**3GPP TSG-SA3 Meeting #101e S3-202968**

**e-meeting, 9 – 20 November 2020 Revision of S3-20xxxx**

**Source: Huawei, HiSilicon**

**Title: A security solution for UE-to-Network Relay based on Layer 2 Relay**

**Document for: Approval**

**Agenda Item: 5.9**

# 1 Decision/action requested

***Approve this contribution to add a solution in TR33.818***

# 2 References

[1]

# 3 Rationale

This contribution propose a Layer-2 based security solution for UE-to-Network Relay scenario.

# 4 Detailed proposal

pCR

\*\*\* BEGINNING OF CHANGES \*\*\*

# 2 References

The following documents contain provisions which, through reference in this text, constitute provisions of the present document.

- References are either specific (identified by date of publication, edition number, version number, etc.) or non‑specific.

- For a specific reference, subsequent revisions do not apply.

- For a non-specific reference, the latest version applies. In the case of a reference to a 3GPP document (including a GSM document), a non-specific reference implicitly refers to the latest version of that document *in the same Release as the present document*.

[1] 3GPP TR 21.905: "Vocabulary for 3GPP Specifications".

[2] 3GPP TR 23.752: "Study on system enhancement for Proximity based Services (ProSe) in the 5G System (5GS)".

[3] 3GPP TS 22.278: "Service requirements for the Evolved Packet System (EPS)".

[4] 3GPP TS 22.261: "Service requirements for the 5G system; Stage 1".

[5] 3GPP TS 23.303: "Proximity-based services (ProSe); Stage 2".

[6] 3GPP TS 33.303: "Proximity-based Services (ProSe); Security aspects".

[7] 3GPP TS 33.535: "Authentication and Key Management for Applications (AKMA) based on 3GPP credentials in the 5G System (5GS)".

[8] 3GPP TS 33.536: "Security aspects of 3GPP support for advanced Vehicle-to-Everything (V2X) services".

[9] 3GPP TS 23.287: "Architecture enhancements for 5G System (5GS) to support Vehicle-to-Everything (V2X) services".

[10] 3GPP TS 23.502: "Procedures for the 5G System (5GS); Stage 2".

[11] IETF RFC 8446: "The Transport Layer Security (TLS) Protocol Version 1.3".

[xx] 3GPP TS 33.501: "Security architecture and procedures for 5G system".

\*\*\* END OF 1st CHANGES \*\*\*

\*\*\* BEGINNING OF 2nd CHANGES \*\*\*

## 6.Y Solution #Y: A security solution for UE-to-Network Relay based on Layer 2 Relay

### 6.Y.1 Introduction

This solution addresses Key Issue #3 on Security of UE-to-Network Relay. The solution is based on TR 23.752[2] solution #7 which is a Layer 2 Relay solution.

### 6.Y.2 Solution details



Figure 6.y.2-1 UE-to-Network Relay solution for Layer2

Editor’s Note: The function of this solution out of coverage is FFS

0. If the Remote UE is in the coverage, the Remote UE perform initial registration to the network according to the registration procedure in TS 23.502[10]. If the Remote UE is not in the coverage, the Remote UE will perform the Initial Registration via the UE-to-Network Relay in step 7.

1. If in coverage, the Remote UE and UE-to-Network Relay UE independently get the service authorization for indirect communication from the network. If the Remote UE is not in coverage, the pre-configured information will be used.

2-3. The Remote UE and UE-to-Network Relay UE perform UE-to-Network Relay UE discovery and selection. For details of UE-to Network Relay discovery and selection for Layer2 UE-to-Network Relay see clause see clause 6.7.2.9 and Solution #19, Solution #41 of TR 23.752[2].

4. Remote UE initiate a one-to-one communication connection with the selected UE-to-Network Relay UE over PC5 using the procedure as described in clause 6.7 in this study.

5. If the UE-to-Network Relay UE is in CM\_IDLE state, triggered by the communication request received from the Remote UE, the UE-to-Network Relay UE sends a Service Request message to its serving AMF. The relay UE transitions to the connected state by sending a service request.

Editor’s Note: security for PC5 is FFS

6. The Remote UE initials AS connection with NG-RAN via the UE-to-Network Relay UE to establish AS Connection with the same NG-RAN serving the Relay UE.

7. The Remote UE sends a NAS message to the serving AMF. The NAS message is encapsulated in an RRC message that is sent over PC5 to the UE-to-Network Relay UE, and the UE-to-Network Relay UE forwards the message to the NG-RAN. The NG-RAN derives Remote UE's serving AMF and forwards the NAS message to this AMF.

If the Remote UE has registered to the network in step0, then the NAS message is integrity protected by using the NAS security context derived in step0, and the UE puts 5G-GUTI in the NAS message. Both the UE and AMF shall perform the procedures defined in TS 33.501[xx].

If the Remote UE has not registered to the network, then the UE shall send a NAS message with a SUCI and perform primary authentication with the Remote UE’s AMF. Both the UE and AMF shall perform the procedures defined in TS 33.501[xx].

8. Remote UE may trigger the PDU Session Establishment procedure as defined in clause 4.3.2.2 of TS 23.502 [10]. The user plane security between the Remote UE and the gNB shall reuse the procedure defined in clause 6.6 of TS 33.501[xx].

9. The data is transmitted between Remote UE and UPF via UE-to-Network Relay UE and NG-RAN. The UE-to-Network Relay UE forwards all the data messages between the Remote UE and NG-RAN using RAN specified L2 relay method.

Editor’s Note: this step needs to be revisited based on the RAN WG progress

### 6.Y.3 Evaluation

\*\*\*END OF CHANGES\*\*\*