SECURITY COMMUNICATION IN PROSE U2N RELAY

FIELD

[0001] Embodiments of the present disclosure generally relate to the field of telecommunication and in particular, to a method, device, apparatus and computer readable storage medium for security communication in user equipment (UE)-to-network (U2N) relay for proximity based services (ProSe).

BACKGROUND

[0002] For ProSe communication via U2N relay, a user plane (UP) based security solution has been proposed in long term evolution (LTE) technologies. In the fifth generation (5G) communication technologies, as U2N relay will be used for commercial case besides public safety, a control plane (CP) based security solution has been proposed to ensure more solid and promised security. Currently, both UP and CP based security solutions will be supported for ProSe communication via U2N relay to authenticate remote UE and protect PC5 communication. However, workflow and functionality required for a CP based security solution is different from that required for a UP based security solution. Thus, effective management on CP and UP based security solutions is expected.

SUMMARY

[0003] In general, example embodiments of the present disclosure provide a solution for security communication in ProSe U2N relay.

[0004] In a first example, there is provided a first device. The first device comprises at least one processor; and at least one memory including computer program code; the at least one memory and the computer program code are configured to, with the at least one processor, cause the first device to: receive, from a third device, a first configuration comprising at least a set of indicators of a control plane based security procedure or a user plane based security procedure for a set of relay services; perform, based on the first configuration, a discovery procedure to determine a second device to relay a communication between the first device and a network for a relay service; and perform, based on an indicator for the relay service in the set of indicators, one of the control plane based security procedure and the user plane based security procedure for the

communication between the first device and the second device for the relay service.

[0005] In a second example, there is provided a second device. The second device comprises at least one processor; and at least one memory including computer program code; the at least one memory and the computer program code are configured to, with the at least one processor, cause the second device to: receive, from a fourth device, a second configuration comprising at least a set of indicators of a control plane based security procedure or a user plane based security procedure for a set of relay services; and in response to receiving a communication request from a first device for a relay service, perform, based on an indicator for the relay service in the set of indicators, one of the control plane based security procedure or the user plane based security procedure for a communication between the first device and the second device for the relay service.

[0006] In a third example, there is provided a core network element. The core network element comprises at least one processor; and at least one memory including computer program code; the at least one memory and the computer program code are configured to, with the at least one processor, cause the core network element to: obtain, from a further core network element, a configuration comprising at least a set of indicators of a control plane based security procedure or a user plane based security procedure for a set of relay services; and transmit the configuration to the device.

[0007] In a first aspect, there is provided a method for communication. The method comprises: receiving, at a first device and from a third device, a first configuration comprising at least a set of indicators of a control plane based security procedure or a user plane based security procedure for a set of relay services; performing, based on the first configuration, a discovery procedure to determine a second device to relay a communication between the first device and a network for a relay service; and performing, based on an indicator for the relay service in the set of indicators, one of the control plane based security procedure and the user plane based security procedure for the communication between the first device and the second device for the relay service.

[0008] In a second aspect, there is provided a method for communication. The method comprises: receiving, at a second device and from a fourth device, a second configuration comprising at least a set of indicators of a control plane based security procedure or a user plane based security procedure for a set of relay services; and in response to receiving a communication request from a first device for a relay service, performing, based on an

indicator for the relay service in the set of indicators, one of the control plane based security procedure or the user plane based security procedure for a communication between the first device and the second device for the relay service.

[0009] In a third aspect, there is provided a method for communication. The method comprises: obtaining, at a core network element and from a further core network element, a configuration comprising at least a set of indicators of a control plane based security procedure or a user plane based security procedure for a set of relay services; and transmitting the configuration to the device.

[0010] In a fourth aspect, there is provided an apparatus for communication. The apparatus comprises: means for receiving, at a first device and from a third device, a first configuration comprising at least a set of indicators of a control plane based security procedure or a user plane based security procedure for a set of relay services; means for performing, based on the first configuration, a discovery procedure to determine a second device to relay a communication between the first device and a network for a relay service; and means for performing, based on an indicator for the relay service in the set of indicators, one of the control plane based security procedure and the user plane based security procedure for the communication between the first device and the second device for the relay service.

[0011] In a fifth aspect, there is provided an apparatus for communication. The apparatus comprises: means for receiving, at a second device and from a fourth device, a second configuration comprising at least a set of indicators of a control plane based security procedure or a user plane based security procedure for a set of relay services; and means for performing, in response to receiving a communication request from a first device for a relay service and based on an indicator for the relay service in the set of indicators, one of the control plane based security procedure or the user plane based security procedure for a communication between the first device and the second device for the relay service.

[0012] In a sixth aspect, there is provided an apparatus for communication. The apparatus comprises: means for obtaining, at a core network element and from a further core network element, a configuration comprising at least a set of indicators of a control plane based security procedure or a user plane based security procedure for a set of relay services; and means for transmitting the configuration to the device.

[0013] In a fourth example, there is provided a non-transitory computer readable medium

comprising program instructions for causing an apparatus to perform the method according to the first or second or third aspect.

[0014] It is to be understood that the summary section is not intended to identify key or essential features of embodiments of the present disclosure, nor is it intended to be used to limit the scope of the present disclosure. Other features of the present disclosure will become easily comprehensible through the following description.

BRIEF DESCRIPTION OF THE DRAWINGS

[0015] Some example embodiments will now be described with reference to the accompanying drawings, where:

[0016] Fig. 1 illustrates an example communication environment in which embodiments of the present disclosure may be implemented;

[0017] Fig. 2 illustrates a diagram illustrating a process of ProSe communication via U2N relay in which embodiments of the present disclosure may be implemented;

[0018] Fig. 3 illustrates a diagram illustrating a process of a UP based security solution in which embodiments of the present disclosure may be implemented;

[0019] Fig. 4 illustrates a diagram illustrating a process of a CP based security solution in which embodiments of the present disclosure may be implemented;

[0020] Fig. 5 illustrates a diagram illustrating a process of communication according to some embodiments of the present disclosure;

[0021] Fig. 6 illustrates a flowchart of an example method implemented at a first device as remote UE according to some embodiments of the present disclosure;

[0022] Fig. 7 illustrates a flowchart of an example method implemented at a second device as a relay UE according to some embodiments of the present disclosure;

[0023] Fig. 8 illustrates a flowchart of an example method implemented at a core network element according to some embodiments of the present disclosure;

[0024] Fig. 9 illustrates a simplified block diagram of a device that is suitable for implementing embodiments of the present disclosure; and

[0025] Fig. 10 illustrates a block diagram of an example computer readable medium in accordance with some embodiments of the present disclosure.