CLAIMS

WHAT IS CLAIMED IS:

1. A method for reference signal transmission, ~~applicable to~~performed by a terminal device, the method comprising:

determining a positioning request,

wherein the positioning request is configured to indicate a network device to send at least one of resource configuration parameters of a positioning reference signal (PRS) ~~and/~~or the PRS to the terminal device; or the positioning request is configured to indicate the terminal device to send a positioning measurement result to the network device.

2. The method of claim 1, further comprising:

transmitting the PRS based on the positioning request or the resource configuration parameters of the PRS, wherein the positioning request is configured to indicate the network device to send at least one of the resource configuration parameters of the PRS ~~and/~~or the PRS to the terminal device; or

sending the positioning measurement result to the network device based on the positioning request, wherein the positioning request is configured to indicate the terminal device to send the positioning measurement result to the network device.

3. The method of claim 1, further comprising:

sending the positioning request to the network device, wherein the network device is an access network device or a network element with a location management function.

~~4. The method of claim 3, wherein the network device is an access network device or a network element with a location management function.~~

~~5~~4. The method of claim 4~~3~~, wherein sending the positioning request to the network device comprises:

sending the positioning request to the access network device through a random access channel; or,

sending the positioning request to the access network device through a scheduling request (SR).

~~6~~5. The method of claim ~~5~~4, wherein when the positioning request is configured to indicate the network device to send at least one of the resource configuration parameters of the PRS ~~and/~~or the PRS to the terminal device~~;~~ ,

~~wherein~~ sending the positioning request to the access network device through the random access channel comprises one of:

sending positioning request supplementary information to the access network device, wherein the positioning request supplementary information comprises first indication information of the PRS, and the first indication information is information of resource configuration recommendation parameters of the PRS recommended by the terminal device to the access network device, or receiving second indication information of the PRS sent by the access network device through a Msg2 in a 4-step random access channel, wherein the second indication information is configured to indicate the resource configuration parameters of the PRS sent by the access network device;

or

wherein when the positioning request is configured to indicate the terminal device to send the positioning measurement result to the network device,

sending the positioning request to the access network device through the random access channel comprises: sending the positioning measurement result to the access network device through physical uplink shared channel resources in a Msg3 of a 4-step random access channel or in a Msg A of a 2-step random access channel, and

sending the positioning request to the access network device through the SR comprises: sending the positioning measurement result to the access network device through physical uplink shared channel resources scheduled by the access network device based on the SR.

~~7~~6. The method according to claim ~~6~~5, wherein the positioning request supplementary information is sent through a Msg3 in a 4-step random access channel or a Msg A in a 2-step random access channel;

when the positioning request is configured to indicate the network device to send at least one of the resource configuration parameters of the PRS or the PRS to the terminal device, the method further comprises: measuring the PRS sent by the access network device based on the

resource configuration parameters, and sending a measurement result to the access network device through a Msg3 in the 4-step random access channel.

~~8. The method of claim 5, wherein the positioning request is configured to indicate the network device to send the resource configuration parameters of the PRS and/or the PRS to the terminal device;~~

~~wherein sending the positioning request to the access network device through the random access channel comprises:~~

~~receiving second indication information of the PRS sent by the access network device through a Msg2 in a 4-step random access channel, wherein the second indication information is configured to indicate the resource configuration parameters of the PRS sent by the access network device.~~

~~9. The method of claim 8, further comprising:~~

~~measuring the PRS sent by the access network device based on the resource configuration parameters, and sending a measurement result to the access network device through a Msg3 in the 4-step random access channel.~~

~~10. The method of claim 5, wherein the positioning request is configured to indicate the terminal device to send the positioning measurement result to the network device;~~

~~wherein sending the positioning request to the access network device through the random access channel comprises:~~

~~sending the positioning measurement result to the access network device through physical uplink shared channel resources in a Msg3 of a 4-step random access channel or in a Msg A of a 2-step random access channel.~~

~~11. The method of claim 5, wherein the positioning request is configured to indicate the terminal device to send the positioning measurement result to the network device;~~

~~wherein sending the positioning request to the access network device through the SR comprises:~~

~~sending the positioning measurement result to the access network device through physical uplink shared channel resources scheduled by the access network device based on the SR.~~

~~12~~7. The method of claim 1, wherein determining the positioning request comprises:

receiving the positioning request sent by the network device, wherein the network device is an access network device or a network element with a location management function.

~~13. The method of claim 12, wherein the network device is an access network device or a network element with a location management function.~~

~~14~~8. The method of claim ~~13~~7, wherein when the positioning request is configured to indicate the network device to send at least one of the resource configuration parameters of the PRS or the PRS to the terminal device, receiving the positioning request sent by the network device comprises:

receiving a paging message sent by the access network device, wherein the paging message comprises the positioning request; and

the method further comprises: receiving a first downlink signaling sent by the access network device, wherein the first downlink signaling is configured to indicate third indication information of the PRS, and the third indication information comprises the resource configuration parameters; and the first downlink signaling comprises at least one of: a radio resource control signaling, a medium access control signaling, or a downlink control information signaling;

or

receiving the positioning request sent by the access network device comprises: receiving a second downlink signaling sent by the access network device, wherein the second downlink signaling is configured to indicate the positioning request through fourth indication information, and the second downlink signaling comprises at least one of: a radio resource control signaling, a medium access control signaling, or a downlink control information signaling; wherein the fourth indication information comprises the resource configuration parameters.

~~15. The method of claim 14, wherein the positioning request is configured to indicate the network device to send the resource configuration parameters of the PRS and/or the PRS to the terminal device;~~

~~wherein the method further comprises:~~

~~receiving a first downlink signaling sent by the access network device, wherein the first downlink signaling is configured to indicate third indication information of the PRS, and the third indication information comprises the resource configuration parameters; and the first~~

~~downlink signaling comprises at least one of: a radio resource control signaling, a medium access control signaling, or a downlink control information signaling.~~

~~16~~9. The method of claim ~~13~~7, wherein the positioning request is configured to indicate the terminal device to send the positioning measurement result to the network device;

wherein the method further comprises:

sending the positioning measurement result to the access network device through physical uplink shared channel resources in a Msg3 of a 4-step random access channel or in a Msg A in a 2-step random access channel.

~~17. The method of claim 13, wherein the positioning request is configured to indicate the network device to send the resource configuration parameters of the PRS and/or the PRS to the terminal device;~~

~~wherein receiving the positioning request sent by the access network device comprises:~~

~~receiving a second downlink signaling sent by the access network device, wherein the second downlink signaling is configured to indicate the positioning request through fourth indication information, and the second downlink signaling comprises at least one of: a radio resource control signaling, a medium access control signaling, or a downlink control information signaling; the fourth indication information comprises the resource configuration parameters.~~

~~18~~10. The method of any one of claims 1 to 9, wherein the resource configuration parameters comprise at least one of a resource mapping identifier and a beam identifier;

wherein the PRS comprises: an uplink signal for positioning; or a downlink PRS;

wherein at least one of a first correspondence between resource mapping identifiers and time-frequency resource location parameters or a second corresponding relationship between beam identifiers and reference signal identifiers indicating beam directions is preconfigured, wherein the time-frequency resource location parameters comprise at least one of: frequency domain parameters, time domain parameters and space domain parameters;

wherein the method further comprises: receiving resource indication information sent by the network device, wherein the resource indication information comprises at least one of: a mapping relationship between resource mapping identifiers and time-frequency resource location parameters, and a mapping relationship between beam identifiers and reference signal

identifiers indicating beam directions; the resource indication information is information of at least one of a resource position or a beam direction in which the network device indicates to the terminal device to transmit the PRS.

~~19. The method of any one of claims 1 to 18, further comprising:~~

~~receiving resource indication information sent by the network device, wherein the resource indication information comprises at least one of: a mapping relationship between resource mapping identifiers and time-frequency resource location parameters, and a mapping relationship between beam identifiers and reference signal identifiers indicating beam directions;~~

~~the resource indication information is information of a resource position and/or a beam direction in which the network device indicates to the terminal device to transmit the PRS.~~

~~20. The method of any one of claims 1 to 18, wherein~~

~~a first correspondence between resource mapping identifiers and time-frequency resource location parameters is preconfigured; and/or~~

~~a second corresponding relationship between beam identifiers and reference signal identifiers indicating beam directions is preconfigured.~~

~~21. The method of claim 20, wherein the time-frequency resource location parameters comprise at least one of: frequency domain parameters, time domain parameters and space domain parameters.~~

~~22. The method of any one of claims 1 to 18, wherein the PRS comprises:~~

~~an uplink signal for positioning; or~~

~~a downlink PRS.~~

~~23~~11. A method for reference signal transmission, ~~applicable to~~performed by a network device, the method comprising:

determining a positioning request,

wherein the positioning request is configured to indicate the network device to send at least one of resource configuration parameters of a positioning reference signal (PRS) ~~and/~~or the PRS to a terminal device; or the positioning request is configured to indicate the terminal device to send a positioning measurement result to the network device.

~~24~~12. The method of claim ~~23~~11, further comprising:

transmitting the PRS based on the positioning request or the resource configuration parameters of the PRS, wherein the positioning request is configured to indicate the network device to send at least one of the resource configuration parameters of the PRS ~~and/~~or the PRS to the terminal device; or

receiving the positioning measurement result sent by the terminal device based on the positioning request, wherein the positioning request is configured to indicate the terminal device to send the positioning measurement result to the network device;

wherein determining the positioning request comprises: receiving the positioning request sent by the terminal device.

~~25. The method of claim 23, wherein determining the positioning request comprises: receiving the positioning request sent by the terminal device.~~

~~26~~13. The method of claim ~~25~~12, wherein the network device is an access network device;

wherein receiving the positioning request sent by the terminal device comprises:

receiving the positioning request sent by the terminal device through a random access channel; or

receiving the positioning request sent by the terminal device through a scheduling request (SR).

~~27~~14. The method of claim ~~26~~13, wherein when the positioning request is configured to indicate the network device to send at least one of the resource configuration parameters of the PRS ~~and/~~or the PRS to the terminal device~~;~~,

~~wherein~~ receiving the positioning request sent by the terminal device through the random access channel comprises one of:

receiving positioning request supplementary information sent by the terminal device, wherein the positioning request supplementary information comprises first indication information of the PRS, and the first indication information is information of resource configuration recommendation parameters of the PRS recommended by the terminal device to the access network device, or sending second indication information of the PRS to the terminal device through a Msg2 in a 4-step random access channel, wherein the second indication information is configured to indicate the resource configuration parameters of the PRS sent by the access network device;

or

wherein when the positioning request is configured to indicate the terminal device to send the positioning measurement result to the network device,

receiving the positioning request sent by the terminal device through the random access channel comprises: receiving the positioning measurement result sent by the terminal device through physical uplink shared channel resources in a Msg3 of a 4-step random access channel or in a Msg A of a 2-step random access channel, and

receiving the positioning request sent by the terminal device through the SR comprises: receiving the positioning measurement result sent by the terminal device through physical uplink shared channel resources scheduled by the access network device based on the SR.

~~28~~15. The method of claim ~~27~~14, wherein the positioning request supplementary information is sent through a Msg3 in a 4-step random access channel or a Msg A in a 2-step random access channel.

~~29. The method of claim 26, wherein the positioning request is configured to indicate the network device to send the resource configuration parameters of the PRS and/or the PRS to the terminal device;~~

~~wherein receiving the positioning request sent by the terminal device through the random access channel comprises:~~

~~sending second indication information of the PRS to the terminal device through a Msg2 in a 4-step random access channel, wherein the second indication information is configured to indicate the resource configuration parameters of the PRS sent by the access network device.~~

~~30. The method according to claim 26, wherein the positioning request is configured to indicate the terminal device to send the positioning measurement result to the network device;~~

~~wherein receiving the positioning request sent by the terminal device through the random access channel comprises:~~

~~receiving the positioning measurement result sent by the terminal device through physical uplink shared channel resources in a Msg3 of a 4-step random access channel or in a Msg A of a 2-step random access channel.~~

~~31. The method of claim 26, wherein the positioning request is configured to indicate the terminal device to send the positioning measurement result to the network device;~~

~~wherein receiving the positioning request sent by the terminal device through the SR comprises:~~

~~receiving the positioning measurement result sent by the terminal device through physical uplink shared channel resources scheduled by the access network device based on the SR.~~

~~32~~16. The method of claim ~~23~~11, further comprising:

sending the positioning request to the terminal device.

~~33~~17. The method of claim ~~32~~16, wherein when the positioning request is configured to indicate the network device to send at least one of the resource configuration parameters of the PRS or the PRS to the terminal device, sending the positioning request to the terminal device comprises:

sending a paging message to the terminal device, wherein the paging message comprises the positioning request; and

the method further comprises: sending a first downlink signaling to the terminal device, wherein the first downlink signaling is configured to indicate third indication information of the PRS, and the third indication information comprises the resource configuration parameters; and the first downlink signaling comprises at least one of: a radio resource control signaling, a medium access control signaling, or a downlink control information signaling;

or

sending the positioning request to the terminal device comprises: sending a second downlink signaling to the terminal device, wherein the second downlink signaling is configured to indicate the positioning request through fourth indication information, and the second downlink signaling comprises at least one of: a radio resource control signaling, a medium access control signaling, or a downlink control information signaling; wherein the fourth indication information comprises the resource configuration parameters.

~~34. The method of claim 33, wherein the positioning request is configured to indicate the network device to send the resource configuration parameters of the PRS and/or the PRS to the terminal device;~~

~~wherein the method further comprises:~~

~~sending a first downlink signaling to the terminal device, wherein the first downlink signaling is configured to indicate third indication information of the PRS, and the third~~

~~indication information comprises the resource configuration parameters; and the first downlink signaling comprises at least one of: a radio resource control signaling, a medium access control signaling, or a downlink control information signaling.~~

~~35~~18. The method of claim ~~32~~16, wherein the positioning request is configured to indicate the terminal device to send the positioning measurement result to the network device;

wherein the method further comprises:

receiving the positioning measurement result sent by the terminal device through physical uplink shared channel resources in a Msg3 of a 4-step random access channel or in a Msg A in a 2-step random access channel.

~~36. The method of claim 32, wherein the positioning request is configured to indicate the network device to send the resource configuration parameters of the PRS and/or the PRS to the terminal device;~~

~~wherein sending the positioning request to the terminal device comprises:~~

~~sending a second downlink signaling to the terminal device, wherein the second downlink signaling is configured to indicate the positioning request through fourth indication information, and the second downlink signaling comprises at least one of: a radio resource control signaling, a medium access control signaling, or a downlink control information signaling; the fourth indication information comprises the resource configuration parameters.~~

~~37~~19. The method of any one of claims ~~23~~11 to 18, wherein the resource configuration parameters comprise at least one of a resource mapping identifier and a beam identifier;

wherein the PRS comprises: an uplink signal for positioning; or a downlink PRS;

wherein at least one of a first correspondence between resource mapping identifiers and time-frequency resource location parameters or a second corresponding relationship between beam identifiers and reference signal identifiers indicating beam directions is preconfigured, wherein the time-frequency resource location parameters comprise at least one of: frequency domain parameters, time domain parameters and space domain parameters;

wherein the method further comprises: sending resource indication information to the terminal device, wherein the resource indication information comprises at least one of: a mapping relationship between resource mapping identifiers and time-frequency resource location parameters, and a mapping relationship between beam identifiers and reference signal

identifiers indicating beam directions; the resource indication information is information of at least one of a resource position or a beam direction in which the network device indicates to the terminal device to transmit the PRS.

~~38. The method of any one of claims 23 to 37, further comprising:~~

~~sending resource indication information to the terminal device, wherein the resource indication information comprises at least one of: a mapping relationship between resource mapping identifiers and time-frequency resource location parameters, and a mapping relationship between beam identifiers and reference signal identifiers indicating beam directions;~~

~~the resource indication information is information of a resource position and/or a beam direction in which the network device indicates to the terminal device to transmit the PRS~~.

~~39. The method of any one of claims 23 to 37, wherein~~

~~a first correspondence between resource mapping identifiers and time-frequency resource location parameters is preconfigured; and/or~~

~~a second corresponding relationship between beam identifiers and reference signal identifiers indicating beam directions is preconfigured.~~

~~40. The method of claim 39, wherein the time-frequency resource location parameters comprise at least one of: frequency domain parameters, time domain parameters and space domain parameters.~~

~~41. The method of any one of claims 23 to 37, wherein the PRS comprises:~~

~~an uplink signal for positioning; or~~

~~a downlink PRS.~~

~~42. An apparatus for reference signal transmission, applicable to a terminal device, the method comprising:~~

~~a processing module, configured to determine a positioning request;~~

~~wherein the positioning request is configured to indicate a network device to send resource configuration parameters of a positioning reference signal (PRS) and/or the PRS to the terminal device; or the positioning request is configured to indicate the terminal device to send a positioning measurement result to the network device.~~

~~43. An apparatus for reference signal transmission, applicable to a network device, the method comprising:~~

~~a processing module, configured to determine a positioning request;~~

~~wherein the positioning request is configured to indicate the network device to send resource configuration parameters of a positioning reference signal (PRS) and/or the PRS to a terminal device; or the positioning request is configured to indicate the terminal device to send a positioning measurement result to the network device.~~

~~44~~20. A terminal device, comprising:

a processor;

a transceiver connected to the processor; and

a memory configured to store an instruction executable by the processor;

wherein, the processor is configured to load and execute the executable instruction to implement the method for reference signal transmission according to any one of claims 1 to ~~22~~10.

~~45. A network device, comprising:~~

~~a processor;~~

~~a transceiver connected to the processor; and~~

~~a memory configured to store an instruction executable by the processor;~~

~~wherein, the processor is configured to load and execute the executable instruction to implement the method for reference signal transmission according to any one of claims 23 to 41.~~

~~46. A computer-readable storage medium storing at least one instruction, at least one program, at least one code set or at least one instruction set, which are loaded and executed by the processor, the method for reference signal transmission according to any one of claims 1 to 41 is implemented.~~