**3GPP TSG-WG SA2 Meeting #163 *S2-2406903***

**Jeju, KR, May 27th – 31st, 2024 (revision of S2-2406556)**

**Source: Huawei, HiSilicon**

**Title: KI#3 Conclusion: For UE-SAT-UE communication**

**Document for: Approval**

**Agenda Item: 19.1**

**Work Item / Release: FS\_5GSAT\_Ph3\_ARCH / Rel-19**

*Abstract: To reuse existing LI architecture, AGW should be onboard. In this release, only when two UEs are under the same satellite, the UE-SAT-UE communication will be enabled.*

# 1. Introduction/Discussion

Based on SA3-LI LS on LI considerations for UE-Satellite-UE communications, it is clear the requirement that LI functions need to be present along with their associated network functions on board a satellite.

Based on clause of 7.4.1 IMS High Level LI Architecture in TS 33.127, if only UL CL/L-PSA UPF deployed on satellite, some SA3-LI work needed to support the IMS LI as media traffic will not go through to AGW on ground. SA2 can start normative work with both UL CL/L-PSA UPF and AGW deployed on satellite. Whether SA2 can start normative work with only UL CL/L-PSA UPF on board depends on SA3-LI feedback.



Figure 7.4-1: EPS/5GS-Anchored IMS High Level LI Architecture

Considering the time limitation, we propose to only consider two UEs are under the same satellite case in this release. We also propose to assume the same SMF and P-CSCF will be used in this release.

# 2. Text Proposal

It is proposed to capture the following changes vs. TR 23.700-29.

\* \* \* \* First change (all new) \* \* \* \*

# 8 Conclusions

## 8.3 Conclusion for KI#3 UE-Satellite-UE Communication

SA2 starts normative work with both UL CL/L-PSA UPF and AGW deployed on satellite first. Whether SA2 can start normative work with only UL CL/L-PSA UPF on board depends on SA3-LI feedback.

### 8.3.x UEs using the same satellite with regenerative-based satellite access

It cannot be guaranteed that any two satellites of some NGSO satellite constellations are connect to each other, and it is also not clear how this can be determined by network. The availability of this transport network connection is a necessary condition to consider when enabling the UE-SAT-UE communication involving multiple satellites as it used during the IMS call setup and to support call continuity when either of the serving satellites change. However, current solutions documented in the TR do not seem sufficiently mature with regards to the determination of support of inter satellite connections and corresponding procedures to change serving satellite. For this reason, it is desirable to specify a solution which considers the case where the same satellite is used by both UEs: this will be a baseline solution that can be further extended to more general scenarios.

The baseline solution will have the following features:

* Two UEs are under the same satellites.
* When HANDOVER happens, the UE-SAT-UE communication is disabled and ground-based PSA UPF and AGW are used.
* The two UEs use the same HPLMN.

To enable the UE-SAT-UE communication when the two UEs are under the same satellite and enable AGW relocation when handover happens, the following principles apply for normative work:

* The SMF(s) serving the UE accessing the same satellite selects a PSA UPF on ground for IMS PDU Sessions of the two UEs.
* During the voice call setup procedure, if the P-CSCF determines that the UE-SAT-UE communication is possible for the two UEs, e.g., based on access-type and Cell ID in P-Access-Network-Info, the P-CSCF selects the AGW onboard associated with the Cell ID for these two UEs and indicates to the SMF via the PCF to insert onboard UL CL/BP/local PSA UPFs for the IMS PDU Sessions of the two UEs.

NOTE: For NR satellite access to 5GC the NR CGI (NCGI) available to the UE is a "physical" Cell ID on Uu interface which is different with "mapped" cell ID provided by RAN to core network. Therefore, the UE reported Cell ID is associated with the satellite and can be used by the P-CSCF to determine the AGW on satellite.

* When handover happens, the SMF notifies the P-CSCF (via PCF) to reselect the on ground AGW and the UE sends a re-invite message to the P-CSCF . The P-CSCF also notifies the SMF to remove the UL CL/BP/local PSA UPF onboard for the IMS PDU Session.

\* \* \* \* End of changes \* \* \* \*