Claims

1. A remote terminal device comprising:

at least one processor; and

at least one memory storing instructions that, when executed by the at least one processor, cause the remote terminal device at least to:

obtain a selection policy for selecting a relay selection code (RSC) from a plurality of RSCs, an RSC of the plurality of RSCs being associated with an indicator for indicating whether the RSC supports a control plane (CP) security procedure or a user plane (UP) security procedure;

based on determining that path switching from a source relay terminal device with a source RSC is triggered, select a target RSC based on the selection policy by selecting one of the plurality of RSCs for which the remote terminal device has a valid root key as the target RSC, a source indicator associated with the source RSC, and a plurality of indicators associated with the plurality of RSCs; and

select, for the path switching, a target relay terminal device based on the target RSC.

2. The remote terminal device of claim 1, wherein the remote terminal device is caused to select a target relay terminal device based on the target RSC by:

selecting the target relay terminal device with the target RSC that is the same as the source RSC.

3. The remote terminal device of claim 1, wherein the remote terminal device is further caused to:

determine the plurality of RSCs;

obtain the plurality of indicators; and

determine, based on the source RSC and the plurality of indicators, whether the source RSC and the plurality of RSCs support the CP security procedure or the UP security procedure.

4. The remote terminal device of claim 1, wherein the remote terminal device is further caused to select the target RSC based on the selection policy by:

based on determining that the source RSC supports the CP security procedure, select, as

the target RSC, one of the plurality of RSCs for which the remote terminal device has the valid root key and supporting the CP security procedure.

5. The remote terminal device of claim 1, wherein the remote terminal device is further caused to select the target RSC based on the selection policy by:

based on determining that the source RSC supports the UP security procedure, select, as the target RSC, one of the plurality of RSCs for which the remote terminal device has the valid root key and supporting the UP security procedure.

6. The remote terminal device of claim 1, wherein the remote terminal device is further caused to:

generate a direct communication request (DCR) including an identity (ID) of the valid root key, the valid root key being used to generate at least one security key for establishing a security link for a direct communication between the remote terminal device and the target relay terminal device.

7. The remote terminal device of claim 3, wherein the remote terminal device is further caused to at least one of:

based on determining that the source RSC supports the CP security procedure, select, as the target RSC, one of the at least one candidate RSC supporting the CP security procedure;

based on determining that the source RSC supports the UP security procedure, select, as the target RSC, one of the plurality of RSCs supporting the UP security procedure; or

randomly select one of the plurality of RSCs as the target RSC.

8. The remote terminal device of claim 7, wherein the remote terminal device is further caused to:

generate a DCR including a subscription concealed identifier (SUCI) used for triggering a proximity based services (ProSe) authentication procedure of the remote terminal device.

9. The remote terminal device of claim 1, wherein the selection policy comprises at least one of:

a selection order based on the CP security procedure or the UP security procedure that the source RSC and the target RSC supported; or

an authentication policy to be used by the remote terminal device to determine whether to trigger a ProSe authentication procedure.