified target parameter.

[0044] According to a seventh aspect, an embodiment of this application provides a communication apparatus. The communication apparatus includes a processor. The processor is coupled to a memory. The memory is configured to store a program or instructions. When the program or the instructions are executed by the processor, the apparatus is enabled to perform the method according to the first aspect and any possible implementation of the first aspect, or performs the method according to the second aspect and any possible implementation of the second aspect, or performs the method according to the third aspect and any possible implementation of

the third aspect, or perform the method according to the fourth aspect and any possible implementation of the fourth aspect, or perform the method according to the fifth aspect and any possible implementation of the fifth aspect, or perform the method according to the sixth aspect and any possible implementation of the sixth aspect.

[0045] According to an eighth aspect, an embodiment of this application provides a chip, including a processor. The processor is coupled to a memory. The memory is configured to store instructions. When the instructions are executed by the processor, the chip is enabled to implement the method according to the first aspect to the sixth aspect and any possible implementation of the first aspect to the sixth aspect.

[0046] According to a ninth aspect, an embodiment of this application provides a computer-readable storage medium. The computer-readable storage medium stores instructions. When the instructions are run on a computer, the computer is enabled to perform the method according to the first aspect to the sixth aspect and any possible implementation of the first aspect to the sixth aspect.

[0047] According to a tenth aspect, an embodiment of this application provides a computer program product including instructions. When the computer program product runs on a computer, the computer is enabled to perform the method according to the first aspect to the sixth aspect and any possible implementation of the first aspect to the sixth aspect.

BRIEF DESCRIPTION OF DRAWINGS

[0048] FIG. 1 is a diagram of a communication scenario according to an embodiment of this application;

[0049] FIG. 2 is a diagram of a structure of an AP or a STA according to an embodiment of this application;

[0050] FIG. 3 is a schematic flowchart of a communication method according to an embodiment of this application;

[0051] FIG. 4 is a diagram of periodic sub-periods according to an embodiment of this application;

[0052] FIG. 5 is a diagram of a frame structure according to an embodiment of this application;

[0053] FIG. 6 is a diagram of another frame structure according to an embodiment of this application;

[0054] FIG. 7 is a diagram of sub-period groups according to an embodiment of this application;

[0055] FIG. 8 is a diagram of an overlapping time period according to an embodiment of this

application;

[0056] FIG. 9 is a diagram of still another frame structure according to an embodiment of this application;

[0057] FIG. 10 is a schematic flowchart of another communication method according to an embodiment of this application;

[0058] FIG. 11 is a schematic flowchart of still another communication method according to an embodiment of this application;

[0059] FIG. 12 is a diagram of a structure of a communication apparatus according to an embodiment of this application; and

[0060] FIG. 13 is a diagram of a structure of another communication apparatus according to an embodiment of this application.

DESCRIPTION OF EMBODIMENTS

[0061] To implement coexistence management of a plurality of communication technologies in a communication device, an embodiment of this application provides a communication method, to avoid a data conflict.

[0062] The communication method provided in this embodiment of this application may be applied to a communication scenario shown in FIG. 1. As shown in the figure, the communication scenario may include an access point device (AP) and one or more non-access point devices (STA).

[0063] The access point device may be an access point through which a terminal device (such as a mobile phone) accesses a wired (or wireless) network, and is mainly deployed in a home, a building, and a park area. A typical coverage radius is tens of meters to hundreds of meters. Certainly, the access point may alternatively be deployed outdoors. The access point device is equivalent to a bridge that connects a wired network and a wireless network. A main function of the access point device is to connect various wireless network clients together and then connect the wireless network to an Ethernet. Specifically, the access point device may be a terminal device (such as a mobile phone) or a network device (such as a router) with a Wi-Fi chip. The access point device may be a device that supports the 802.11be standard. The access point may alternatively be a device supporting a plurality of wireless local area network (wireless local area network, WLAN) standards of the 802.11 family, for example, 802.11ax, 802.11ac, 802.11n, 802.11g, 802.11b, 802.11a, 802.11be, Wi-Fi 7, Wi-Fi 8, or a next-generation standard of Wi-Fi 8. The access point device in this application may be a high efficient (high efficient, HE) AP or an extremely high throughput (extremely high throughput, EHT) AP, or may be an access point device applicable to a future-generation Wi-Fi standard.

[0064] The access point device may be an access point single-link device or an access point multi-link device (AP MLD).

[0065] A station device may be a wireless communication chip, a wireless sensor, a wireless communication terminal, or the like, and may also be referred to as a user. For example, the station device may be a mobile phone, a tablet computer, a set-top box, a smart television, a smart wearable device, a vehicle-mounted communication device, a computer, or the like that supports a Wi-Fi communication function. Optionally, a station may support the 802.11be standard. The station device may also support a plurality of wireless local area network (wireless local area network, WLAN) standards of the 802.11 family, such as 802.11ax, 802.11ac, 802.11n, 802.11g, 802.11b, 802.11a, 802.11be, Wi-Fi 7, Wi-Fi 8, or a next generation of Wi-Fi 8.

[0066] For example, the access point and the station may be devices used in an internet of vehicles, internet of things (internet of things, IoT) nodes, sensors, or the like in an internet of things, smart cameras, smart remote controls, smart water or electricity meters, or the like in a smart home, or sensors in a smart city.

[0067] The station device can be a station single-link device or a station multi-link device (non-AP MLD).

[0068] For example, a specific structure of the AP or the STA may be shown in a structural diagram shown in FIG. 2, and may include a processor. Optionally, the specific structure of the AP or the STA may further include one or more of the following: a memory, a transmitter, a receiver, a signal detector, or a digital signal processor, and optionally, may further include a user interface. Alternatively, the transmitter and the receiver may be combined into a transceiver. This is not limited in this application.

[0069] It should be noted that a name of a device shown in FIG. 1 is merely an example, and there may be another name in a future communication system. A quantity of devices in FIG. 1 is also merely an example, and more or fewer devices may be included. This is not limited in this application.

[0070] The communication method provided in this application may be applicable to data communication between an AP and a STA, or may be applicable to communication between STAs. This is not limited in this application.

[0071] As shown in FIG. 3, the communication method provided in this embodiment of this application may include the following steps.

[0072] Step 301a: A first communication device transmits a first radio frame to a second communication device, to request the first communication device to enter a target mode.

[0073] Step 301b: The second communication device receives the first radio frame transmitted by the first communication device.

[0074] The first communication device may be a STA 1 in the communication scenario shown in FIG. 1, and the second communication device may be the AP or a STA 2 in the communication scenario shown in FIG. 1.

[0075] The first radio frame transmitted by the first communication device is used to request the first communication device to enter the target mode. After the first communication device enters the target mode, the second communication device performs communication according to a communication requirement of the target mode.

[0076] For example, the first communication device communicates with the second communication device by using a Wi-Fi communication technology, and when the first communication device determines that another communication technology (for example, a Bluetooth communication technology, a NearLink communication technology, or a UWB communication technology) has a communication requirement, the first communication device may transmit the first radio frame to the second communication device, to request to enter the target mode. After the first communication device enters the target mode, because the first communication device may perform communication by using another communication technology, the second communication device cannot communicate with the first communication device in a normal mode. For example, the second communication device cannot directly transmit a data frame to the first communication device when there is a data transmission requirement. Instead, the second communication device should interact with the first communication device according to the specified rule.

[0077] After receiving the first radio frame, the second communication device may determine whether to allow the first communication device to enter the target mode. For example, if the second communication device determines that no data with a relatively high latency requirement currently needs to be transmitted to the first communication device, the second communication device may determine to allow the first device to enter the target mode. If the second communication device determines that a large amount of data with a relatively high latency requirement currently needs to be transmitted to the first communication device, the second communication device may alternatively reject the first communication device from entering the target mode.

[0078] Optionally, when the first communication device is allowed to enter the target mode, the second communication device may transmit a second radio frame to the first communication device, to indicate whether to allow the first communication device to enter the target mode.

[0079] In a possible design, when receiving the first radio frame transmitted by the first communication device, the second communication device allows the first communication device to enter the target mode, but does not reject the first communication device to from entering the

target mode. For example, the second communication device may transmit indication information to the first communication device in advance, to indicate that the first communication device is supported in entering the target mode. In this case, when the first communication device needs to enter the target mode, the first communication device transmits the first radio frame to the second communication device. After receiving the first radio frame, the second communication device does not reject the first communication device from entering the target mode, and therefore transmits the second radio frame to the first communication device. In this case, the second radio frame does not indicate that the first communication device is rejected from entering the target mode, but is used to confirm that the first communication device can enter the target mode.

[0080] After the first communication device enters the target mode, the first communication device and the second communication device may further perform the following steps.

[0081] Step 302a: The second communication device transmits a data frame that conforms to the specified rule to the first communication device.

[0082] Step 302b: The first communication device receives the data frame that conforms to the specified rule and that is transmitted by the second communication device.

[0083] The specified rule includes: The data frame is a data frame that is acknowledged by the first communication device and allowed to be transmitted; and/or, the data frame is a data frame related to a specified target parameter. In a special embodiment, it may alternatively be set that after the first communication device enters the target mode, the second communication device is not allowed to transmit the data frame to the first communication device.

[0084] Optionally, when the specified rule includes that the data frame is the data frame that is acknowledged by the first communication device and allowed to be transmitted, before transmitting the data frame, the second communication device may first transmit a third radio frame to the first communication device, where the third radio frame is used to request to transmit the data frame; and if the first communication device receives the third radio frame and determines that the second communication device is currently allowed to transmit the data frame to the first communication device, the first communication device may transmit a fourth radio frame to the second communication device, where the fourth radio frame indicates that the data frame is allowed to be transmitted. Alternatively, when the specified rule includes that the data frame is a data frame that is acknowledged by the first communication device and allowed to be transmitted, the second communication device needs to transmit a third radio frame to the first communication device, to request to transmit the data frame; and the data frame can be transmitted to the first communication device only when a fourth radio frame indicating that the data frame is allowed to be transmitted is received; otherwise, the data frame cannot be transmitted to the first communication device.

[0085] For example, if the second communication device has a requirement for communicating with the first communication device, the second communication device may first transmit the third radio frame to the first communication device instead of directly transmitting the data frame. If the first communication device is currently performing communication by using another communication technology (such as a Bluetooth communication technology, a NearLink communication technology, or a UWB communication technology), the first communication device may not receive or identify the third radio frame transmitted by the second communication device. In this case, the first communication device does not transmit the fourth radio frame to the second communication device, in other words, the first communication device does not allow the second communication device to transmit the data frame to the first communication device. The second communication device cannot transmit the data frame to the first communication device without permission of the first communication device, that is, the second communication device cannot perform step 302a.

[0086] For another example, the second communication device transmits the third radio frame to the first communication device, to request to transmit the data frame to the first communication device. The first communication device currently may not perform communication by using another communication technology, or currently only occupies a relatively small quantity of resources to perform communication by using another communication technology, but the first communication device determines to perform communication by using another communication technology soon, or determines to occupy a relatively large quantity of resources to perform communication by using another communication technology soon. In this case, the first communication device may reject a request of transmitting the data frame of the second communication device, that is, does not allow the second communication device to transmit the data frame to the first communication device. In this case, the first communication device may not transmit the fourth radio frame to the second communication device, or may transmit a fifth radio frame to the second communication device, to indicate that the second communication device is not allowed to transmit the data frame to the first communication device. If the second communication device does not receive the fourth radio frame or receives the fifth radio frame after transmitting the third radio frame, it is determined that the second communication device cannot transmit the data frame to the first communication device currently.

[0087] For another example, the second communication device transmits the third radio frame to the first communication device, to request to transmit the data frame to the first communication device. Although the first communication device may plan to use another communication technology for communication, the first communication device currently does not use the another communication technology for communication, or only occupies a relatively small quantity of

resources to perform communication by using the another communication technology. In this case, the first communication device may allow the second communication device to transmit the data frame to the first communication device. In this case, that the first communication device transmits the fourth radio frame to the second communication device indicates that the second communication device is allowed to transmit the data frame to the first communication device. After receiving the fourth radio frame transmitted by the first communication device, the second communication device may transmit the data frame to the first communication device.

[0088] Further, in the target mode, a quantity of times that the second communication device transmits the third radio frame may be limited. For example, a maximum quantity of times of transmitting the third radio frame in the target mode may be configured as K, where a value of K may be specified in a protocol, or may be configured by the first communication device or the second communication device in advance, or may be configured by the first communication device by using the first radio frame. After the first communication device enters the target mode, when the quantity of times of transmitting the third radio frame by the second communication device to the first communication device reaches K, the second communication device no longer transmits the third radio frame to the first communication device. The value of K may be an integer greater than or equal to 1. When K=1, the second communication device can transmit the third radio frame only once before transmitting the data frame.

[0089] Optionally, when the specified rule includes that the data frame is the data frame related to the specified target parameter, the second communication device should generate and transmit the data frame based on the target parameter. The target parameter in the target mode is set, so that a quantity of resources that need to be occupied by the transmitted data frame can be controlled, thereby minimizing impact on communication performed by the first communication device by using another communication technology.

[0090] For example, the target parameter may include a maximum quantity of spatial streams, a minimum quantity of spatial streams, a maximum modulation and coding set (modulation and coding set, MCS), a minimum MCS, a maximum bandwidth, and a maximum presentation protocol data unit (presentation protocol data unit, PPDU) duration, a maximum data frame length, dual carrier modulation, or the like.

[0091] In a possible implementation, the first radio frame may include first indication information indicating a first time period. Correspondingly, the foregoing step 302a and step 302b occur in the first time period. Alternatively, when the first radio frame includes first indication information indicating a first time period, the second communication device cannot transmit the data frame to the first communication device in the first time period, and in a time period other than the first time period in the target mode, the second communication device may transmit the

data frame to the first communication device.

[0092] For example, although the first communication device requests to enter the target mode because of another communication requirement, the first communication device may not need to continuously perform communication by using another communication technology. Therefore, the first communication device may use the first time period as a reserved time period for communication using another communication technology. In this case, in the first time period, when the second communication device wants to transmit data to the first communication device, the second communication device needs to transmit the data frame that conforms to the specified rule. In a time period other than the first time period in the target mode, the second communication device may transmit the data frame to the first communication device in a normal transmission mode.

[0093] For another example, although the first communication device requests to enter the target mode because of another communication requirement, the first communication device may not always need to perform communication by using another communication technology, or may not always perform communication by using another communication technology and occupy a large quantity of transmission resources. Therefore, the first communication device may use the first time period as a time period in which the first communication device may communicate with the second communication device. In this case, in a non-first time period after the first communication device enters the target mode, the second communication device cannot transmit the data frame to the first communication device. When the first time period is reached, the second communication device may transmit the data frame that conforms to the specified rule to the first communication device.

[0094] When the first time period is configured, the quantity of times that the second communication device transmits the third radio frame in the first time period may be further limited. For example, the maximum quantity of times of transmitting the third radio frame in the first time period of the target mode may be configured as L, where a value of L may be specified in a protocol, or may be configured by the first communication device or the second communication device in advance, or may be configured by the first communication device by using the first radio frame. In the first time period after the first communication device enters the target mode, when the quantity of times that the second communication device transmits the third radio frame to the first communication device reaches L, the second communication device no longer transmits the third radio frame to the first communication device. The value of L may be an integer greater than or equal to 1. When L=1, the second communication device can transmit the third radio frame only once when transmitting the data frame in the first time period.

[0095] Optionally, the first time period indicated by the first radio frame may include a

plurality of sub-periods. That is, the first time period is not a continuous time period. A requirement for performing communication by the first communication device by using another communication technology may not be continuous. Therefore, setting a non-continuous first time period helps reduce a waste of resources, and also helps reduce transmission delays of various communication modes. For example, the first communication device communicates with the second communication device by using the Wi-Fi communication technology. When the first communication device has a requirement for communicating with a third communication device by using the Bluetooth technology, the first communication device may request to enter the target mode, and reserve the first time period for communication with the third communication device by using the Bluetooth technology. In a non-first time period after the first communication device enters the target mode, the second communication device may normally perform data transmission with the first communication device by using the Wi-Fi communication technology. In the first time period after the first communication device enters the target mode, the first communication device may communicate with the third communication device by using the Bluetooth technology. Therefore, if the second communication device wants to transmit the data frame to the first communication device, the second communication device needs to transmit the data frame that conforms to the specified rule. Because the first time period is discontinuous, the first communication device may perform transmission with the second communication device and the third communication device alternately, thereby helping reduce the waste of resources, helping balance transmission delays with the second communication device and the third communication device, and avoiding generating a relatively large delay between the first communication device and the second communication device or the third communication device.

[0096] In a specific example, the first time period may include a plurality of periodic sub-periods. As shown in FIG. 4, the first time period includes a sub-period 1, a sub-period 2, a sub-period 3, and the like. When the sub-period 1, the sub-period 2, the sub-period 3, and the like arrive periodically, the second communication device may transmit, in the sub-period 1, the sub-period 2, and the sub-period 3 that arrive periodically, the data frame that conforms to the specified rule to the first communication device. In another time period after the first communication device enters the target mode, the second communication device may directly transmit the data frame to the first communication device, or the second communication device is not allowed to transmit the data frame to the first communication device.

[0097] When the first time period includes a periodic sub-period, the first indication information may specifically indicate one or any combination of the following information: a start time of the periodic sub-period, a duration of each sub-period in the periodic sub-period, or an interval between two adjacent sub-periods in the periodic sub-period.

[0098] FIG. 4 is still used as an example. The start time of the periodic sub-period may represent a start time of a first sub-period, that is, a start time t1 of the sub-period 1. When the first indication information indicates the start time, the first indication information may indicate a moment t1, or may indicate Δt1, where Δt1=t1–t0, which represents that the time Δt1 past from a start moment t0 of entering the target mode is the start time of the sub-period 1. The duration of each sub-period in the periodic sub-period is a duration T of the sub-period 1, the sub-period 2, or the sub-period 3 in the example shown in FIG. 4, where T=t2–t1=t4–t3=t6–t5. The interval between two adjacent sub-periods in the periodic sub-period may indicate an interval between start times of the two adjacent sub-periods (for example, an interval between the start time t1 of the sub-period 1 and a start time t3 of the sub-period 2), or may indicate an interval between an end time of a previous sub-period and a start time of the next sub-period (for example, an interval between an end time t2 of the sub-period 1 and the start time t3 of sub-period 2).

[0099] As described above, the first communication device may be a multi-link device. When the first communication device is a multi-link device, after the first communication device enters the target mode, there may be one or more links that can be used by the first communication device. If the first communication device may communicate with the second communication device by using a plurality of links after entering the target mode, the first communication device may configure a same first time period for different links, or may configure different first time periods for different links. That is, the first indication information may specifically indicate the first time period corresponding to each link. For example, after entering the target mode, the first communication device may communicate with the second communication device by using a link 1 and a link 2, and the first communication device may separately configure a first time period corresponding to the link 1 and a first time period corresponding to the link 2. If the first communication device does not separately configure the first time periods corresponding to the link 1 and the link 2, and configures only one first time period, it may be understood that the first time period corresponding to the link 1 and the first time period corresponding to the link 2 are the same.

[00100] In a possible design, the first indication information may be carried in a target wake time (target wake time, TWT) element of the first radio frame. For example, in an example shown in FIG. 5, the TWT element includes TWT parameter information (TWT parameter information). A "target wake time (target wake time)" field in the TWT parameter information may indicate the start time of the periodic sub-period; a "nominal minimum TWT wake duration (nominal minimum TWT wake duration)" field in the TWT parameter information may indicate a duration of each sub-period in the periodic sub-period; and a "TWT wake interval mantissa (TWT wake interval mantissa)" field in the TWT parameter information and a "TWT wake interval exponent (TWT

wake interval exponent)" field in request type (request type) information in the TWT parameter information may jointly indicate the interval between two adjacent sub-periods in the periodic sub-period. For example, it is assumed that the interval between two adjacent sub-periods in the periodic sub-period is $A*r^B$, where r is a constant (for example, r=2 or r=10), the "TWT wake interval mantissa" field may indicate a value of A, and the "TWT wake interval exponent" field may indicate a value of B.

[00101] In another possible design, a new element may be defined in the first radio frame, to indicate the first indication information. For example, in an example shown in FIG. 6, a new element is defined in the first radio frame: a service period element (SP element). The service period element may include an element identifier (element ID), a length (length), and SP parameter information (SP parameter information). The SP parameter information may include a "service period start time (SP start time)" field, a "service period duration (SP duration)" field, and a "service period interval (SP interval)" field, which are respectively used to represent the start time of the periodic sub-period, the duration of each sub-period in the periodic sub-period, and the interval between two adjacent sub-periods in the periodic sub-period. Optionally, the "SP interval" field may further include a "service period interval mantissa (SP interval mantissa)" field and a "service period interval exponent (SP interval exponent)" field. For example, the interval between two adjacent sub-periods in the periodic sub-period is $A*r^B$, where r is a constant (for example, r=2 or r=10), the "SP interval mantissa" field may indicate a value of A, and the "SP interval exponent" field may indicate a value of B.

[00102] Optionally, the first radio frame may include a plurality of TWT elements or a plurality of service period elements, each TWT element or service period element is used to represent a periodic sub-period group, and the plurality of TWT elements or service period elements represent a plurality of periodic sub-period groups configured by the first communication device.

[00103] Optionally, when the first time period includes a plurality of sub-periods (periodic or aperiodic sub-periods), a quantity of times that the second communication device transmits the third radio frame in each sub-period may be further limited. For example, a maximum quantity of times of transmitting the third radio frame in each sub-period in the target mode may be configured as N, where a value of N may be specified in a protocol, or may be configured by the first communication device or the second communication device in advance, or may be configured by the first communication device by using the first radio frame. In each time sub-period after the first communication device enters the target mode, when the quantity of times that the second communication device transmits the third radio frame to the first communication device reaches N, the second communication device no longer transmits the third radio frame to the first communication device in this time sub-period. The maximum quantity of times of transmitting the

third radio frame in each sub-period may be agreed in advance, or may be carried in the first radio frame and transmitted to the second communication device.

[00104] In a possible design, in the target mode, when the second communication device transmits the third radio frame to the first communication device but does not receive the fourth radio frame transmitted by the first communication device, that is, the first communication device does not allow the second communication device to transmit the data frame, the second communication device is not allowed to transmit the third radio frame again. Alternatively, when the first time period is configured, in the first time period of the target mode, if the second communication device transmits the third radio frame to the first communication device but does not receive the fourth radio frame transmitted by the first communication device, the second communication device is not allowed to transmit the third radio frame again. Alternatively, when the first time period is configured and the first time period includes a first sub-period, the second communication device may not transmit the third radio frame again in the first sub-period if the second communication device does not receive the fourth radio frame transmitted by the first communication device after transmitting the third radio frame.

[00105] In a sub-period, the second communication device wants to transmit a data frame to the first communication device, but the first communication device may be unable to receive the data frame transmitted by the second communication device due to another communication requirement. In addition, because a duration of a sub-period is usually short, and the first communication device may still be unable to receive the data frame transmitted by the second communication device in a short time, if the second communication device continues to transmit the third radio frame to request to transmit a data frame, a waste of resources or a conflict may be caused, and communication performed by the first communication device by using another communication technology may further be affected. Therefore, in a sub-period, the second communication device does not transmit the third radio frame again when the second communication device transmits the third radio frame but does not receive the fourth radio frame. This helps reduce the waste of resources and the conflict, and helps ensure quality of the communication performed by the first communication device by using the another communication technology.

[00106] Optionally, when the first communication device receives the third radio frame and determines to allow the second communication device to transmit the data frame, the first communication device may further configure a duration of a time period in which the second communication device is allowed to transmit the data frame, or configure an end time for allowing the second communication device to transmit the data frame. In the target mode, if the first communication device allows the second communication device to transmit a data frame to the

first communication device, the first communication device may not use another technology for communication currently, or may occupy only a relatively small quantity of resources for communication by using another technology. Therefore, the second communication device may be allowed to transmit a data frame to the first communication device to improve resource utilization and reduce a delay. However, a process of transmitting a data frame by the second communication device shall not affect the communication performed by the first communication device by using the another communication technology. Therefore, the first communication device may limit, according to a communication requirement of the first communication device, a time period in which the second communication device transmits the data frame. Particularly, in the first time period, the time period in which the second communication device transmits the data frame is limited, so that the data frame transmitted by the second communication device can be effectively prevented from affecting communication performed by using another communication technology.

[00107] In a specific example, the first communication device may indicate, by using the fourth radio frame, a duration for which the second communication device is allowed to transmit the data frame, which represents that the time period in which the second communication device can transmit the data frame starts from a time point at which the first communication device transmits the fourth radio frame and ends when the duration configured by the first communication device expires. After receiving the fourth radio frame, the second communication device should transmit the data frame to the first communication device before the configured duration expires. Optionally, the second communication device may adjust a length and the like of the to-be-transmitted data frame based on the duration for which the data frame is allowed to be transmitted, to ensure that the data frame is completely transmitted to the first communication device before the duration expires. Optionally, if the second communication device considers that the data frame cannot be completely transmitted to the first communication device before the duration expires, the second communication device may give up transmitting the data frame, and wait for a next time when the data frame can be transmitted.

[00108] In another specific example, the first communication device may indicate, by using the fourth radio frame, a start time and/or an end time at which the second communication device is allowed to transmit the data frame. When the fourth radio frame does not indicate the start time, it may be indicated by default that the start time is a time point at which the first communication device transmits the fourth radio frame or a time point at which the second communication device receives the fourth radio frame. The end time indicates that the second communication device should transmit the data frame to the first communication device before the end time arrives. Optionally, the second communication device may adjust the length and the like of the to-be-

transmitted data frame based on the end time at which the data frame is allowed to be transmitted, to ensure that the data frame is completely transmitted to the first communication device before the end time arrives. Optionally, if the second communication device considers that the data frame cannot be completely transmitted to the first communication device before the end time arrives, the second communication device may give up transmitting the data frame, and wait for a next time when the data frame can be transmitted.

[00109] In a possible design, the fourth radio frame may further indicate current receiving capability information of the first communication device. After entering the target mode, the first communication device has a requirement for performing communication by using another communication technology. Therefore, a capability of the first communication device to communicate with the second communication device may change. When allowing the second communication device to transmit the data frame, the first communication device may indicate a current receiving capability of the first communication device by using the fourth radio frame. Optionally, the receiving capability of the first communication device may include one or any combination of the following parameters: a maximum quantity of spatial streams of the data frame, a maximum MCS of the data frame, a maximum bandwidth of the data frame, a maximum PPDU duration of the data frame, a maximum data frame length, whether the data frame allows dual carrier modulation, and whether the second communication device is allowed to transmit a trigger frame to the first communication device. The trigger frame is used to allocate a transmission resource to the first communication device.

[00110] In a possible implementation, the first radio frame may include second indication information, which indicates the specified rule in step 302a and step 302b. In other words, the second communication device determines, based on the second indication information, whether to transmit, in the target mode or in the first time period of the target mode, the data frame that is acknowledged by the first communication device and allowed to be transmitted or the data frame related to the specified target parameter, or the second communication device is not allowed to transmit the data frame to the first communication device.

[00111] For example, two types of specified rules are configured in advance: a specified rule 1 and a specified rule 2. The specified rule 1 indicates that the data frame is not allowed to be transmitted, and the specified rule 2 indicates that the data frame that is acknowledged by the first communication device and allowed to be transmitted may be transmitted. If the second indication information indicates the specified rule 1, when the first communication device enters a mode or enters the first time period of the target mode, the second communication device cannot transmit the data frame to the first communication device. If the second indication information indicates the specified rule 2, when the first communication device enters the target mode or enters the first

time period of the target mode, the second communication device needs to transmit the third radio frame to the first communication device before transmitting the data frame, and transmits the data frame to the first communication device only when the fourth radio frame is received.

[00112] For another example, when the second indication information is "00", it may indicate that the second communication device is not allowed to transmit the data frame to the first communication device in the first time period. In this case, even if the second communication device needs to transmit data to the first communication device in the first time period, the second communication device cannot transmit data in the first time period, and the second communication device may give up data transmission in this time period, or may transmit data to the first communication device after the first time period ends. When the second indication information is "01", it may indicate that the second communication device may transmit, in the first time period, the data frame that is acknowledged by the first communication device and allowed to be transmitted. In this case, when the second communication device has a data transmission requirement in the first time period, the second communication device may first transmit the third radio frame to the first communication device, and if a fourth radio frame transmitted by the first communication device is received, the second communication device may transmit the data frame to the first communication device; or if the fourth radio frame transmitted by the first communication device is not received, the second communication device cannot transmit the data frame to the first communication device. When the second indication information is "10", it may indicate that the second communication device may transmit, in the first time period, a data frame generated based on the specified target parameter to the first communication device. In this case, when the second communication device has a data transmission requirement in the first time period, the second communication device may generate the data frame based on the target parameter, and transmit the data frame to the first communication device. When the second indication information is "11", it may indicate that the second communication device may transmit, in the first time period, a data frame that is acknowledged by the first communication device and allowed to be transmitted and that is related to the specified target parameter.

[00113] Further, when the first time period indicated by the first indication information includes a plurality of sub-periods, the second indication information may specifically indicate a specified rule corresponding to each sub-period. In a specific embodiment, if the plurality of sub-periods are divided into a plurality of sub-period groups, the second indication information may separately indicate a specified rule corresponding to each sub-period group.

[00114] For example, the first indication information indicates that the first time period includes a periodic sub-period group 1 and a periodic sub-period group 2. As shown in FIG. 7, the sub-period group 1 includes a sub-period 1, a sub-period 3, a sub-period 5, ... that arrive periodically,

and the sub-period group 2 includes a sub-period 2, a sub-period 4, a sub-period 6, ... that arrive periodically. The second indication information may indicate specified rules respectively corresponding to the sub-period group 1 and the sub-period group 2. For example, the specified rule corresponding to the sub-period group 1 includes: transmitting the data frame related to the specified target parameter; and the specified rule corresponding to the sub-period group 2 includes: transmitting the data frame that is acknowledged by the first communication device and allowed to be transmitted.

[00115] When the first time period indicated by the first indication information includes a plurality of sub-periods, some sub-periods may have an overlapping time period. In this case, when the second indication information separately indicates a specified rule corresponding to each sub-period or each sub-period group, a conflict may occur between specified rules of the overlapping time period. As shown in FIG. 8, the first indication information indicates a periodic sub-period group 1 and a periodic sub-period group 2, a sub-period 2 in the sub-period group 1 overlaps with a sub-period 5 in the sub-period group 2, and a sub-period 3 in the sub-period group 1 overlaps with a sub-period 6 in the sub-period group 2. If the second indication information indicates that the specified rule corresponding to the sub-period group 1 is transmitting the data frame related to the specified target parameter, and the specified rule corresponding to the sub-period group 2 is transmitting the data frame that is acknowledged by the first communication device and allowed to be transmitted, the overlapping time period correspond to two different specified rules.

[00116] In this case, a possible implementation is that priorities are configured for various specified rules in advance, and when it is determined, based on the second indication information, that the overlapping time period corresponds to a plurality of specified rules, the second communication device may determine, based on the priorities, the specified rules corresponding to the overlapping time period. For example, a specified rule 1 may be set to "not allowing the second communication device to transmit the data frame", and a priority of the specified rule 1 is set to 1 (it is assumed that a smaller number indicates a higher priority); a specified rule 2 is set to "transmitting the data frame that is acknowledged by the first communication device and allowed to be transmitted", and a priority of the specified rule 2 is set to 2; and a specified rule 3 is set to "transmitting the data frame related to the specified target parameter", and a priority of the specified rule 3 is set to 3. FIG. 8 is still used as an example. If the first communication device indicates, by using the first indication information, the sub-period group 1 and the sub-period group 2, and indicates, by using the second indication information, that the specified rule corresponding to the sub-period group 1 is the specified rule 2 and the specified rule corresponding to the sub-period group 2 is the specified rule 3, because the priority of the specified rule 2 is higher than the priority of the specified rule 3, although the sub-period 5 in the sub-period group

2 corresponds to the specified rule 3, the specified rule 2 with a higher priority is used for the sub-period 5 because the sub-period 5 overlaps with the sub-period 2 in the sub-period group 1.

[00117] Optionally, when the first time period includes a plurality of sub-periods or a plurality of sub-period groups, but the second indication information indicates only one specified rule, it may indicate that the plurality of sub-periods or the plurality of sub-period groups use a same specified rule.

[00118] As described above, the first communication device may be a multi-link device. When the first communication device is a multi-link device, and the first communication device may use a plurality of links after entering the target mode, the first communication device may configure a same specified rule for different links, or may configure different specified rules for different links. When the first communication device configures different specified rules for different links, the second indication information may specifically indicate a specified rule corresponding to each link. For example, after entering the target mode, the first communication device may communicate with the second communication device by using the link 1 and the link 2, and the first communication device may separately configure a specified rule A corresponding to the link 1 and a specified rule B corresponding to the link 2. If the first communication device does not separately configure the specified rules for the link 1 and the link 2, but configures only one specified rule, it may be understood that the specified rule corresponding to the link 1 and the specified rule corresponding to the link 2 are the same.

[00119] In a possible design, the first radio frame may carry link information, indicating a link that can be used in the target mode. The link information may include an identifier of one or more links (link ID) that can be used in the target mode, and may further include information such as the first indication information, the second indication information, and a maximum quantity of times of transmitting the third radio frame, which correspond to and are carried in each link. The link information may be carried in a multi-link element (multi-link element, MLE), and the multi-link element is used to carry information about a multi-link device and information about a station (including an AP or a non-AP) in the multi-link device. As shown in FIG. 9, the MLE may include a "multi-link control (multi-link control)" field, a "common information (common info)" field, and a "link information (link info)" field. The "common info" field may carry common information of a plurality of stations in the multi-link device, and/or the information about the multi-link device. The "link info" field may carry information about a station on each link in the multi-link device, and may include one or more "per-STA profile" subelements, each "per-STA profile" subelement may carry information about one link, and the link ID may be included in a "STA info" field in the "per-STA profile" subelement. The "multi-link control" field may carry a type of the multi-link element and other information. Therefore, the information such as the first indication information,

the second indication information, and the maximum quantity of times of transmitting the third radio frame, which correspond to each link may be carried in a "per-STA profile" subelement corresponding to each link, for example, carried in a "STA information (STA Info)" field or a " STA profile (STA profile)" field in the "per-STA profile" subelement.

[00120] In a traditional communication mode, when the first communication device may perform communication by using another communication technology, if the second communication device still transmits the data frame to the first communication device in a conventional communication mode, a process of performing communication by the first communication by using the another communication technology may be affected; or if the second communication device cannot transmit the data frame to the first communication device at all, a waste of resources may be caused, and a transmission delay between the second communication device and the first communication device is affected. However, in the foregoing embodiment of this application, when the first communication device has another communication requirement, the first communication device may request to enter the target mode. After the first communication device enters the target mode, if the second communication device wants to transmit the data frame to the first communication device, the second communication device needs to obtain permission of the first communication device before transmitting the data frame to the first communication device, or needs to transmit the data frame that meets the target parameter. Therefore, the foregoing embodiment helps fully utilize resources and reduce the transmission delay.

[00121] As shown in FIG. 10, another communication method provided in an embodiment of this application may include the following steps.

[00122] Step 1001: A first communication device transmits a first radio frame to a second communication device, to request the first communication device to enter a target mode, where the first radio frame includes first indication information indicating a first time period.

[00123] The first radio frame transmitted by the first communication device is used to request the first communication device to enter the target mode. After the first communication device enters the target mode, the second communication device performs communication according to a communication requirement of the target mode.

[00124] A manner in which the first indication information indicates the first time period is similar to that in the foregoing embodiment. For details, refer to the descriptions of the first indication information and the first time period in the foregoing embodiment. Details are not described herein again.

[00125] After receiving the first radio frame, the second communication device may determine whether to allow the first communication device to enter the target mode. Optionally, the second communication device may transmit a second radio frame to the first communication device, to

indicate whether to allow the first communication device to enter the target mode.

[00126] Optionally, when receiving the first radio frame transmitted by the first communication device, the second communication device allows the first communication device to enter the target mode. It may also be understood as that a function of the first radio frame is to notify the second communication device that the first communication device is to enter the target mode, and the second communication device does not need to determine whether to allow the first communication device to enter the target mode.

[00127] After the first communication device enters the target mode, the first communication device and the second communication device may further perform the following step.

[00128] Step 1002: In a time period other than the first time period, the second communication device transmits a data frame that conforms to a specified rule to the first communication device.

[00129] The specified rule includes: The data frame is a data frame that is acknowledged by the first communication device and allowed to be transmitted; and/or, the data frame is a data frame related to a specified target parameter.

[00130] In a possible implementation, when the specified rule includes that the data frame is the data frame that is acknowledged by the first communication device and allowed to be transmitted, before transmitting the data frame, the second communication device may first transmit a third radio frame to the first communication device, where the third radio frame is used to request to transmit the data frame; and if the first communication device receives the third radio frame and determines that the second communication device is currently allowed to transmit the data frame to the first communication device, the first communication device may transmit a fourth radio frame to the second communication device, where the fourth radio frame indicates that the data frame is allowed to be transmitted.

[00131] Optionally, when the first time period includes a plurality of sub-periods (periodic or aperiodic sub-periods), a quantity of times that the second communication device transmits the third radio frame in a time period other than each sub-period may be further limited. The maximum quantity of times of transmitting the third radio frame in the time period other than each sub-period may be agreed in advance, or may be carried in the first radio frame and transmitted to the second communication device.

[00132] Optionally, in a non-first time period of the target mode, if the second communication device transmits the third radio frame to the first communication device but does not receive the fourth radio frame transmitted by the first communication device, the second communication device is not allowed to transmit the third radio frame again. Alternatively, when the first time period includes a first sub-period, the second communication device may not transmit the third radio frame again in a non-first sub-period when the second communication device transmits the

third radio frame but does not receive the fourth radio frame transmitted by the first communication device.

[00133] Optionally, when the first communication device receives the third radio frame and determines to allow the second communication device to transmit the data frame, the first communication device may further configure a duration of a time period in which the second communication device is allowed to transmit the data frame, or configure an end time for allowing the second communication device to transmit the data frame. The duration or the end time may be transmitted to the second communication device by using the fourth radio frame.

[00134] Optionally, the fourth radio frame may further indicate current receiving capability information of the first communication device. After entering the target mode, the first communication device has a requirement for performing communication by using another communication technology. Therefore, a capability of the first communication device to communicate with the second communication device may change. When allowing the second communication device to transmit the data frame, the first communication device may indicate a current receiving capability of the first communication device by using the fourth radio frame.

[00135] Optionally, the receiving capability of the first communication device may include one or any combination of the following parameters: a maximum quantity of spatial streams of the data frame, a maximum MCS of the data frame, a maximum bandwidth of the data frame, a maximum PPDU duration of the data frame, a maximum data frame length, whether the data frame allows dual carrier modulation, and whether the second communication device is allowed to transmit the third radio frame to the first communication device to request to transmit the data frame.

[00136] In a possible implementation, in the target mode, when the second communication device transmits the third radio frame to the first communication device but does not receive the fourth radio frame transmitted by the first communication device, that is, the first communication device does not allow the second communication device to transmit the data frame, the second communication device is not allowed to transmit the third radio frame again. Optionally, when the specified rule includes that the data frame is the data frame related to the specified target parameter, the second communication device should generate and transmit the data frame based on the target parameter. The target parameter in the target mode is set, so that a quantity of resources that need to be occupied by the transmitted data frame can be controlled, thereby minimizing impact on communication performed by the first communication device by using another communication technology.

[00137] For example, the target parameter may include a maximum quantity of spatial streams, a minimum quantity of spatial streams, a maximum MCS, a minimum MCS, a maximum bandwidth, a maximum PPDU duration, a maximum data frame length, dual carrier modulation,

or the like.

[00138] In a possible design, the first radio frame may include second indication information indicating the specified rule in step 1002. In other words, the second communication device determines, based on the second indication information, whether to transmit, in a time period other than the first time period, the data frame that is acknowledged by the first communication device and allowed to be transmitted or the data frame related to the specified target parameter.

[00139] A manner in which the second indication information indicates the specified rule is similar to that in the foregoing embodiment. For details, refer to the descriptions of the second indication information and the specified rule in the foregoing embodiment. Details are not described herein again.

[00140] The foregoing step 1002 is an operation that can be performed by the second communication device in a time period other than the first time period after the first communication device enters the target mode. After the first communication device enters the first time period, the second communication device may perform the following step 1003a or step 1003b.

[00141] Step 1003a: The second communication device directly transmits the data frame to the first communication device in the first time period.

[00142] In the first time period, the second communication device may transmit the data frame to the first communication device in a conventional communication mode, without first transmitting the third radio frame and waiting for receiving the fourth radio frame before transmitting the data frame. Optionally, the data frame transmitted by the second communication device in the first time period may not be generated and transmitted based on the target parameter.

[00143] Step 1003b: The second communication device cannot transmit the data frame to the first communication device in the first time period.

[00144] In a traditional communication mode, when the first communication device may perform communication by using another communication technology, if the second communication device still transmits the data frame to the first communication device in a conventional communication mode, a process of performing communication by the first communication by using the another communication technology may be affected; or if the second communication device cannot transmit the data frame to the first communication device at all, a waste of resources may be caused, and a transmission delay between the second communication device and the first communication device is affected. However, in the foregoing embodiment of this application, when the first communication device has another communication requirement, the first communication device may request to enter the target mode. In a time period other than the first time period after the first communication device enters the target mode, if the second

communication device wants to transmit the data frame to the first communication device, the second communication device needs to obtain permission of the first communication device before transmitting the data frame to the first communication device, or needs to transmit the data frame that meets the target parameter. Therefore, the foregoing embodiment helps fully utilize resources and reduce the transmission delay.

[00145] As shown in FIG. 11, another communication method provided in an embodiment of this application may include the following steps.

[00146] Step 1101: A first communication device transmits a first radio frame to a second communication device, to request the first communication device to enter a target mode, where the first radio frame includes first indication information indicating a first time period.

[00147] The first radio frame transmitted by the first communication device is used to request the first communication device to enter the target mode. After the first communication device enters the target mode, the second communication device performs communication according to a communication requirement of the target mode.

[00148] A manner in which the first indication information indicates the first time period is similar to that in the foregoing embodiments. For details, refer to the descriptions of the first indication information and the first time period in the foregoing embodiments. Details are not described herein again.

[00149] After receiving the first radio frame, the second communication device may determine whether to allow the first communication device to enter the target mode. Optionally, the second communication device may transmit a second radio frame to the first communication device, to indicate whether to allow the first communication device to enter the target mode.

[00150] After the first communication device enters the target mode, the second communication device may further perform step 1102a and step 1103, or the second communication device may further perform step 1102b and step 1103.

[00151] Step 1102a: The second communication device directly transmits a data frame to the first communication device in the first time period.

[00152] In the first time period, the second communication device may transmit the data frame to the first communication device in a conventional communication mode, without first transmitting a third radio frame and waiting for receiving a fourth radio frame before transmitting the data frame. Optionally, the data frame transmitted by the second communication device in the first time period may not be generated and transmitted based on the target parameter.

[00153] Step 1102b: In the first time period, the second communication device transmits a data frame that conforms to a specified rule to the first communication device.

[00154] The specified rule includes: The data frame is a data frame that is acknowledged by the

first communication device and allowed to be transmitted; and/or, the data frame is a data frame related to a specified target parameter.

[00155] In a possible implementation, when the specified rule includes that the data frame is the data frame that is acknowledged by the first communication device and allowed to be transmitted, before transmitting the data frame, the second communication device may first transmit the third radio frame to the first communication device, where the third radio frame is used to request to transmit the data frame; and if the first communication device receives the third radio frame and determines that the second communication device is currently run to transmit the data frame to the first communication device, the first communication device may transmit the fourth radio frame to the second communication device, where the fourth radio frame indicates that the data frame is allowed to be transmitted.

[00156] Optionally, when the first time period includes a plurality of sub-periods (periodic or aperiodic sub-periods), a quantity of times that the second communication device transmits the third radio frame in each sub-period may be further limited. A maximum quantity of times of transmitting the third radio frame in each sub-period may be agreed in advance, or may be carried in the first radio frame and transmitted to the second communication device.

[00157] Optionally, in the first time period of the target mode, if the second communication device transmits the third radio frame to the first communication device but does not receive the fourth radio frame transmitted by the first communication device, the second communication device is not allowed to transmit the third radio frame again. Alternatively, when the first time period includes a first sub-period, the second communication device may not transmit the third radio frame again in the first sub-period when the second communication device transmits the third radio frame but does not receive the fourth radio frame transmitted by the first communication device.

[00158] Optionally, when the first communication device receives the third radio frame and determines to allow the second communication device to transmit the data frame, the first communication device may further configure a duration of a time period in which the second communication device is allowed to transmit the data frame, or configure an end time for allowing the second communication device to transmit the data frame. The duration or the end time may be transmitted to the second communication device by using the fourth radio frame.

[00159] Optionally, the fourth radio frame may further indicate current receiving capability information of the first communication device. The receiving capability of the first communication device may include one or any combination of the following parameters: a maximum quantity of spatial streams of the data frame, a maximum MCS of the data frame, a maximum bandwidth of the data frame, a maximum PPDU duration of the data frame, a maximum data frame length,

whether the data frame allows dual carrier modulation, and whether the second communication device is allowed to transmit the third radio frame to the first communication device to request to transmit the data frame.

[00160] In a possible implementation, in the target mode, when the second communication device transmits the third radio frame to the first communication device but does not receive the fourth radio frame transmitted by the first communication device, that is, the first communication device does not allow the second communication device to transmit the data frame, the second communication device is not allowed to transmit the third radio frame again.

[00161] Optionally, when the specified rule includes that the data frame is the data frame related to the specified target parameter, the second communication device should generate and transmit the data frame based on the target parameter. The target parameter in the target mode is set, so that a quantity of resources that need to be occupied by the transmitted data frame can be controlled, thereby minimizing impact on communication performed by the first communication device by using another communication technology. For example, the target parameter may include a maximum quantity of spatial streams, a minimum quantity of spatial streams, a maximum MCS, a minimum MCS, a maximum bandwidth, a maximum PPDU duration, a maximum data frame length, dual carrier modulation, or the like.

[00162] In a possible design, the first radio frame may include second indication information indicating the specified rule in step 1102b. In other words, the second communication device determines, based on the second indication information, whether to transmit, in the first time period, the data frame that is acknowledged by the first communication device and allowed to be transmitted or the data frame related to the specified target parameter.

[00163] A manner in which the second indication information indicates the specified rule is similar to that in the foregoing embodiments. For details, refer to the descriptions of the second indication information and the specified rule in the foregoing embodiments. Details are not described herein again.

[00164] Step 1103: The second communication device cannot transmit the data frame to the first communication device in a time period other than the first time period.

[00165] In a traditional communication mode, when the first communication device may perform communication by using another communication technology, if the second communication device still transmits the data frame to the first communication device in a conventional communication mode, a process of performing communication by the first communication by using the another communication technology may be affected; or if the second communication device cannot transmit the data frame to the first communication device at all, a waste of resources may be caused, and a transmission delay between the second communication

device and the first communication device is affected. However, in the foregoing embodiment of this application, when the first communication device has another communication requirement, the first communication device may request to enter the target mode. In the first time period after the first communication device enters the target mode, if the second communication device wants to transmit the data frame to the first communication device, the second communication device needs to obtain permission of the first communication device before transmitting the data frame to the first communication device, or needs to transmit the data frame that meets the target parameter. Therefore, the foregoing embodiment helps fully utilize resources and reduce a transmission delay.

[00166] FIG. 12 is a diagram of a communication apparatus according to an embodiment of this application. The communication apparatus includes a processing module 1201 and a transceiver module 1202. The processing module 1201 is configured to implement data processing performed by the communication apparatus. The transceiver module 1202 is configured to receive content between the communication apparatus and another unit or network element, or transmit content between the communication apparatus and another unit or network element. It should be understood that, in this embodiment of this application, the processing module 1201 may be implemented by a processor or a processor-related circuit component (also referred to as a processing circuit), and the transceiver module 1202 may be implemented by a receiver/transmitter or a receiver/transmitter-related circuit component.

[00167] For example, the communication apparatus may be a communication apparatus device, or may be a chip used in a communication apparatus device or another combined device or component with a function of the communication apparatus device.

[00168] When the communication apparatus is a first communication device, the processing module 1201 transmits a first radio frame to a second communication device by using the transceiver module 1202, where the first radio frame is used to request the first communication device to enter a target mode. After the first communication device enters the target mode, a data frame transmitted by the second communication device is received by using the transceiver module 1202, where the data frame conforms to a specified rule. The specified rule includes: The data frame is a data frame that is acknowledged by the first communication device and allowed to be transmitted; and/or, the data frame is a data frame related to a specified target parameter.

[00169] In addition, the foregoing modules may be further configured to support another process performed by the first communication device in the embodiments shown in FIG. 3 to FIG. 9. For beneficial effects, refer to the foregoing descriptions. Details are not described herein again.

[00170] When the communication apparatus is a second communication device, the processing module 1201 receives, by using the transceiver module 1202, a first radio frame transmitted by a first communication device, where the first radio frame is used to request the first communication

device to enter a target mode. After the first communication device enters the target mode, a data frame is transmitted to the first communication device by using the transceiver module 1202, where the data frame conforms to a specified rule. The specified rule includes: The data frame is a data frame that is acknowledged by the first communication device and allowed to be transmitted; and/or, the data frame is a data frame related to a specified target parameter.

[00171] In addition, the foregoing modules may be further configured to support another process performed by the second communication device in the embodiments shown in FIG. 3 to FIG. 9. For beneficial effects, refer to the foregoing descriptions. Details are not described herein again.

[00172] When the communication apparatus is a first communication device, the processing module 1201 transmits a first radio frame to a second communication device by using the transceiver module 1202, where the first radio frame is used to request the first communication device to enter a target mode, and the first radio frame further indicates a first time period of the target mode. In the first time period after the first communication device enters the target mode, the second communication device is allowed to directly transmit a data frame, or the second communication device is not allowed to transmit a data frame. In a time period other than the first time period after the first communication device enters the target mode, the data frame transmitted by the second communication device is received by using the transceiver module 1202, where the data frame conforms to a specified rule. The specified rule includes: The data frame is a data frame that is acknowledged by the first communication device and allowed to be transmitted; and/or, the data frame is a data frame related to a specified target parameter.

[00173] In addition, the foregoing components may be further configured to support another process performed by the first communication device in the embodiment shown in FIG. 10. For beneficial effects, refer to the foregoing descriptions. Details are not described herein again.

[00174] When the communication apparatus is a second communication device, the processing module 1201 receives, by using the transceiver module 1202, a first radio frame transmitted by a first communication device, where the first radio frame is used to request the first communication device to enter a target mode, and the first radio frame further indicates a first time period of the target mode. In the first time period after the first communication device enters the target mode, the second communication device is allowed to directly transmit a data frame, or the second communication device is not allowed to transmit a data frame. In a time period other than the first time period after the first communication device enters the target mode, the data frame is allowed to be transmitted to the first communication device by using the transceiver module 1202, where the data frame conforms to a specified rule. The specified rule includes: The data frame is a data frame that is acknowledged by the first communication device and allowed to be transmitted;

and/or, the data frame is a data frame related to a specified target parameter.

[00175] In addition, the foregoing components may be further configured to support another process performed by the second communication device in the embodiment shown in FIG. 10. For beneficial effects, refer to the foregoing descriptions. Details are not described herein again.

[00176] When the communication apparatus is a first communication device, the processing module 1201 transmits a first radio frame to a second communication device by using the transceiver module 1202, where the first radio frame is used to request the first communication device to enter a target mode, and the first radio frame further indicates a first time period of the target mode. In a time period other than the first time period after the first communication device enters the target mode, the second communication device is not allowed to transmit a data frame to the first communication device. After the first communication device enters the target mode and in the first time period, the second communication device is allowed to directly transmit a data frame to the first communication device, or the second communication device is allowed to transmit a data frame that conforms to a specified rule to the first communication device. The specified rule includes: The data frame is a data frame that is acknowledged by the first communication device and allowed to be transmitted; and/or, the data frame is a data frame related to a specified target parameter.

[00177] In addition, the foregoing components may be further configured to support another process performed by the first communication device in the embodiment shown in FIG. 11. For beneficial effects, refer to the foregoing descriptions. Details are not described herein again.

[00178] When the communication apparatus is a second communication device, the processing module 1201 receives, by using the transceiver module 1202, a first radio frame transmitted by a first communication device, where the first radio frame is used to request the first communication device to enter a target mode, and the first radio frame further indicates a first time period of the target mode. In a time period other than the first time period after the first communication device enters the target mode, the second communication device is not allowed to transmit a data frame to the first communication device. After the first communication device enters the target mode and in the first time period, the second communication device is allowed to directly transmit a data frame to the first communication device, or a data frame that conforms to a specified rule is allowed to be transmitted to the first communication device by using the transceiver module 1202. The specified rule includes: The data frame is a data frame that is acknowledged by the first communication device and allowed to be transmitted; and/or, the data frame is a data frame related to a specified target parameter.

[00179] In addition, the foregoing components may be further configured to support another process performed by the second communication device in the embodiment shown in FIG. 11. For

beneficial effects, refer to the foregoing descriptions. Details are not described herein again.

[00180] FIG. 13 is a diagram of another communication apparatus according to an embodiment of this application. The communication apparatus includes a processor 1301 and a communication interface 1302, and may further include a memory 1303 and a bus 1304. The processor 1301, the communication interface 1302, and the memory 1303 may be connected to each other through the bus 1304. The bus 1304 may be a peripheral component interconnect (peripheral component interconnect, PCI) bus, an extended industry standard architecture (extended industry standard architecture, EISA) bus, or the like. The bus 1304 may be classified into an address bus, a data bus, a control bus, and the like. For ease of representation, only one line is used to represent the bus in FIG. 13, but this does not mean that there is only one bus or only one type of bus.

[00181] The processor 1301 may be a central processing unit (central processing unit, CPU), a network processor (network processor, NP), or a combination of a CPU and an NP. The processor may further include a hardware chip. The hardware chip may be an application-specific integrated circuit (application-specific integrated circuit, ASIC), a programmable logic device (programmable logic device, PLD), or a combination thereof. The PLD may be a complex programmable logic device (complex programmable logic device, CPLD), a field programmable gate array (field programmable gate array, FPGA), generic array logic (Generic Array Logic, GAL), or any combination thereof. The memory 1303 may be a volatile memory or a nonvolatile memory, or may include both a volatile memory and a nonvolatile memory. The nonvolatile memory may be a read-only memory (read-only memory, ROM), a programmable read-only memory (programmable ROM, PROM), an erasable programmable read-only memory (erasable PROM, EPROM), an electrically erasable programmable read-only memory (electrically EPROM, EEPROM), or a flash memory. The volatile memory may be a random access memory (random access memory, RAM), used as an external cache.

[00182] The processor 1301 is configured to implement a data processing operation of the communication apparatus. The communication interface 1302 is configured to implement a receiving operation and a transmitting operation of the communication apparatus.

[00183] When the communication apparatus is a first communication device, the processor 1301 transmits a first radio frame to a second communication device through the communication interface 1302, where the first radio frame is used to request the first communication device to enter a target mode. After the first communication device enters the target mode, a data frame transmitted by the second communication device is received through the communication interface 1302, where the data frame conforms to a specified rule. The specified rule includes: The data frame is a data frame that is acknowledged by the first communication device and allowed to be transmitted; and/or, the data frame is a data frame related to a specified target parameter.

[00184] In addition, the foregoing components may be further configured to support another process performed by the first communication device in the embodiments shown in FIG. 3 to FIG. 9. For beneficial effects, refer to the foregoing descriptions. Details are not described herein again.

[00185] When the communication apparatus is a second communication device, the processor 1301 receives, through the communication interface 1302, a first radio frame transmitted by a first communication device, where the first radio frame is used to request the first communication device to enter a target mode. After the first communication device enters the target mode, a data frame is transmitted to the first communication device through the communication interface 1302, where the data frame conforms to a specified rule. The specified rule includes: The data frame is a data frame that is acknowledged by the first communication device and allowed to be transmitted; and/or, the data frame is a data frame related to a specified target parameter.

[00186] In addition, the foregoing components may be further configured to support another process performed by the second communication device in the embodiments shown in FIG. 3 to FIG. 9. For beneficial effects, refer to the foregoing descriptions. Details are not described herein again.

[00187] When the communication apparatus is a first communication device, the processor 1301 transmits a first radio frame to a second communication device through the communication interface 1302, where the first radio frame is used to request the first communication device to enter a target mode, and the first radio frame further indicates a first time period of the target mode. In the first time period after the first communication device enters the target mode, the second communication device is allowed to directly transmit a data frame, or the second communication device is not allowed to transmit a data frame. In a time period other than the first time period after the first communication device enters the target mode, the data frame transmitted by the second communication device is received through the communication interface 1302, where the data frame conforms to a specified rule. The specified rule includes: The data frame is a data frame that is acknowledged by the first communication device and allowed to be transmitted; and/or, the data frame is a data frame related to a specified target parameter.

[00188] In addition, the foregoing components may be further configured to support another process performed by the first communication device in the embodiment shown in FIG. 10. For beneficial effects, refer to the foregoing descriptions. Details are not described herein again.

[00189] When the communication apparatus is a second communication device, the processor 1301 receives, through the communication interface 1302, a first radio frame transmitted by a first communication device, where the first radio frame is used to request the first communication device to enter a target mode, and the first radio frame further indicates a first time period of the target mode. In the first time period after the first communication device enters the target mode,

the second communication device is allowed to directly transmit a data frame, or the second communication device is not allowed to transmit a data frame. In a time period other than the first time period after the first communication device enters the target mode, the data frame is allowed to be transmitted to the first communication device through the communication interface 1302, where the data frame conforms to a specified rule. The specified rule includes: The data frame is a data frame that is acknowledged by the first communication device and allowed to be transmitted; and/or, the data frame is a data frame related to a specified target parameter.

[00190] In addition, the foregoing components may be further configured to support another process performed by the second communication device in the embodiment shown in FIG. 10. For beneficial effects, refer to the foregoing descriptions. Details are not described herein again.

[00191] When the communication apparatus is a first communication device, the processor 1301 transmits a first radio frame to a second communication device through the communication interface 1302, where the first radio frame is used to request the first communication device to enter a target mode, and the first radio frame further indicates a first time period of the target mode. In a time period other than the first time period after the first communication device enters the target mode, the second communication device is not allowed to transmit a data frame to the first communication device. After the first communication device enters the target mode and in the first time period, the second communication device is allowed to directly transmit a data frame to the first communication device, or the second communication device is allowed to transmit a data frame that conforms to a specified rule to the first communication device. The specified rule includes: The data frame is a data frame that is acknowledged by the first communication device and allowed to be transmitted; and/or, the data frame is a data frame related to a specified target parameter.

[00192] In addition, the foregoing components may be further configured to support another process performed by the first communication device in the embodiment shown in FIG. 11. For beneficial effects, refer to the foregoing descriptions. Details are not described herein again.

[00193] When the communication apparatus is a second communication device, the processor 1301 receives, through the communication interface 1302, a first radio frame transmitted by a first communication device, where the first radio frame is used to request the first communication device to enter a target mode, and the first radio frame further indicates a first time period of the target mode. In a time period other than the first time period after the first communication device enters the target mode, the second communication device is not allowed to transmit a data frame to the first communication device. After the first communication device enters the target mode and in the first time period, the second communication device is allowed to directly transmit a data frame to the first communication device, or a data frame that conforms to a specified rule is

allowed to be transmitted to the first communication device through the communication interface 1302. The specified rule includes: The data frame is a data frame that is acknowledged by the first communication device and allowed to be transmitted; and/or, the data frame is a data frame related to a specified target parameter.

[00194] In addition, the foregoing components may be further configured to support another process performed by the second communication device in the embodiment shown in FIG. 11. For beneficial effects, refer to the foregoing descriptions. Details are not described herein again.

[00195] Based on a same technical concept, an embodiment of this application further provides a computer-readable storage medium. The computer-readable storage medium stores computer-readable instructions. When the computer-readable instructions are run on a computer, the method according to any one of the foregoing possible implementations is performed.

[00196] An embodiment of this application provides a computer program product including instructions. When the computer program product runs on a computer, the foregoing method embodiments are performed.

[00197] An embodiment of this application provides a chip, including a processor. The processor is coupled to a memory, the memory is configured to store instructions, and when the instructions are executed by the processor, the chip is enabled to implement the method steps performed by any one of the foregoing nodes.

[00198] In descriptions of embodiments of this application, the term "and/or" describes an association relationship between associated objects and indicates that three relationships may exist. For example, A and/or B may indicate the following three cases: Only A exists, both A and B exist, and only B exists. "A plurality of" in this application means two or more.

[00199] In addition, it should be understood that in the description of this application, terms such as "first" and "second" are merely used for distinguishing and description, but should not be understood as indicating or implying relative importance, or should not be understood as indicating or implying a sequence. Reference to "one embodiment", "some embodiments", or the like described in this specification means that one or more embodiments of this application include a specific feature, structure, or characteristic described with reference to embodiments. Therefore, statements such as "in an embodiment", "in some embodiments", "in some other embodiments", and "in other embodiments" that appear at different places in this specification do not necessarily mean referring to a same embodiment. Instead, the statements mean "one or more but not all of embodiments", unless otherwise specifically emphasized in another manner. The terms "comprise", "include", "have", and their variants all mean "include but are not limited to", unless otherwise specifically emphasized in another manner.

[00200] The method steps in embodiments of this application may be implemented in a

hardware manner, or may be implemented in a manner of executing software instructions by the processor. The software instructions may include a corresponding software module. The software module may be stored in a random access memory, a flash memory, a read-only memory, a programmable read-only memory, an erasable programmable read-only memory, an electrically erasable programmable read-only memory, a register, a hard disk, a removable hard disk, a CD-ROM, or any other form of storage medium well-known in the art. For example, a storage medium is coupled to a processor, so that the processor can read information from the storage medium and write information into the storage medium. Certainly, the storage medium may be a component of the processor. The processor and the storage medium may be disposed in an ASIC. In addition, the ASIC may be located in a base station or a terminal. Certainly, the processor and the storage medium may exist in a base station or terminal as discrete components.

[00201] All or some of the foregoing embodiments may be implemented by using software, hardware, firmware, or any combination thereof. When software is used to implement the embodiments, all or a part of the embodiments may be implemented in a form of a computer program product. The computer program product includes one or more computer programs or instructions. When the computer programs or the instructions are loaded and executed on a computer, the procedures or functions in embodiments of this application are all or partially executed. The computer may be a general-purpose computer, a dedicated computer, a computer network, a network device, user equipment, or another programmable apparatus. The computer program or instructions may be stored in a computer-readable storage medium, or may be transmitted from a computer-readable storage medium to another computer-readable storage medium. For example, the computer program or instructions may be transmitted from a website, computer, server, or data center to another website, computer, server, or data center in a wired or wireless manner. The computer-readable storage medium may be any usable medium that can be accessed by the computer, or a data storage device, for example, a server or a data center, integrating one or more usable media. The usable medium may be a magnetic medium, for example, a floppy disk, a hard disk, or a magnetic tape; or may be an optical medium, for example, a digital video disc; or may be a semiconductor medium, for example, a solid-state drive. The computer-readable storage medium may be a volatile or non-volatile storage medium, or may include two types of storage media: a volatile storage medium and a non-volatile storage medium.

[00202] In embodiments of this application, unless otherwise stated or there is a logic conflict, terms and/or descriptions in different embodiments are consistent and may be mutually referenced, and technical features in different embodiments may be combined into a new embodiment based on an internal logical relationship thereof.

[00203] It may be understood that various numbers in embodiments of this application are

merely used for differentiation for ease of description, and are not used to limit the scope of embodiments of this application. Sequence numbers of the foregoing processes do not mean an execution sequence, and the execution sequence of the processes should be determined based on functions and internal logic of the processes.

CLAIMS

1. A communication method, applied to a first communication device, wherein the method comprises:

transmitting a first radio frame to a second communication device, wherein the first radio frame is used to request the first communication device to enter a target mode; and

receiving, after the first communication device enters the target mode, a data frame transmitted by the second communication device, wherein the data frame conforms to a specified rule; and

the specified rule comprises: the data frame is a data frame that is acknowledged by the first communication device and allowed to be transmitted; and/or, the data frame is a data frame related to a specified target parameter.

2. The method according to claim 1, wherein the first radio frame further comprises first indication information indicating a first time period; and

the receiving, after the first communication device enters the target mode, the data frame transmitted by the second communication device comprises:

receiving, after the first communication device enters the target mode and in the first time period, the data frame that is transmitted by the second communication device and that conforms to the specified rule.

3. The method according to claim 2, wherein the first communication device is a multi-link communication device, and the first communication device is capable of using M links after entering the target mode, wherein M is an integer greater than or equal to 1; and

the first indication information specifically indicates the first time periods respectively corresponding to the M links.

4. The method according to claim 2 or 3, wherein the first indication information specifically indicates that the first time period comprises a periodic sub-period group; and

the first indication information comprises one or any combination of the following information: a start time of the periodic sub-period group, a duration of each sub-period in the periodic sub-period group, and an interval between two adjacent sub-periods in the periodic sub-period group.

5. The method according to claim 1, wherein when the data frame is the data frame that is acknowledged by the first communication device and allowed to be transmitted, before receiving the data frame transmitted by the second communication device, the method further comprises:

receiving a third radio frame transmitted by the second communication device, wherein the third radio frame is used to request to transmit the data frame; and

transmitting a fourth radio frame to the second communication device, wherein the fourth radio frame indicates that the data frame is allowed to be transmitted.

6. The method according to claim 5, wherein the third radio frame is transmitted at most N times in a first sub-period, wherein N is an integer greater than 0, and the first sub-period is one of at least one sub-period comprised in a first time period.

7. The method according to claim 5 or 6, wherein the first radio frame further comprises first indication information indicating the first time period;

in the target mode, when the second communication device does not receive the fourth radio frame after transmitting the third radio frame in the first sub-period in the first time period, the second communication device is not allowed to transmit the third radio frame again; and

the first sub-period is one of the at least one sub-period comprised in the first time period.

8. The method according to claim 5, wherein the fourth radio frame further indicates a duration or an end time for allowing the second communication device to transmit the data frame in a first time period; and

the receiving the data frame transmitted by the second communication device comprises:

receiving, from a time point at which the fourth radio frame is transmitted to a time point before the duration ends, the data frame transmitted by the second communication device; or

receiving, before the end time, the data frame transmitted by the second communication device.

9. The method according to any one of claims 5 to 8, wherein the fourth radio frame further indicates receiving capability information of the first communication device after the first communication device enters the target mode, wherein the receiving capability information comprises one or any combination of the following information:

a maximum quantity of spatial streams that the first communication device is capable of receiving in the first time period, a maximum modulation and coding set MCS, a maximum bandwidth, a maximum presentation protocol data unit PPDU duration, a maximum data frame length, or whether dual carrier modulation is allowed.

10. The method according to any one of claims 1 to 9, wherein the first radio frame further comprises second indication information, and the second indication information indicates the specified rule.

11. The method according to claim 10, wherein when the first time period comprises a plurality of sub-periods, the second indication information specifically indicates specified rules respectively corresponding to the sub-periods.

12. The method according to claim 11, wherein when at least two sub-periods in the plurality of sub-periods have an overlapping time period, and the second indication information indicates

that the at least two sub-periods correspond to different specified rules, the second communication device determines, based on a priority of each of the specified rules, a specified rule corresponding to the overlapping time period.

13. The method according to any one of claims 10 to 12, wherein the first communication device is a multi-link communication device, and the first communication device is capable of using M links after entering the target mode, wherein M is an integer greater than or equal to 1; and

the second indication information specifically indicates specified rules respectively corresponding to the M links.

14. The method according to any one of claims 1 to 13, wherein the target parameter comprises one or any combination of the following parameters: a maximum quantity of spatial streams, a minimum quantity of spatial streams, a maximum modulation and coding set MCS, a minimum MCS, a maximum bandwidth, a maximum presentation protocol data unit PPDU duration, a maximum data frame length, or dual carrier modulation.

15. A communication method, applied to a second communication device, wherein the method comprises:

receiving a first radio frame transmitted by a first communication device, wherein the first radio frame is used to request the first communication device to enter a target mode; and

transmitting a data frame to the first communication device after the first communication device enters the target mode, wherein the data frame conforms to a specified rule; and

the specified rule comprises: the data frame is a data frame that is acknowledged by the first communication device and allowed to be transmitted; and/or, the data frame is a data frame related to a specified target parameter.

16. The method according to claim 15, wherein the first radio frame further comprises first indication information indicating a first time period; and

the transmitting the data frame to the first communication device after the first communication device enters the target mode comprises:

transmitting, after the first communication device enters the target mode and in the first time period, the data frame that conforms to the specified rule to the first communication device.

17. The method according to claim 16, wherein the first communication device is a multi-link communication device, and the first communication device is capable of using M links after entering the target mode, wherein M is an integer greater than or equal to 1; and

the first indication information specifically indicates the first time periods respectively corresponding to the M links.

18. The method according to claim 16 or 17, wherein the first indication information

specifically indicates that the first time period comprises a periodic sub-period group; and

the first indication information comprises one or any combination of the following information: a start time of the periodic sub-period group, a duration of each sub-period in the periodic sub-period group, and an interval between two adjacent sub-periods in the periodic sub-period group.

19. The method according to claim 15, wherein when the data frame is the data frame that is acknowledged by the first communication device and allowed to be transmitted, before transmitting the data frame to the first communication device, the method further comprises:

transmitting a third radio frame to the first communication device, wherein the third radio frame is used to request to transmit the data frame; and

receiving a fourth radio frame transmitted by the first communication device, wherein the fourth radio frame indicates that the data frame is allowed to be transmitted.

20. The method according to claim 19, wherein the third radio frame is transmitted at most N times in a first sub-period, wherein N is an integer greater than 0, and the first sub-period is one of at least one sub-period comprised in a first time period.

21. The method according to claim 19 or 20, wherein the first radio frame further comprises first indication information indicating the first time period;

in the target mode, if the fourth radio frame is not received after the third radio frame is transmitted in the first sub-period in the first time period, the third radio frame is not allowed to be transmitted again; and

the first sub-period is one of the at least one sub-period comprised in the first time period.

22. The method according to claim 19, wherein the fourth radio frame further indicates a duration or an end time for allowing the second communication device to transmit the data frame in the first time period; and

the transmitting the data frame to the first communication device comprises:

transmitting the data frame to the first communication device from a transmitting time of the fourth radio frame to a time before the duration ends; or

transmitting the data frame to the first communication device before the end time.

23. The method according to any one of claims 19 to 22, wherein the fourth radio frame further indicates receiving capability information of the first communication device after the first communication device enters the target mode, wherein the receiving capability information comprises one or any combination of the following information:

a maximum quantity of spatial streams that the first communication device is capable of receiving in the first time period, a maximum modulation and coding set MCS, a maximum bandwidth, a maximum presentation protocol data unit PPDU duration, a maximum data frame

length, or whether dual carrier modulation is allowed.

24. The method according to any one of claims 15 to 23, wherein the first radio frame further comprises second indication information, and the second indication information indicates the specified rule.

25. The method according to claim 24, wherein when the first time period comprises a plurality of sub-periods, the second indication information specifically indicates the specified rules respectively corresponding to the sub-periods.

26. The method according to claim 25, wherein when at least two sub-periods in the plurality of sub-periods have an overlapping time period, and the second indication information indicates that the at least two sub-periods correspond to different specified rules, the second communication device determines, based on a priority of each of the specified rules, a specified rule corresponding to the overlapping time period.

27. The method according to any one of claims 24 to 26, wherein the first communication device is a multi-link communication device, and the first communication device is capable of using M links after entering the target mode, wherein M is an integer greater than or equal to 1; and

the second indication information specifically indicates specified rules respectively corresponding to the M links.

28. The method according to any one of claims 15 to 27, wherein the target parameter comprises one or any combination of the following parameters: a maximum quantity of spatial streams, a minimum quantity of spatial streams, a maximum modulation and coding set MCS, a minimum MCS, a maximum bandwidth, a maximum presentation protocol data unit PPDU duration, a maximum data frame length, or dual carrier modulation.

29. A communication apparatus, comprising a processor, wherein the processor is coupled to a memory, the memory is configured to store a program or instructions, and when the program or the instructions are executed by the processor, the apparatus is enabled to perform the method according to any one of claims 1 to 28.

30. A computer-readable storage medium, wherein the computer-readable storage medium stores instructions, and when the instructions are run on a computer, the computer is enabled to perform the method according to any one of claims 1 to 28.