

CLAIMS

1. A method for transmitting information, comprising:

recording, by a User Equipment (UE), 2-step Random Access (RA) related information; and

transmitting, by the UE, the 2-step RA related information to a network device;

wherein the 2-step RA related information comprises:

information of a Physical Uplink Shared Channel (PUSCH) resource for a message A (msg A) configured by the network device to the UE, the PUSCH resource comprising at least one of size or position of the resource.

2. The method of claim 1, wherein the 2-step RA related information further comprises at least one of the following:

a UE state when the UE initiates a 2-step RA;

a scenario where the UE initiates the 2-step RA;

whether a quality of a reference signal is higher than a threshold configured by the network device when the UE initiates the 2-step RA;

whether the 2-step RA and a 4-step RA initiated by the UE share random access resources;

resource information of the shared random access resources when the 2-step RA and the 4-step RA initiated by the UE share the random access resources;

a number of Synchronization Signal and PBCH Blocks (SSBs) of the 2-step RA mapped to each Physical Random Access Channel (PRACH) occasion;

transmission parameters of the msg A transmitted when the UE initiates the 2-step RA, the transmission parameters comprising at least one of a frequency-domain starting position, a subcarrier spacing, a number of msg A PRACH transmission occasions frequency-division multiplexed in one time instance (msgA-RO-FDM), a maximum number of the msg A transmitted before switching to the 4-step RA, a PRACH configuration index of the msg A (msgA-PRACH-ConfigurationIndex) and a frequency offset of a lowest point in a frequency-domain of PRACH transmission occasions relative to a Physical Resource Block number 0 (PRB0) (msgA-RO-FrequencyStart);

whether the UE is configured with a PRACH root sequence or a PRACH root sequence index of the msg A;

whether a ra-Prioritization field is applied to access identities;

a maximum number of preambles allowed to be transmitted before declaring failure;
or
a length of a time window for receiving a message B (msg B) configured by the network device.

3. The method of claim 2, wherein

the reference signal comprises an SSB and a Channel State Information-Reference Signal (CSI-RS), and

the threshold configured by the network device is the following:

a Reference Signal Received Power (RSRP) threshold of an SSB corresponding to random access resources for transmitting the msg A (msgA-RSRP-ThresholdSSB),

an RSRP threshold of an Supplementary Uplink (SUL) of the SSB corresponding to the random access resources for transmitting the msg A (msgA-RSRP-ThresholdSSB-SUL),

an RSRP threshold of a CSI-RS corresponding to the random access resources for transmitting the msg A (msgA-RSRP-ThresholdCSI-RS), or

an RSRP threshold of an SUL of the CSI-RS corresponding to the random access resources for transmitting the msg A (msgA-RSRP-ThresholdCSI-RS-SUL).

4. The method of any one of claims 1 to 3, wherein transmitting, by the UE, the 2-step RA related information to the network device comprises:

transmitting, by the UE, the 2-step RA related information when the UE is in an idle state or in an inactive state or in a connected state or in a process of switching to the connected state.

5. The method of claim 4, wherein the 2-step RA related information is transmitted through a random access report or a predefined message.

6. The method of claim 4, wherein transmitting the 2-step RA related information comprises:

actively transmitting, by the UE, the 2-step RA related information to the network device; or

transmitting, by the UE, after receiving a request message from the network device, the 2-step RA related information to the network device.

7. The method of claim 6, wherein before receiving the request message from the network device, the method further comprises:

transmitting, by the UE, indication information of a 2-step RA related log recorded by the UE to the network device.

8. The method of claim 1, wherein before recording the 2-step RA related information, the method further comprises:

receiving configuration information from the network device, and configuring, according to the configuration information, the 2-step RA related information to be recorded by the UE; or

configuring, according to local pre-stored information, the 2-step RA related information to be recorded by the UE.

9. A method for receiving information, comprising:

receiving, by a network device, 2-step Random Access (RA) related information from a User Equipment (UE);

wherein the 2-step RA related information comprises:

information of a Physical Uplink Shared Channel (PUSCH) resource for a message A (msg A) configured by the network device to the UE, the PUSCH resource comprising at least one of size or position of the resource.

10. The method of claim 9, wherein the 2-step RA related information further comprises at least one of the following:

a UE state when the UE initiates a 2-step RA;

a scenario where the UE initiates the 2-step RA;

whether a quality of a reference signal is higher than a threshold configured by the network device when the UE initiates the 2-step RA;

whether the 2-step RA and a 4-step RA initiated by the UE share random access resources;

resource information of the shared random access resources when the 2-step RA and the 4-step RA initiated by the UE share the random access resources;

a number of Synchronization Signal and PBCH Blocks (SSBs) of the 2-step RA mapped to each Physical Random Access Channel (PRACH) occasion;

transmission parameters of the msg A transmitted when the UE initiates the 2-step RA, the transmission parameters comprising at least one of a frequency-domain starting position, a subcarrier spacing, a number of msg A PRACH transmission occasions frequency-division multiplexed in one time instance (msgA-RO-FDM), a maximum number of the msg A transmitted before switching to the 4-step RA, a PRACH configuration index of the msg A (msgA-PRACH-ConfigurationIndex) and a frequency offset of a lowest point in a frequency-domain of PRACH transmission occasions relative to a Physical Resource Block number 0 (PRB0) (msgA-RO-FrequencyStart);

whether the UE is configured with a PRACH root sequence or a PRACH root sequence index of the msg A;

whether a ra-Prioritization field is applied to access identities;

a maximum number of preambles allowed to be transmitted before declaring failure;

or

a length of a time window for receiving a message B (msg B) configured by the network device.

11. The method of claim 9, wherein before receiving the 2-step RA related information from the UE, the method further comprises:

transmitting configuration information to the UE to configure the 2-step RA related information to be recorded by the UE.

12. The method of claim 11, wherein the 2-step RA related information is transmitted through a random access report or a predefined message.

13. The method of claim 11 or 12, wherein receiving the 2-step RA related information from the UE comprises:

receiving the 2-step RA related information actively transmitted by the UE; or

transmitting a request message to the UE, and receiving the 2-step RA related information transmitted by the UE according to the request message.

14. The method of claim 13, wherein before transmitting the request message to the UE, the method further comprises:

receiving indication information of a 2-step RA related log recorded by the UE from the UE.

15. The method of claim 9, wherein after receiving the 2-step RA related information from the UE, the method further comprises:

optimizing, according to the 2-step RA related information, network coverage and random access procedure parameters.

16. A User Equipment (UE), comprising:

a recording module, configured to record 2-step Random Access (RA) related information; and

a transmitting module, configured to transmit the 2-step RA related information to a network device;

wherein the 2-step RA related information comprises:

information of a Physical Uplink Shared Channel (PUSCH) resource for a message A (msg A) configured by the network device to the UE, the PUSCH resource comprising at least one of size or position of the resource.

17. A User Equipment (UE), comprising a processor, a memory, and programs stored on the memory and being capable of running on the processor, wherein the programs, when executed by the processor, implement the method for transmitting information of any one of claims 1 to 8.

18. A network device, comprising:

a receiving module, configured to receive 2-step Random Access (RA) related information from a User Equipment (UE);

wherein the 2-step RA related information comprises:

information of a Physical Uplink Shared Channel (PUSCH) resource for a message A (msg A) configured by the network device to the UE, the PUSCH resource comprising at least one of size or position of the resource.

19. A network device, comprising a processor, a memory, and programs stored on the memory and being capable of running on the processor, wherein the programs, when executed by the processor, implement the method for receiving information of any one of claims 9 to 15.

20. A computer-readable storage medium configured to store computer programs, wherein the computer programs, when executed by a processor, implement the method for transmitting information of any one of claims 1 to 8, or implement the method for receiving information of any one of claims 9 to 15.