Wireless Communication Method and Device

Technical Field

The present application relates to the field of communications, and more particularly, to a wireless communication method and device.

Background

In a wireless communication system, a terminal device may send a Sounding Reference Signal (SRS) through an SRS resource.

A network device may perform, for example, measurement for Channel State Information (CSI) and beam management based on an SRS sent by a terminal.

In a future wireless communication system, communication scenarios are various. How to realize reasonable SRS sending to improve communication performance is an urgent problem to be solved.

Summary

Embodiments of the present application provide a wireless communication method and device, which can realize that a terminal device flexibly selects a resource utilization scheme used for transmitting an SRS on a time domain resource unit, so that a function of the time domain resource unit can be realized as required, and therefore reasonable SRS sending can be realized to improve communication performance.

In a first aspect, a wireless communication method is provided, including: determining, by a terminal device, at least one time domain resource unit occupied for performing SRS transmission on an SRS resource; determining, by the terminal device, a resource utilization scheme used for transmitting an SRS on the at least one time domain resource unit; and performing, by the terminal device, the SRS transmission on the at least one time domain resource unit according to the determined resource utilization scheme.

In combination with the first aspect, in a possible implementation of the first aspect, the resource utilization scheme is a scheme by which the terminal device utilizes a frequency

domain resource, a transmit antenna and/or a transmit beam in case of performing the SRS transmission on the at least one time domain resource unit.

In combination with the first aspect or any one of the above-mentioned possible implementations, in another possible implementation of the first aspect, the mode of utilizing the frequency domain resource, the antenna and/or the transmit beam includes a switching mode of at least one of the frequency domain resource, the sending antenna or the transmit beam in the at least one time domain resource unit.

In combination with the first aspect or any one of the above-mentioned possible implementations, in another possible implementation of the first aspect, the mode of utilizing the frequency domain resource, the antenna and/or the transmit beam indicates whether at least one of the frequency domain resource, the sending antenna or the transmit beam is switched on the at least one time domain resource unit.

In combination with the first aspect or any one of the above-mentioned possible implementations, in another possible implementation of the first aspect, the resource utilization scheme includes: performing resource hopping on frequency domain resources in the at least one time domain resource unit; or, switching a sending antenna in the at least one time domain resource unit; or, switching a transmit beam in the at least one time domain resource unit; or, adopting a same beam and a same frequency domain resource for transmission in the at least one time domain resource unit.

In combination with the first aspect or any one of the above-mentioned possible implementations, in another possible implementation of the first aspect, switching the sending antenna in the at least one time domain resource unit includes: switching the sending antenna within a same antenna panel in the at least one time domain resource unit; or performing switching between different antenna panels in the at least one time domain resource unit.

In combination with the first aspect or any one of the above-mentioned possible implementations, in another possible implementation of the first aspect, determining, by the terminal device, the resource utilization scheme used for transmitting the SRS in the at least one time domain resource unit, includes: determining, by the terminal device, the resource utilization scheme according to a parameter configuration of the SRS resource.

In combination with the first aspect or any one of the above-mentioned possible implementations, in another possible implementation of the first aspect, the parameter configuration of the SRS resource includes a configuration of the resource utilization scheme by the network device for transmitting the SRS on the at least one time domain resource unit; and determining, by the terminal device, the resource utilization scheme according to the parameter configuration of the SRS resource, includes: determining, by the terminal device, the resource utilization scheme according to the configuration of the resource utilization scheme by the network device for transmitting the SRS on the at least one time domain resource unit.

In combination with the first aspect or any one of the above-mentioned possible implementations, in another possible implementation of the first aspect, determining, by the terminal device, the resource utilization scheme according to the parameter configuration of the SRS resource, includes: determining, by the terminal device, the resource utilization scheme according to a configuration of at least one of the following: a transmission bandwidth of the SRS resource; a quantity of antenna ports for performing the SRS transmission on the SRS resource; a quantity of the at least one time domain resource unit occupied by the SRS resource; a persistent scheme of transmitting the SRS on the SRS resource; an SRS resource hopping configuration of the SRS resource; an interval of subcarriers occupied for transmitting the SRS on the SRS resource; an SRS type of the SRS resource.

In combination with the first aspect or any one of the above-mentioned possible implementations, in another possible implementation of the first aspect, the persistent scheme of transmitting the SRS on the SRS resource includes a periodic transmission scheme, a semi-persistent transmission scheme, or an aperiodic transmission scheme.

In combination with the first aspect or any one of the above-mentioned possible implementations, in another possible implementation of the first aspect, the SRS type of the SRS resource is: an SRS for Channel State Information (CSI) measurement; or an SRS for beam management.

In combination with the first aspect or any one of the above-mentioned possible implementations, in another possible implementation of the first aspect, in case that the quantity of antenna ports for performing the SRS transmission on the SRS resource is less than a first

predetermined value, the determined resource utilization scheme is switching a sending antenna in the at least one time domain resource unit; or in case that the quantity of antenna ports for performing the SRS transmission on the SRS resource is greater than or equal to a second predetermined value, the determined resource utilization scheme is not switching a sending antenna in the at least one time domain resource unit.

In combination with the first aspect or any one of the above-mentioned possible implementations, in another possible implementation of the first aspect, in case that a value of the SRS resource hopping configuration of the SRS resource is a first value, the determined resource utilization scheme is performing resource hopping on frequency domain resources in the at least one time domain resource unit; or in case that a value of the SRS resource hopping configuration of the SRS resource is not the first value, the determined resource utilization scheme is: switching a sending antenna in the at least one time domain resource unit; or, switching a transmit beam in the at least one time domain resource unit; or, adopting a same beam and a same frequency domain resource for transmission in the at least one time domain resource unit.

In combination with the first aspect or any one of the above-mentioned possible implementations, in another possible implementation of the first aspect, after performing, by the terminal device, the SRS transmission on the at least one time domain resource unit, the method further includes: receiving, by the terminal device, a target time domain resource unit in the at least one time domain resource unit indicated by the network device.

In combination with the first aspect or any of the above-mentioned possible implementations, in another possible implementation of the first aspect, the time domain resource unit is a OFDM symbol, a time slot, a mini time slot or a subframe.

In a second aspect, a wireless communication method is provided, including: determining, by a network device, at least one time domain resource unit for performing Sounding Reference Signal (SRS) reception on an SRS resource; determining, by the network device, a resource utilization scheme used by the terminal device to transmit an SRS in the at least one time domain resource unit; receiving, by the network device, the SRS transmitted by the terminal device on the at least one time domain resource unit according to the determined resource

utilization scheme.

In combination with the second aspect, in a possible implementation of the second aspect, the resource utilization scheme is a scheme by which the terminal device utilizes a frequency domain resource, a transmit antenna and/or a transmit beam in case of performing SRS transmission on the at least one time domain resource unit.

In combination with the second aspect or any one of the above-mentioned possible implementations, in another possible implementation of the second aspect, the mode of utilizing the frequency domain resource, the antenna and/or the transmit beam includes: a switching mode of at least one of the frequency domain resource, the sending antenna or the transmit beam in the at least one time domain resource unit.

In combination with the second aspect or any one of the above-mentioned possible implementations, in another possible implementation of the second aspect, the mode of utilizing the frequency domain resource, the antenna and/or the transmit beam indicates: whether at least one of the frequency domain resource, the sending antenna or the transmit beam is switched in the at least one time domain resource unit.

In combination with the second aspect or any above possible implementation thereof, in another possible implementation of the second aspect, the resource utilization scheme includes: performing resource hopping on frequency domain resources in the at least one time domain resource unit; or, switching a sending antenna in the at least one time domain resource unit; or, switching a transmit beam in the at least one time domain resource unit; or, adopting a same beam and a same frequency domain resource for transmission in the at least one time domain resource unit.

In combination with the second aspect or any one of the above-mentioned possible implementations, in another possible implementation of the second aspect, switching the sending antenna in the at least one time domain resource unit, includes: switching the sending antenna within a same antenna panel in the at least one time domain resource unit; or performing switching between different antenna panels in the at least one time domain resource unit.

In combination with the second aspect or any one of the above-mentioned possible

implementations, in another possible implementation of the second aspect, determining, by the network device, the resource utilization scheme used by the terminal device to transmit the SRS in the at least one time domain resource unit, includes: determining, by the network device, the resource utilization scheme according to a parameter configuration of the SRS resource.

In combination with the second aspect or any one of the above-mentioned possible implementations, in another possible implementation of the second aspect, the parameter configuration of the SRS resource includes a configuration of the resource utilization scheme by the network device for transmitting the SRS on the at least one time domain resource unit; determining, by the network device, the resource utilization scheme according to the parameter configuration of the SRS resource, includes: determining, by the network device, the resource utilization scheme, according to the configuration of the resource utilization scheme by the network device for transmitting the SRS on the at least one time domain resource unit.

In combination with the second aspect or any one of the above-mentioned possible implementations, in another possible implementation of the second aspect, determining, by the network device, the resource utilization scheme according to the parameter configuration of the SRS resource, includes: determining, by the network device, the resource utilization scheme according to a configuration of at least one of the following: a transmission bandwidth of the SRS resource; a quantity of antenna ports for performing the SRS transmission on the SRS resource; a quantity of the at least one time domain resource unit occupied by the SRS resource; a persistent scheme of transmitting the SRS on the SRS resource; an SRS resource hopping configuration of the SRS resource; an interval of subcarriers occupied for transmitting the SRS on the SRS resource; an SRS type of the SRS resource.

In combination with the second aspect or any one of the above-mentioned possible implementations, in another possible implementation of the second aspect, the persistent scheme of transmitting the SRS on the SRS resource includes: a periodic transmission scheme, a semi-persistent transmission scheme or an aperiodic transmission scheme.

In combination with the second aspect or any one of the above-mentioned possible implementations, in another possible implementation of the second aspect, the SRS type of the SRS resource is: an SRS for Channel State Information (CSI) measurement; or an SRS for

beam management.

In combination with the second aspect or any one of the above-mentioned possible implementations, in another possible implementation of the second aspect, in case that the quantity of antenna ports for performing the SRS transmission on the SRS resource is less than a first predetermined value, the determined resource utilization scheme is switching a sending antenna in the at least one time domain resource unit; or in case that the quantity of antenna ports for performing the SRS transmission on the SRS resource is greater than or equal to a second predetermined value, the determined resource utilization scheme is not switching a sending antenna in the at least one time domain resource unit.

In combination with the second aspect or any one of the above-mentioned possible implementations, in another possible implementation of the second aspect, in case that a value of the SRS resource hopping configuration of the SRS resource is a first value, the determined resource utilization scheme is performing resource hopping on frequency domain resources in the at least one time domain resource unit; or in case that a value of the SRS resource hopping configuration of the SRS resource is not the first value, the determined resource utilization scheme is: switching a sending antenna in the at least one time domain resource unit; or, switching a transmit beam in the at least one time domain resource unit; or, adopting a same beam and a same frequency domain resource for transmission in the at least one time domain resource unit.

In combination with the second aspect or any one of the above-mentioned possible implementations, in another possible implementation of the second aspect, after receiving, by the network device, the SRS transmitted by the terminal device on the at least one time domain resource unit, the method further includes: indicating, by the network device, a target time domain resource unit in the at least one time domain resource unit to the terminal device, according to a reception result of the SRS.

In combination with the second aspect or any one of the above-mentioned possible implementations, in another possible implementation of the second aspect, the time domain resource unit is a OFDM symbol, a time slot, a mini time slot or a subframe.

In a third aspect, a terminal device is provided, which is used for performing the method

in the above first aspect or any possible implementation of the first aspect. Specifically, the terminal device includes functional modules used for executing the method in the first aspect or any possible implementation of the first aspect described above.

In a fourth aspect, a network device is provided, which is used for performing the method in the above second aspect or any possible implementation of the second aspect. Specifically, the network device includes functional modules for executing the method in the second aspect or in any possible implementation of the second aspect described above.

In a fifth aspect, a terminal device is provided, which includes a processor, a memory, and a transceiver. The processor, the memory, and the transceiver communicate with each other through internal connection paths to transfer control and/or data signals, so that the terminal device implements the method in the first aspect or any possible implementation of the first aspect described above.

In a sixth aspect, a network device is provided, which includes a processor, a memory, and a transceiver. The processor, the memory, and the transceiver communicate with each other through internal connection paths to transfer control and/or data signals, so that the network device implements the method in the second aspect or any possible implementation of the second aspect described above.

In a seventh aspect, a computer readable medium for storing a computer program is provided. The computer program includes instructions for executing any method or any possible implementation of the method described above.

In an eighth aspect, a computer program product containing instructions is provided. In case of running on a computer, the computer program product causes the computer to execute any method or the method in any possible implementation described above.

Therefore, in embodiments of the present application, a terminal device determines at least one time domain resource unit occupied for performing SRS transmission on an SRS resource; the terminal device determines a resource utilization scheme used for transmitting the SRS on the at least one time domain resource unit; the terminal device performs the SRS transmission on the at least one time domain resource unit according to the determined resource utilization scheme, so that the terminal device can flexibly select the resource utilization

scheme used for transmitting the SRS on the time domain resource unit, so that a function of the time domain resource unit can be realized as required, and therefore reasonable SRS sending can be realized to improve communication performance.

Brief Description of Drawings

To describe the technical solution of embodiments of the present application more clearly, accompanying drawings that need to be used in the description of embodiments or the prior art will be briefly introduced below. It is apparent that the accompanying drawings described below are only some embodiments of the present application; and for a person of ordinary skill in the art, other drawings may be obtained according to these drawings without paying an inventive effort.

FIG. 1 is a schematic diagram of a wireless communication system according to an embodiment of the present application.

FIG. 2 is a schematic flowchart of a wireless communication method according to an embodiment of the present application.

FIG. 3 is a schematic flowchart of a wireless communication method according to an embodiment of the present application.

FIG. 4 is a schematic block diagram of a terminal device according to an embodiment of the present application.

FIG. 5 is a schematic block diagram of a network device according to an embodiment of the present application.

FIG. 6 is a schematic block diagram of a system chip according to an embodiment of the present application.

FIG. 7 is a schematic block diagram of a communication device according to an embodiment of the present application.

Detailed Description

The technical solution in embodiments of the present application will be described below with reference to the drawings in embodiments of the present application. It is apparent that the embodiments described are just some embodiments of the present application, but not all embodiments of the present application. According to the embodiments of the present application, all other embodiments achieved by a person of ordinary skill in the art without paying an inventive effort are within the protection scope of the present application.

Technical solutions of embodiments of the present application may be applied to various communication systems, such as, a Global System of Mobile communication (GSM) system, a Code Division Multiple Access (CDMA) system, a Wideband Code Division Multiple Access (WCDMA) system, a General Packet wireless Service (GPRS) system, a Long Term Evolution (LTE) system, an LTE Frequency Division Duplex (FDD) system, an LTE Time Division Duplex (TDD) system, a Universal Mobile Telecommunication System (UMTS), a Worldwide Interoperability for Microwave Access (WiMAX) communication system, or a future 5G system (may also be referred to as a New Radio (NR) system), or the like.

FIG. 1 shows a wireless communication system 100 to which an embodiment of the present application is applied. The wireless communication system 100 may include a network device 110. The network device 100 may be a device that communicates with a terminal device. The network device 100 may provide communication coverage for a specific geographical area, and may communicate with a terminal device (e.g., UE) in the coverage area. Optionally, the network device 100 may be a Base Transceiver Station (BTS) in a GSM system or CDMA system, a NodeB (NB) in a WCDMA system, an Evolutional Node B (eNB or eNodeB) in an LTE system, or a radio controller in a Cloud Radio Access Network (CRAN). Or the network device may be a relay station, an access point, a vehicle-mounted device, a wearable device, a network side device in a future 5G network, or a network device in a future evolved Public Land Mobile Network (PLMN), etc.

The wireless communication system 100 further includes at least one terminal device 120 in the coverage area of the network device 110. The terminal device 120 may be mobile or fixed. Optionally, the terminal device 120 may be referred to as an access terminal, a User device (UE), a subscriber unit, a subscriber station, a mobile station, a remote station, a remote

terminal, a mobile device, a user terminal, a terminal, a wireless communication device, a user agent, or a user apparatus. The access terminal may be a cellular phone, a cordless phone, a Session Initiation Protocol (SIP) phone, a Wireless Local Loop (WLL) station, a Personal Digital Assistant (PDA), a handheld device with a wireless communication function, a computing device, or other processing device connected to a wireless modem, a vehicle-mounted device, a wearable device, a terminal device in a future 5G network, or a terminal device in a future evolved Public Land Mobile Network (PLMN), or the like.

Optionally, Device to Device (D2D) communication may be performed between the terminal devices 120.

Optionally, the 5G system or network may also be referred to as a New Radio (NR) system or network.

FIG. 1 exemplifies one network device and two terminal devices. Optionally, the wireless communication system 100 may include multiple network devices, and another quantity of terminal devices may be included within the coverage area of each network device, which is not limited in embodiments of the present application.

Optionally, the wireless communication system 100 may further include other network entities such as a network controller, a mobile management entity, and embodiments of the present application are not limited thereto.

It should be understood that the terms "system" and "network" are often used interchangeably in this document. The term "and/or" in this document is merely an association relationship describing associated objects, indicating that there may be three relationships, for example, A and/or B may indicate three cases: A alone, A and B, and B alone. In addition, the symbol "/" in this document generally indicates that objects before and after the symbol "/" have an "or" relationship.

FIG. 2 is a schematic flowchart of a wireless communication method 200 according to an embodiment of the present application. The method 200 may optionally be applied to, but not limited to, the system shown in FIG. 1. The method 200 includes at least part of contents of the following.

In 210, a terminal device determines at least one time domain resource unit to be occupied

for performing SRS transmission on an SRS resource.

Optionally, in the embodiment of the present application, the SRS resource is a resource which may be used to transmit the SRS. The at least one time domain resource unit for performing the SRS transmission may belong to one SRS resource. The one SRS resource is any one of multiple SRS resources which may be used for SRS transmission. In the multiple SRS resources, at least one parameter configuration of each SRS resource is independent of other SRS resources, and the at least one parameter configuration includes at least one of the following: a time domain resource occupied for sending an SRS; a frequency domain resource occupied for sending an SRS; an SRS sequence used for sending an SRS; a number of times that an SRS is sent after receiving trigger signaling sent by a network device; or the like. A network side may allocate a configuration parameter for each SRS resource with independent signaling.

Optionally, the time domain resource unit mentioned in embodiments of the present application may be an Orthogonal Frequency Division Multiplexing (OFDM) symbol, a time slot, a mini time slot or a subframe.

Optionally, in case that the time domain resource unit is a OFDM symbol, the length of the OFDM symbol may be determined according to a subcarrier interval used to transmit an SRS on the SRS resource, or may be determined according to a subcarrier interval for determining a time slot length of a time slot in which the OFDM symbol is located, or may be determined according to a subcarrier interval used to transmit data in a time slot in which the OFDM symbol is located.

Optionally, in case that multiple time domain resource units are determined by the terminal device, the multiple time domain resource units are continuous time domain resource units.

Optionally, in case that the time domain resource unit is an OFDM symbol, the at least one time domain resource unit determined by the terminal device may be the last at least one OFDM symbol of a time slot.

Optionally, the terminal device may determine the at least one time domain resource unit according to a configuration of the network device.

For example, the network device may configure the last few OFDM symbols in a time slot for SRS transmission, then the terminal device may determine the last few OFDM symbols to transmit an SRS according to the configuration of the network device.

Optionally, the terminal device may determine the at least one time domain resource unit according to a current communication requirement.

For example, in case that an SRS is sent currently for transmit beam management, a same quantity of time domain resource units as a quantity of transmit beams may be selected.

For example, in case that an SRS is sent currently for obtaining uplink channel information of multiple antennas, a same quantity of time domain resource units as a quantity of sending antennas may be selected.

In 220, the terminal device determines a resource utilization scheme used for transmitting an SRS on the at least one time domain resource unit.

Optionally, the resource utilization scheme used for transmitting the SRS may be a resource utilization scheme for a non-time domain resource, for example, the resource utilization scheme may be a mode of utilizing a frequency domain resource, a transmit antenna and/or a transmit beam by the terminal device in case of performing the SRS transmission on the at least one time domain resource unit.

It should be understood that the resource utilization scheme may also be a mode of utilizing a resource other than a frequency domain resource, a sending antenna and a transmit beam, for example, may be a mode of utilizing a code domain resource, and embodiments of the present application do not particularly restrict this.

Optionally, the mode of utilizing the frequency domain resource, the antenna and/or the transmit beam includes: a switching mode of at least one of the frequency domain resource, the sending antenna or the transmit beam in the at least one time domain resource unit.

Specifically, the switching mode may indicate an object which is required to be switched in at least one of the frequency domain resource, the sending antenna or the transmit beam, and/or how the object to be switched is switched in the at least one time domain resource unit.

In case that one time domain resource unit is determined, the switching mode may

indicate an object which is required to be switched in at least one of the frequency domain resource, the sending antenna or the transmit beam, and/or how the object to be switched is switched among multiple finer-grained resources in the one time domain resource unit.

For example, the time domain resource unit is a subframe, and the switching mode may indicate a mode of how at least one of the frequency domain resource, the sending antenna, or the transmit beam is switched among multiple time slots in the subframe.

Or, in case that multiple time domain resource units are determined, the switching mode may indicate an object which is required to be switched in at least one of the frequency domain resource, the sending antenna or the transmit beam, and/or a mode how the object to be switched is switched among the multiple time domain resource units, and/or a mode how the object to be switched is switched among multiple finer-grained resources within a certain time domain resource unit.

For example, the multiple time domain resource units are multiple subframes, and the switching mode may indicate a mode in which the frequency domain resource, the sending antenna and/or the transmit beam is switched among multiple time slots within a certain subframe, or indicate a mode in which the frequency domain resource, the sending antenna and/or the transmit beam is switched among the multiple subframes.

At least one of the frequency domain resource, the sending antenna or the transmit beam is switched in the at least one time domain resource unit means that at least one of the frequency domain resource, the sending antenna or the transmit beam is not always the same in the at least one time domain resource unit.

Specifically, in case that the time domain resource unit determined by the terminal device includes one time domain resource unit, at least one of the frequency domain resource, the sending antenna or the transmit beam is different in at least part of the time domain resources in multiple more fine-grained time domain resources in the time domain resource unit.

For example, if the one time domain resource unit is a subframe, then at least one of the frequency domain resource, the sending antenna, or the transmit beam is different in at least part of the time domain resources in multiple time slots within the subframe.

Or, in case that the time domain resource unit determined by the terminal device includes

multiple time domain resource units, at least one of the frequency domain resource, the sending antenna or the transmit beam is not always the same among multiple finer-grained time domain resources of a certain time domain resource unit (i.e., different in at least part of the time domain resources in the multiple time domain resources), or at least one of the frequency domain resource, the sending antenna and the transmit beam is not always the same among the multiple time domain resource units (i.e., different in at least part of the time domain resource units in the multiple time domain resource units).

For example, the multiple time domain resource units are multiple subframes, then at least one of the frequency domain resource, the sending antenna or the transmit beam is not always the same among the multiple subframes, or at least one of the frequency domain resource, the sending antenna or the transmit beam is not always the same among multiple time slots of a certain subframe in the multiple subframes.

Optionally, the mode of utilizing the frequency domain resource, the antenna, and/or the transmit beam indicates: whether at least one of the frequency domain resource, the sending antenna or the transmit beam is switched in the at least one time domain resource unit.

For example, the mode indicates whether the frequency domain resource, the sending antenna and the transmit beam are switched in the at least one time domain resource unit respectively.

Optionally, in embodiments of the present application, the resource utilization scheme determined by the terminal device includes mode 1), mode 2), mode 3) or mode 4).

Among them, the mode 1) is performing resource hopping on frequency domain resources in the at least one time domain resource unit.

For example, the terminal device may adopt different frequency domain resources to transmit the SRS on different time domain resource units, wherein an agreed frequency domain resource hopping pattern is adopted among frequency domain resources used to transmit the SRS on the different time domain resource units, for example, the resource hopping pattern is determined according to the quantity of time domain resource units and/or a configuration of the network side.

The mode 2) is switching a sending antenna in the at least one time domain resource unit.

Switching the sending antenna in the at least one time domain resource unit in the mode 2) includes mode 2-1) and mode 2-2).

The mode 2-1) is switching the sending antenna within a same antenna panel in the at least one time domain resource unit; or, for example, the terminal device adopts different physical antennas in a same antenna array to transmit the SRS in different time domain resource units, and indexes of the physical antennas used to transmit the SRS on the different time domain resource units may be obtained according to an agreed formula, generally adopting a mode of antenna polling. For example, the physical antenna currently used for transmitting the SRS is determined according to an index of the time domain resource unit. In an implementation, due to the limitation of radio frequencies of a terminal, a quantity of uplink radio frequencies may be less than a quantity of physical antennas. To enable the network device to obtain a corresponding channel of each physical antenna, the terminal device may send the SRS on each physical antenna in turn.

Mode 2-2) is performing switching between different antenna panels in the at least one time domain resource unit.

For example, the terminal device adopts different antenna panels to transmit the SRS in different time domain resource units, and the antenna panels for transmitting the SRS on the different time domain resource units may be determined by the terminal device itself or configured by the network side. After receiving an SRS sent on multiple time domain resource units, the network device may notify the terminal device of an index of the time domain resource unit in which an SRS signal with the best received quality is located, so that the terminal device may subsequently transmit another signal by adopting a corresponding antenna panel. In a specific implementation, that the terminal device adopts different antenna panels to send SRS signals, may be reflected in an assumption of the terminal device that at least spatial parameters of the SRSs transmitted on different time domain resource units are not quasi-co-located.

It should be understood that, in addition to the modes 2-1) and 2-2), the mode 2) may also include another mode. For example, an antenna array which sends the SRS on the at least one time domain resource unit may include multiple antenna arrays, at least one antenna array

among the multiple antenna arrays includes multiple antennas for transmitting the SRS on the at least one time domain resource unit, wherein in case that the SRS is sent, each antenna occupies a different time domain resource compared with other antennas.

The mode 3) is switching a transmit beam in the at least one time domain resource unit.

For example, the terminal device adopts different beams to transmit the SRS in different time domain resource units, and the beams for transmitting the SRS on different time domain resource units may be determined by the terminal device itself or configured by the network side. After receiving the SRS transmitted by different beams on multiple time domain resource units, the network side may inform the terminal device of an index of the time domain resource unit in which an SRS signal with the best receiving quality is located, so that the terminal device may subsequently transmit another signal by adopting a corresponding beam. In a specific implementation, that the terminal device adopts different beams to send SRS signals may be reflected in an assumption of the terminal device or a network that spatial parameters of the SRSs transmitted on different time domain resource units are not Quasi-co-location (QCL).

The mode 4) is adopting a same beam and a same frequency domain resource for transmission in the at least one time domain resource unit.

For example, the terminal device adopts the same beam and frequency domain resource to transmit the SRS in the multiple time domain resource units, and the network device may adopt different receiving beams to receive the SRS in the multiple time domain resource units, thereby determining the best receiving beam. In a specific implementation, that the terminal adopts a same beam to send SRS signals may be reflected in an assumption of the terminal or a base station that spatial parameters of the SRSs transmitted on different time domain resource units are quasi-co-located.

Optionally, in embodiments of the present application, the terminal device may select a resource utilization scheme to use from multiple resource utilization schemes. For example, one mode is selected from the mode 1), the mode 2-1), the mode 2-2), the mode 3) and the mode 4).

Optionally, in embodiments of the present application, the terminal device may determine the resource utilization scheme according to a parameter configuration of the SRS resource.

In an implementation, the parameter configuration of the SRS resource includes a

configuration of the resource utilization scheme by the network device for transmitting the SRS on the at least one time domain resource unit; the terminal device determines the resource utilization scheme according to the configuration of the resource utilization scheme by the network device for transmitting the SRS on the at least one time domain resource unit.

Specifically, configuration information of the resource utilization scheme may be indicated to the terminal device together with another parameter configuration of the SRS resource, for example, through high-layer signaling. In addition, if the SRS resource is used for aperiodic SRS transmission, then the configuration information of the resource utilization scheme may be indicated to the terminal device through Downlink Control Information (DCI) together with trigger signaling of an aperiodic SRS.

In an implementation, the terminal device determines the resource utilization scheme according to a configuration of at least one of the following: a transmission bandwidth of the SRS resource; a quantity of antenna ports for performing the SRS transmission on the SRS resource; a quantity of at least one time domain resource unit occupied by the SRS resource; a persistent scheme of transmitting the SRS on the SRS resource; an SRS resource hopping configuration of the SRS resource; an interval of subcarriers occupied for transmitting the SRS on the SRS resource; an SRS type of the SRS resource.

Optionally, the persistent scheme of transmitting the SRS on the SRS resource includes a periodic transmission scheme, a semi-persistent transmission scheme or an aperiodic transmission scheme.

Specifically, semi-persistent transmission is SRS transmission activated by activation signaling and may be stopped by deactivation signaling, and aperiodic transmission is a limited number of times of SRS transmission triggered by DCI, not requiring to be stopped by deactivation signaling.

Optionally, the SRS type of the SRS resource is: an SRS for Channel State Information (CSI) measurement; or an SRS for beam management.

Optionally, the SRS type may be distinguished according to a purpose of a sent SRS. For example, two SRS types may be defined, which are respectively used for uplink CSI measurement and uplink sending/receiving beam management.

It should be understood that in addition to distinguishing SRS types according to purposes of SRSs, the SRS types may also be distinguished according to other factors, which is not specifically limited in embodiments of the present application.

In order to understand the present application more clearly, several specific implementations of determining the resource utilization scheme will be introduced below. It should be understood that the following is only specific implementations of the present application and should not constitute special restrictions on the present application.

In an implementation, in case that the quantity of antenna ports for performing the SRS transmission on the SRS resource is less than a first predetermined value, the determined resource utilization scheme is switching a sending antenna in the at least one time domain resource unit; or, in case that the quantity of antenna ports for performing the SRS transmission on the SRS resource is greater than or equal to a second predetermined value, the determined resource utilization scheme is not switching a sending antenna in the at least one time domain resource unit.

In an implementation, in case that a value of the SRS resource hopping configuration of the SRS resource is a first value, the determined resource utilization scheme is performing resource hopping on frequency domain resources in the at least one time domain resource unit; or, in case that a value of the SRS resource hopping configuration of the SRS resource is not a first value, the determined resource utilization scheme is: switching a sending antenna in the at least one time domain resource unit; or, switching a transmit beam in the at least one time domain resource unit; or, adopting a same beam and a same frequency domain resource for transmission in the at least one time domain resource unit. The first value is optionally 1 or 0.

In an implementation, the terminal device determines the resource utilization scheme according to the transmission bandwidth of the SRS resource.

For example, if the transmission bandwidth of the SRS resource is greater than or equal to a definite value of a user (e.g., an entire transmission bandwidth of the user), then the determined resource utilization scheme indicates that the resource hopping on frequency domain resources is not performed in the at least one time domain resource unit; and if the transmission bandwidth of the SRS resource is less than a definite value, then the determined

resource utilization scheme indicates that the resource hopping on frequency domain resources is performed in the at least one time domain resource unit.

In an implementation, the terminal determines the resource utilization scheme according to the persistent scheme of the SRS on the SRS resource.

For example, in case that the terminal device performs periodic transmission or semi-persistent transmission of the SRS, then it determine to switch a transmit beam in the at least one time domain resource unit, to adopt a same beam and a same frequency domain resource for transmission in the at least one time domain resource unit, or to switch between different antenna panels in the at least one time domain resource unit; and in case that the terminal device performs aperiodic SRS transmission, it determine to perform resource hopping on frequency domain resources in the at least one time domain resource unit.

In an implementation, the terminal device may determine the resource utilization scheme according to a subcarrier interval used for transmitting the SRS on the SRS resource.

For example, if the subcarrier interval is equal to a subcarrier interval for determining a time slot length of a time slot in which the time domain resource unit is located, or is equal to a subcarrier interval for transmitting data in a time slot in which the time domain resource unit is located, then resource hopping on frequency domain resources may be performed in the at least one time domain resource unit, or switching a sending antenna within a same antenna panel may be performed in the at least one time domain resource unit.

For example, if the subcarrier interval is greater than a subcarrier interval for determining a time slot length of a time slot in which the time domain resource unit is located, or is greater than a subcarrier interval for transmitting data in a time slot in which the time domain resource unit is located, then switching between different antenna panels may be performed in the at least one time domain resource unit, switching a transmit beam may be performed in the at least one time domain resource unit, or transmission may be performed by adopting a same beam and a same frequency domain resource in the at least one time domain resource unit.

In an implementation, in case that the terminal determines the transmission scheme according to the SRS type of the SRS resource, if the SRS type is the SRS for obtaining CSI, then the resource hopping on frequency domain resources may be performed in the at least one

time domain resource unit, or switching the sending antenna within the same antenna panel may be performed in the at least one time domain resource unit; and if the SRS type is the SRS for beam management, then switching between different antenna panels may be performed in the at least one time domain resource unit, switching the transmit beam may be performed in the at least one time domain resource unit, or transmission may be performed by adopting the same beam and the same frequency domain resource in the at least one time domain resource unit.

In 230, the terminal device performs the SRS transmission in the at least one time domain resource unit according to the determined resource utilization scheme.

Optionally, in the embodiment of the present application, after the terminal device performs the SRS transmission on the at least one time domain resource unit, the terminal device receives a target time domain resource unit in the at least one time domain resource unit indicated by the network device.

Specifically, the network device may select the target time domain resource unit (e.g., the time domain resource unit bearing an SRS with the best signal quality) from the at least one time domain resource unit according to a reception result of the SRS, and indicate the target time domain resource unit to the terminal device. The terminal device may send a subsequent downlink signal according to the indication of the network device. Specifically, the terminal device may send a subsequent downlink signal according to a sending mode of sending an SRS on the target time domain resource unit.

For example, the terminal device may send the subsequent downlink signal to the network device by utilizing a transmit beam, a sending power, or a sending antenna, etc., adopted in case of sending the SRS on the target time domain resource unit.

Therefore, in embodiments of the present application, a terminal device determines at least one time domain resource unit occupied for performing SRS transmission on an SRS resource; the terminal device determines a resource utilization scheme used for transmitting an SRS on the at least one time domain resource unit; and the terminal device performs the SRS transmission on the at least one time domain resource unit according to the determined resource utilization scheme, so that the terminal device may flexibly select the resource utilization scheme used for transmitting the SRS on the time domain resource unit, and thus a function of

the time domain resource unit can be realized as required.

FIG. 3 is a schematic flowchart of a wireless communication method 300 according to an embodiment of the present application. The method 300 includes at least some of the following contents.

In 310, a network device determines at least one time domain resource unit for performing SRS reception on a Sounding Reference Signal (SRS) resource.

Optionally, the time domain resource unit is an OFDM symbol, a time slot, a mini time slot or a subframe.

In 320, the network device determines a resource utilization scheme used by the terminal device to transmit an SRS in the at least one time domain resource unit.

Optionally, the resource utilization scheme is a scheme by which the terminal device utilizes a frequency domain resource, a transmit antenna and/or a transmit beam in case of performing SRS transmission on the at least one time domain resource unit.

Optionally, the mode of utilizing the frequency domain resource, the antenna and/or the transmit beam includes a switching mode of at least one of the frequency domain resource, the sending antenna or the transmit beam in the at least one time domain resource unit.

Optionally, the mode of utilizing the frequency domain resource, the antenna and/or the transmit beam indicates whether at least one of the frequency domain resource, the sending antenna or the transmit beam is switched on the at least one time domain resource unit.

Optionally, the resource utilization scheme includes: performing resource hopping on frequency domain resources in the at least one time domain resource unit; or, switching a sending antenna in the at least one time domain resource unit; or, switching a transmit beam in the at least one time domain resource unit; or, adopting a same beam and a same frequency domain resource for transmission in the at least one time domain resource unit.

Optionally, switching the sending antenna in the at least one time domain resource unit includes: switching the sending antenna within a same antenna panel in the at least one time domain resource unit; or performing switching between different antenna panels in the at least one time domain resource unit.

Optionally, the network device determines the resource utilization scheme according to a parameter configuration of the SRS resource.

In an implementation, the parameter configuration of the SRS resource includes a configuration of the resource utilization scheme by the network device for transmitting the SRS on the at least one time domain resource unit; and the network device determines the resource utilization scheme according to the configuration of the resource utilization scheme by the network device for transmitting the SRS on the at least one time domain resource unit.

In an implementation, the network device determines the resource utilization scheme according to a configuration of at least one of the following: a transmission bandwidth of the SRS resource; a quantity of antenna ports for performing the SRS transmission on the SRS resource; a quantity of the at least one time domain resource unit occupied by the SRS resource; a persistent scheme of transmitting the SRS on the SRS resource; an SRS resource hopping configuration of the SRS resource; an interval of subcarriers occupied for transmitting the SRS on the SRS resource; an SRS type of the SRS resource.

Optionally, the persistent scheme of transmitting the SRS on the SRS resource includes a periodic transmission scheme, a semi-persistent transmission scheme or an aperiodic transmission scheme.

Optionally, the SRS type of the SRS resource is: an SRS for Channel State Information (CSI) measurement; or an SRS for beam management.

Optionally, in case that the quantity of antenna ports for performing the SRS transmission on the SRS resource is less than a first predetermined value, the determined resource utilization scheme is switching a sending antenna in the at least one time domain resource unit; or in case that the quantity of antenna ports for performing the SRS transmission on the SRS resource is greater than or equal to a second predetermined value, the determined resource utilization scheme is not switching a sending antenna in the at least one time domain resource unit.

Optionally, in case that a value of the SRS resource hopping configuration of the SRS resource is a first value, the determined resource utilization scheme is performing resource hopping on frequency domain resources in the at least one time domain resource unit; or in case that a value of the SRS resource hopping configuration of the SRS resource is not a first value,

the determined resource utilization scheme is: switching a sending antenna in the at least one time domain resource unit; or, switching a transmit beam in the at least one time domain resource unit; or, adopting a same beam and a same frequency domain resource for transmission in the at least one time domain resource unit.

In 330, the network device receives the SRS transmitted by the terminal device on the at least one time domain resource unit according to the determined resource utilization scheme.

Optionally, in the embodiment of the present application, after the network device receives the SRS transmitted by the terminal device on the at least one time domain resource unit, the network device indicates a target time domain resource unit in the at least one time domain resource unit to the terminal device according to a reception result of the SRS.

It should be understood that the specific implementation in the method 300 shown in FIG. 3 may refer to the implementation in the method 200. For example, the implementation of determining, by the network device, the resource utilization scheme may refer to the implementation of determining, by the terminal device, the resource utilization scheme, which will not be repeated here for brevity.

FIG. 4 is a schematic block diagram of a terminal device 400 according to an embodiment of the present application. As shown in FIG. 4, the terminal device 400 may include a processing unit 410 and a communication unit 420.

The processing unit 410 is used for determining at least one time domain resource unit occupied for performing SRS transmission on a Sounding Reference Signal (SRS) resource; determining a resource utilization scheme used for transmitting an SRS on the at least one time domain resource unit; the communication unit 420 is used for performing the SRS transmission on the at least one time domain resource unit according to the resource utilization scheme determined by the processing unit.

It should be understood that the terminal device 400 may correspond to the terminal device in the method 200, and may implement a corresponding operation implemented by the terminal device in the method 200, which will not be described in detail herein for the sake of brevity.

FIG. 5 is a schematic block diagram of a network device 500 according to an embodiment

of the present application. As shown in FIG. 5, the network device 500 may include a processing unit 510 and a communication unit 520.

The processing unit 510 is used for determining at least one time domain resource unit for performing SRS reception on a Sounding Reference Signal (SRS) resource; determining a resource utilization scheme used by the terminal device to transmit an SRS in the at least one time domain resource unit; the communication unit 520 is used for receiving the SRS transmitted by the terminal device on the at least one time domain resource unit according to the resource utilization scheme determined by the processing unit 510.

It should be understood that the network device 500 may correspond to the network device in the method 300, and may implement a corresponding operation implemented by the network device in the method 300, which will not be described in detail herein for the sake of brevity.

FIG. 6 is a schematic structural diagram of a system chip 600 according to an embodiment of the present application. The system chip 600 of FIG. 6 includes an input interface 601, an output interface 602, a processor 603, and a memory 604, which could be connected through internal communication connection lines. The processor 603 is used for executing codes in the memory 604.

Optionally, in case that the codes are executed, the processor 603 implements the method implemented by the network device in the method embodiments. For sake of conciseness, the specific description will not be repeated here.

Optionally, in case that the codes are executed, the processor 603 implements the method implemented by the terminal device in the method embodiments. For sake of conciseness, the specific description will not be repeated here.

FIG. 7 is a schematic block diagram of a communication device 700 according to an embodiment of the present application. As shown in FIG. 7, the communication device 700 includes a processor 710 and a memory 720. The memory 720 may store program codes, and the processor 710 may execute the program codes stored in the memory 720.

Optionally, as shown in FIG. 7, the communication device 700 may include a transceiver 730, and the processor 710 may control the transceiver 730 to communicate with the external.

Optionally, the processor 710 may call the program codes stored in the memory 720 to perform corresponding operations of the network device in the method embodiments, which will not be described here repeatedly for brevity.

Optionally, the processor 710 may call the program codes stored in the memory 720 to perform corresponding operations of the terminal device in the method embodiments, which will not be described here repeatedly for brevity.

It should be understood that the processor in an embodiment of the present invention may be an integrated circuit chip with a capability for processing signals. In the implementation process, the actions of the method embodiments described above may be accomplished by integrated logic circuits of hardware in the processor or instructions in the form of software. The processor may be a general purpose processor, a digital signal processor (DSP), an application specific integrated circuit (ASIC), a field programmable gate array (FPGA), or other programmable logic device, discrete gate or transistor logic device, or discrete hardware component. The processor may implement various methods, acts and logic block diagrams disclosed in embodiments of the present application. The general purpose processor may be a microprocessor or the processor may be any conventional processor or the like. The actions of the method disclosed in connection with the embodiment of the present application may be directly embodied by the execution of the hardware decoding processor, or by the execution of a combination of hardware and software modules in the decoding processor. The software modules may be located in a storage medium commonly used in the art, such as a random access memory, flash memory, read-only memory, programmable read-only memory or electrically erasable programmable memory, or register. The storage medium is located in the memory, and the processor reads the information in the memory and accomplishes the actions of the above method in combination with its hardware.

It should be understood that the memory in embodiments of the present application may be a transitory memory or non-transitory memory, or may include both transitory and non-transitory memories. The non-transitory memory may be a read-only memory (ROM), programmable ROM (PROM), an erasable programmable ROM (EPROM), an electrically erasable programmable ROM (EEPROM), or a flash memory. The transitory memory may be a

random access memory (RAM) which serves as an external cache. As an example but not a limitation, many forms of RAMs are available, such as a static random access memory (SRAM), a dynamic random access memory (DRAM), a synchronous dynamic random access memory (SDRAM), a double data rate SDRAM (DDR SDRAM), an enhanced SDRAM (ESDRAM), a Synchlink DRAM (SLDRAM), and a Direct Rambus RAM (DR RAM). It should be noted that the memories of the systems and methods described herein are intended to include, but are not limited to, these and any other suitable types of memories.

Those of ordinary skill in the art will recognize that the exemplary units and algorithm acts described in connection with the embodiments disclosed herein may be implemented in electronic hardware, or a combination of computer software and electronic hardware. Whether these functions are implemented in hardware or software depends on a specific application and design constraint of the technical solution. Skilled artisans may use different approaches to realize the described functions for each particular application, but such realization should not be considered to be beyond the scope of the present application.

Those skilled in the art may clearly understand that for convenience and conciseness of description, the specific working process of the system, device and unit described above may refer to the corresponding process in the embodiments of methods described above, and details are not described herein again.

In several embodiments provided by the present application, it should be understood that the disclosed system, apparatus and method may be implemented in other ways. For example, the apparatus embodiments described above are only illustrative, for another example, the division of the units is only a logical function division, and there may be other division manners in actual implementation. For still another example, multiple units or components may be combined or integrated into another system, or some features may be ignored or not executed. On the other hand, the mutual coupling or direct coupling or communication connection shown or discussed may be indirect coupling or communication connection through some interfaces, devices or units, and may be in electrical, mechanical or other forms.

The units described as separated components may or may not be physically separated, and the component shown as a unit may or may not be a physical unit, i.e., it may be located in one

place or may be distributed over multiple network units. Some or all of the units may be selected according to practical needs to achieve a purpose of the solution of the embodiments.

In addition, various functional units in various embodiments of the present application may be integrated in one processing unit, or various units may be physically present separately, or two or more units may be integrated in one unit.

The functions may be stored in a computer readable storage medium if implemented in a form of a software functional unit and sold or used as a separate product. Based on this understanding, the technical solution of the present application, in essence, or the part contributing to the existing art, or the part of the technical solution, may be embodied in the form of a software product stored in a storage medium, including a number of instructions for causing a computer device (which may be a personal computer, a server, or a network device, etc.) to perform all or part of the acts of the methods described in various embodiments of the present application. The aforementioned storage medium includes various media capable of storing program codes, such as a U disk, a mobile hard disk, a read-only memory (ROM), a random access memory (RAM), a magnetic disk, or an optical disk.

The foregoing are merely exemplary embodiments of the present application, but the protection scope of the present application is not limited thereto. Any person skilled in the art may easily conceive variations or substitutions within the technical scope disclosed by the present application, which should be included within the protection scope of the present application. Therefore, the protection scope of the present application should be subject to the protection scope of the claims.

What we claim is:

1. A wireless communication method, comprising:

determining, by a terminal device, at least one time domain resource unit occupied for performing Sounding Reference Signal (SRS) transmission on an SRS resource;

determining, by the terminal device, a resource utilization scheme used for transmitting an SRS on the at least one time domain resource unit;

performing, by the terminal device, the SRS transmission on the at least one time domain resource unit according to the determined resource utilization scheme.

2. The method according to claim 1, wherein the resource utilization scheme is a scheme by which the terminal device utilizes a frequency domain resource, a transmit antenna and/or a transmit beam in case of performing the SRS transmission on the at least one time domain resource unit.

3. The method according to claim 2, wherein the mode of utilizing the frequency domain resource, the antenna and/or the transmit beam comprises:

a switching mode of at least one of the frequency domain resource, the transmit antenna or the transmit beam in the at least one time domain resource unit.

4. The method according to claim 2, wherein the mode of utilizing the frequency domain resource, the antenna and/or the transmit beam indicates:

whether at least one of the frequency domain resource, the transmit antenna or the transmit beam is switched on the at least one time domain resource unit.

5. The method according to claim 1 or 2, wherein the resource utilization scheme comprises:

performing resource hopping on frequency domain resources in the at least one time domain resource unit; or,

switching a transmit antenna in the at least one time domain resource unit; or,

switching a transmit beam in the at least one time domain resource unit; or,

performing transmission with adopting a same beam and a same frequency domain

resource in the at least one time domain resource unit.

6. The method according to claim 5, wherein switching the transmit antenna in the at least one time domain resource unit comprises:

switching the transmit antenna within a same antenna panel in the at least one time domain resource unit; or

performing switching between different antenna panels in the at least one time domain resource unit.

7. The method according to any one of claims 1 to 6, wherein determining, by the terminal device, the resource utilization scheme used for transmitting the SRS in the at least one time domain resource unit, comprises:

determining, by the terminal device, the resource utilization scheme according to a parameter configuration of the SRS resource.

8. The method according to claim 7, wherein the parameter configuration of the SRS resource comprises a configuration of the resource utilization scheme by the network device for transmitting the SRS on the at least one time domain resource unit;

determining, by the terminal device, the resource utilization scheme according to the parameter configuration of the SRS resource, comprises:

determining, by the terminal device, the resource utilization scheme according to the configuration of the resource utilization scheme by the network device for transmitting the SRS on the at least one time domain resource unit.

9. The method according to claim 7, wherein determining, by the terminal device, the resource utilization scheme according to the parameter configuration of the SRS resource, comprises:

determining, by the terminal device, the resource utilization scheme according to a configuration of at least one of the following:

a transmission bandwidth of the SRS resource;

a quantity of antenna ports for performing the SRS transmission on the SRS resource;

a quantity of the at least one time domain resource unit occupied by the SRS resource;

a persistent scheme of transmitting the SRS on the SRS resource;

an SRS resource hopping configuration of the SRS resource;

an interval of subcarriers occupied for transmitting the SRS on the SRS resource;

an SRS type of the SRS resource.

10. The method according to claim 9, wherein the persistent scheme of transmitting the SRS on the SRS resource comprises:

a periodic transmission scheme, a semi-persistent transmission scheme or an aperiodic transmission scheme.

11. The method according to claim 9 or 10, wherein the SRS type of the SRS resource is:

an SRS for Channel State Information (CSI) measurement; or

an SRS for beam management.

12. The method according to any one of claims 9 to 11, wherein,

in case that the quantity of antenna ports for performing the SRS transmission on the SRS resource is less than a first predetermined value, the determined resource utilization scheme is switching a transmit antenna in the at least one time domain resource unit; or

in case that the quantity of antenna ports for performing the SRS transmission on the SRS resource is greater than or equal to a second predetermined value, the determined resource utilization scheme is not switching a transmit antenna in the at least one time domain resource unit.

13. The method according to any one of claims 9 to 12, wherein in case that a value of the SRS resource hopping configuration of the SRS resource is a first value, the determined resource utilization scheme is performing resource hopping on frequency domain resources in the at least one time domain resource unit; or

in case that a value of the SRS resource hopping configuration of the SRS resource is not the first value, the determined resource utilization scheme is:

switching a transmit antenna in the at least one time domain resource unit; or,

switching a transmit beam in the at least one time domain resource unit; or,

performing transmission with adopting a same beam and a same frequency domain resource in the at least one time domain resource unit.

14. The method according to any one of claims 1 to 13, wherein after performing, by the terminal device, the SRS transmission on the at least one time domain resource unit, the method further comprises:

receiving, by the terminal device, a target time domain resource unit in the at least one time domain resource unit indicated by the network device.

15. The method according to any one of claims 1 to 14, wherein the time domain resource unit is an Orthogonal Frequency Division Multiplexing (OFDM) symbol, a time slot, a mini time slot or a subframe.

16. A wireless communication method, comprising:

determining, by a network device, at least one time domain resource unit for performing Sounding Reference Signal (SRS) reception on an SRS resource;

determining, by the network device, a resource utilization scheme used by a terminal device to transmit an SRS in the at least one time domain resource unit;

receiving, by the network device, the SRS transmitted by the terminal device on the at least one time domain resource unit according to the determined resource utilization scheme.

17. The method according to claim 16, wherein the resource utilization scheme is a scheme by which the terminal device utilizes a frequency domain resource, a transmit antenna and/or a transmit beam in case of performing SRS transmission on the at least one time domain resource unit.

18. The method according to claim 17, wherein the mode of utilizing the frequency domain resource, the antenna and/or the transmit beam comprises:

a switching mode of at least one of the frequency domain resource, the transmit antenna or the transmit beam in the at least one time domain resource unit.

19. The method according to claim 17, wherein the mode of utilizing the frequency domain resource, the antenna and/or the transmit beam indicates:

whether at least one of the frequency domain resource, the transmit antenna or the transmit beam is switched in the at least one time domain resource unit.

20. The method according to claim 16 or 17, the resource utilization scheme comprises:

performing resource hopping on frequency domain resources in the at least one time domain resource unit; or,

switching a transmit antenna in the at least one time domain resource unit; or,

switching a transmit beam in the at least one time domain resource unit; or,

performing transmission with adopting a same beam and a same frequency domain resource in the at least one time domain resource unit.

21. The method according to claim 20, wherein switching the transmit antenna in the at least one time domain resource unit comprises:

switching the transmit antenna within a same antenna panel in the at least one time domain resource unit; or

performing switching between different antenna panels in the at least one time domain resource unit.

22. The method according to any one of claims 16 to 21, wherein determining, by the network device, the resource utilization scheme used by a terminal device to transmit the SRS in the at least one time domain resource unit, comprises:

determining, by the network device, the resource utilization scheme according to a parameter configuration of the SRS resource.

23. The method according to claim 22, wherein the parameter configuration of the SRS resource comprises a configuration of the resource utilization scheme by the network device for transmitting the SRS on the at least one time domain resource unit;

determining, by the network device, the resource utilization scheme according to the parameter configuration of the SRS resource, comprises:

determining, by the network device, the resource utilization scheme according to the configuration of the resource utilization scheme by the network device for transmitting the SRS

on the at least one time domain resource unit.

24. The method according to claim 22, wherein determining, by the network device, the resource utilization scheme according to the parameter configuration of the SRS resource, comprises:

determining, by the network device, the resource utilization scheme according to a configuration of at least one of the following:

a transmission bandwidth of the SRS resource;

a quantity of antenna ports for performing the SRS transmission on the SRS resource;

a quantity of the at least one time domain resource unit occupied by the SRS resource;

a persistent scheme of transmitting the SRS on the SRS resource;

an SRS resource hopping configuration of the SRS resource;

an interval of subcarriers occupied for transmitting the SRS on the SRS resource;

an SRS type of the SRS resource.

25. The method according to claim 24, wherein the persistent scheme of transmitting the SRS on the SRS resource comprises:

a periodic transmission scheme, a semi-persistent transmission scheme or an aperiodic transmission scheme.

26. The method according to any one of claims 16 to 25, wherein after receiving, by the network device, the SRS transmitted by the terminal device on the at least one time domain resource unit, the method further comprises:

indicating, by the network device, a target time domain resource unit in the at least one time domain resource unit to the terminal device, according to a reception result of the SRS.

27. The method according to any one of claims 16 to 26, wherein the time domain resource unit is an Orthogonal Frequency Division Multiplexing (OFDM) symbol, a time slot, a mini time slot or a subframe.

28. A terminal device, comprising a processing unit and a communication unit; wherein,

the processing unit is used for determining at least one time domain resource unit

occupied for performing Sounding Reference Signal (SRS) transmission on an SRS resource; determining a resource utilization scheme used for transmitting an SRS on the at least one time domain resource unit;

the communication unit is used for performing the SRS transmission on the at least one time domain resource unit according to the resource utilization scheme determined by the processing unit.

29. The terminal device according to claim 28, wherein the resource utilization scheme is a scheme by which the terminal device utilizes a frequency domain resource, a transmit antenna and/or a transmit beam in case of performing the SRS transmission on the at least one time domain resource unit.

30. The terminal device according to claim 29, wherein the mode of utilizing the frequency domain resource, the antenna and/or the transmit beam comprises:

a switching mode of at least one of the frequency domain resource, the transmit antenna or the transmit beam in the at least one time domain resource unit.

31. The terminal device according to claim 29, wherein the mode of utilizing the frequency domain resource, the antenna and/or the transmit beam indicates:

whether at least one of the frequency domain resource, the transmit antenna or the transmit beam is switched on the at least one time domain resource unit.

32. The terminal device according to claim 28 or 29, wherein the resource utilization scheme comprises:

performing resource hopping on frequency domain resources in the at least one time domain resource unit; or,

switching a transmit antenna in the at least one time domain resource unit; or,

switching a transmit beam in the at least one time domain resource unit; or,

performing transmission with adopting a same beam and a same frequency domain resource in the at least one time domain resource unit.

33. The terminal device according to claim 32, wherein switching the transmit antenna in the at least one time domain resource unit comprises:

switching the transmit antenna within a same antenna panel in the at least one time domain resource unit; or

performing switching between different antenna panels in the at least one time domain resource unit.

34. The terminal device according to any one of claims 28 to 33, wherein the processing unit is further used for:

determining the resource utilization scheme according to a parameter configuration of the SRS resource.

35. The terminal device according to claim 34, wherein the parameter configuration of the SRS resource comprises a configuration of the resource utilization scheme by the network device for transmitting the SRS on the at least one time domain resource unit;

the processing unit is further used for:

determining the resource utilization scheme according to the configuration of the resource utilization scheme by the network device for transmitting the SRS on the at least one time domain resource unit.

36. The terminal device according to claim 34, wherein the processing unit is further used for:

determining the resource utilization scheme according to a configuration of at least one of the following:

a transmission bandwidth of the SRS resource;

a quantity of antenna ports for performing the SRS transmission on the SRS resource;

a quantity of the at least one time domain resource unit occupied by the SRS resource;

a persistent scheme of transmitting the SRS on the SRS resource;

an SRS resource hopping configuration of the SRS resource;

an interval of subcarriers occupied for transmitting the SRS on the SRS resource;

an SRS type of the SRS resource.

37. The terminal device according to claim 36, wherein the persistent scheme of

transmitting the SRS on the SRS resource comprises:

a periodic transmission scheme, a semi-persistent transmission scheme or an aperiodic transmission scheme.

38. The terminal device according to claim 36 or 37, wherein the SRS type of the SRS resource is:

an SRS for Channel State Information (CSI) measurement; or

an SRS for beam management.

39. The terminal device according to any one of claims 36 to 38, wherein,

in case that the quantity of antenna ports for performing the SRS transmission on the SRS resource is less than a first predetermined value, the determined resource utilization scheme is switching a transmit antenna in the at least one time domain resource unit; or

in case that the quantity of antenna ports for performing the SRS transmission on the SRS resource is greater than or equal to a second predetermined value, the determined resource utilization scheme is not switching a transmit antenna in the at least one time domain resource unit.

40. The terminal device according to any one of claims 36 to 39, wherein in case that a value of the SRS resource hopping configuration of the SRS resource is a first value, the determined resource utilization scheme is performing resource hopping on frequency domain resources in the at least one time domain resource unit; or

in case that a value of the SRS resource hopping configuration of the SRS resource is not the first value, the determined resource utilization scheme is:

switching a transmit antenna in the at least one time domain resource unit; or,

switching a transmit beam in the at least one time domain resource unit; or,

performing transmission with adopting a same beam and a same frequency domain resource in the at least one time domain resource unit.

41. The terminal device according to any one of claims 28 to 40, wherein the communication unit is used for receiving a target time domain resource unit in the at least one

time domain resource unit indicated by the network device.

42. The terminal device according to any one of claims 28 to 41, wherein the time domain resource unit is an Orthogonal Frequency Division Multiplexing (OFDM) symbol, a time slot, a mini time slot or a subframe.

43. A network device, comprising: a processing unit and a communication unit; wherein

the processing unit is used for determining at least one time domain resource unit for performing Sounding Reference Signal (SRS) reception on an SRS resource; determining a resource utilization scheme used by the terminal device to transmit an SRS in the at least one time domain resource unit;

the communication unit is used for receiving the SRS transmitted by the terminal device on the at least one time domain resource unit according to the resource utilization scheme determined by the processing unit.

44. The network device according to claim 43, wherein the resource utilization scheme is a scheme by which the terminal device utilizes a frequency domain resource, a transmit antenna and/or a transmit beam in case of performing SRS transmission on the at least one time domain resource unit.

45. The network device according to claim 44, wherein the mode of utilizing the frequency domain resource, the antenna and/or the transmit beam comprises:

a switching mode of at least one of the frequency domain resource, the transmit antenna or the transmit beam in the at least one time domain resource unit.

46. The network device according to claim 44, wherein the mode of utilizing the frequency domain resource, the antenna and/or the transmit beam indicates:

whether at least one of the frequency domain resource, the transmit antenna or the transmit beam is switched in the at least one time domain resource unit.

47. The network device according to claim 43 or 44, wherein the resource utilization scheme comprises:

performing resource hopping on frequency domain resources in the at least one time domain resource unit; or,

switching a transmit antenna in the at least one time domain resource unit; or,

switching a transmit beam in the at least one time domain resource unit; or,

performing transmission with adopting a same beam and a same frequency domain resource in the at least one time domain resource unit.

48. The network device according to claim 47, wherein switching the transmit antenna in the at least one time domain resource unit comprises:

switching the transmit antenna within a same antenna panel in the at least one time domain resource unit; or

performing switching between different antenna panels in the at least one time domain resource unit.

49. The network device according to any one of claims 43 to 48, wherein the processing unit is further used for:

determining the resource utilization scheme according to a parameter configuration of the SRS resource.

50. The network device according to claim 49, wherein the parameter configuration of the SRS resource comprises a configuration of the resource utilization scheme by the network device for transmitting the SRS on the at least one time domain resource unit;

the processing unit is further used for:

determining the resource utilization scheme according to the configuration of the resource utilization scheme by the network device for transmitting the SRS on the at least one time domain resource unit.

51. The device according to claim 49, wherein the processing unit is further used for:

determining the resource utilization scheme according to a configuration of at least one of the following:

a transmission bandwidth of the SRS resource;

a quantity of antenna ports for performing the SRS transmission on the SRS resource;

a quantity of the at least one time domain resource unit occupied by the SRS resource;

a persistent scheme of transmitting the SRS on the SRS resource;

an SRS resource hopping configuration of the SRS resource;

an interval of subcarriers occupied for transmitting the SRS on the SRS resource;

an SRS type of the SRS resource.

52. The network device according to claim 51, wherein the persistent scheme of transmitting the SRS on the SRS resource comprises:

a periodic transmission scheme, a semi-persistent transmission scheme or an aperiodic transmission scheme.

53. The network device according to claim 51 or 52, wherein the SRS type of the SRS resource is:

an SRS for Channel State Information (CSI) measurement; or

an SRS for beam management.

54. The network device according to any one of claims 43 to 53, wherein the communication unit is further used for:

indicating a target time domain resource unit in the at least one time domain resource unit to the terminal device according to a reception result of the SRS.

55. The network device according to any one of claims 43 to 54, wherein the time domain resource unit is an Orthogonal Frequency Division Multiplexing (OFDM) symbol, a time slot, a mini time slot or a subframe.