**3GPP TSG-SA5 Meeting #158 S5-246948**

**Orlando, USA, 18 - 22 November 2024**

**Source: Ericsson**

**Title: MME CDF/CGF based solution for S&F operation with CP data transfer**

**Document for: Approval**

**Agenda Item: 7.5.1**

# 1 Decision/action requested

***The group is asked to discuss and approve the proposal.***

# 2 References

[1] 3GPP TS 28.846 Study on charging aspects of satellite access phase 3

# 3 Rationale

Addition of a new solution for topic #1 based on MME CDF/CGF for S&F operation with CP data transfer.

# 4 Detailed proposal

This document proposes the following changes in TR 28.846 [1].

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| --- |
| **First change** |

6.1.4.x Solution #1.x: MME CDF/CGF based solution for S&F operation with CP data transfer

This solution which relying on EPC CDF/CGF for store and forward satellite operation charging, addresses the Key Issue#1.1 and Key Issue#1.2.

As specified in the clause 5.3.4B of TS 23.401 [5], when the UE accesses the network with Control Plane CIoT EPS Optimisation, the data is stored in the MME onboard. The UE registers in S&F mode to access S&F-based services from E-UTRAN satellite access running in S&F mode. The attach and service request procedure for S&F-based services may use one or more satellites, depending on the deployment and implementation options. On-board MME determines a list of satellites (i.e. S&F Monitoring list) from the same (UE selected) PLMN with which UE can attempt to use to finish the attach and service request procedure.

For the MME split architecture, the CDF/CGF may be deployed on the ground. The MME ground together with the MME onboard behaves jointly as a single MME entity and the UE context is synchronized between them. Each MME-onboard is associated with a different Satellite ID identifier. The high level of the MME split architecture is shown below:



**Figure 6.1.4.x-1: MME split charging architecture**

The MME ground reports charging information to CGF or Billing Domain about satellite access running in S&F mode with the following chargeable events:

- PDN connection creation/release. via the MME onboard for the Control Plane (CP) data transfer.

For the whole EPC onboard architecture, the CDF/CGF may be deployed on the satellite. The high level of the whole EPC onboard architecture is shown below:



**Figure 6.1.4.x-2: Whole EPC on-board charging architecture**

The MME onboard reports charging information to CGF or Billing Domain about satellite access running in S&F mode with the following trigger events:

- PDN connection creation/release. via the MME onboard for the CIoT CP Optimizations.

Table 6.1.4.x-1 shows the enhancements needed for CPDT-SNN-CDR compared with the Table 6.1.3.3.1 in TS 32.253 [x].

**Table 6.1.4.x-1 Extension to CPDT-SNN-CDR for S&F (3GPP TS 32.253 [x] – Table 6.1.3.3.1)**

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| **Field** | **Category** | **Description** |
| RAT Type | OC | This field indicates the Radio Access Technology (RAT) type currently used by the UE, extended with RAT types for satellite. |
| Satellite information | OC | This field holds all the satellite information that support to finish the store and forward satellite operation. |
| Satellite Access Indicator | OC | This field indicates the use of satellite access. |
| S&F Indicator | OC | This field indicates the use of store and forward satellite operation. |
| S&F Monitoring List | OC | This field holds the satellite IDs that used for the store and forward satellite operation. |
| S&F Duration | OC | This field holds the storage duration of data on the satellite. |
| S&F Data volume | OC | This field holds the data volume stored on the satellite. |

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| **End of change** |