**3GPP TSG-SA3 Meeting #115-adhoc-e  *S3-241207-r1***

**Online, April 15 – April 19, 2024**

**Source: Intel**

**Title: Secure Initial Registration for S&F Satellite Operation**

**Document for: Approval**

**Agenda Item: 5.7**

# 1 Decision/action requested

***Approve the pCR to TR 33.700-29***

# 2 References

# 3 Rationale

This contribution proposes input text for the security assumptions of TR 33.700-29.

# 4 Detailed proposal

SA3 is requested to approve the following pCR.

\*\*\*\*\*START CHANGE\*\*\*\*\*

6.Y Solution #Y: Secure Initial Registration for S&F Satellite Operation

6.Y.1 Introduction

This solution specifically addresses the security considerations of Key Issue #1, which pertains to supporting Store and Forward Satellite operations. The Initial Attach / Initial Registration process is crucial for all S&F services. It must ensure the network's integrity and security despite the unique challenges posed by satellite communication, such as intermittent connectivity.

6.Y.2 Solution details

Considering a scenario with a single Low-Earth Orbit (LEO) satellite providing intermittent coverage, this solution proposes modified MME functionality: one segment aboard the satellite (MME-SAT) and the other on the ground (MME-GND). This split architecture accommodates satellite coverage's intermittent connectivity and facilitates secure communication between the UE and the network.



**Figure 6.Y.2-1: Initial Attach in satellite network for S&F operation**

1-3 Initial Registration Process: Upon entering the satellite's coverage, the UE initiates an Initial Attach Request. The MME-SAT, unable to immediately establish a ground connection, temporarily stores the UE's International Mobile Subscriber Identity (IMSI) and issues an Attach Reject message.

4-5 Once MME-SAT establishes contact with MME-GND, it forwards the IMSI to request authentication vectors from the Home Subscriber Server (HSS).

6-10 In subsequent coverage, the UE re-initiates the Attach Request. This time, MME-SAT, equipped with the authentication vectors, proceeds to authenticate the UE, leading to a successful Attach Acceptance.

11-12 Location Update Process: MME-SAT updates the UE's location with the HSS upon establishing ground connectivity, ensuring the UE's subscription permits service in the attempted location. Any discrepancies trigger a detach procedure during the next satellite contact.

Editor’s Note: Aspect related to T3247 needs to be studied further.

Editor’s Note: How to handle Attach requests sent by the UE to separate satellites is FFS

Editor’s Note: how to prevent DoS attacks before the security context is established between UE and network is out of scope of this solution

6.Y.3 Evaluation

Editor’s Note: Each solution should motivate how the potential security requirements of the key issues being addressed are fulfilled.

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\*\*\*\*\*END CHANGE\*\*\*\*\*