**SA WG2 Meeting #143E S2-210xxxx**

**24 February - 09 March, 2021, Electronic, Elbonia**

**Source: Interdigital**

**Title: UUAA At Registration in 5GS**

**Agenda item: 8.7**

**Document for: Approval**

**WorkItem/Release:** **ID\_UAS\_SA2**

*Abstract of the contribution: This contribution proposes a procedure for the UUAA at Registration in 5GS.*

# Discussion

*This solution is analogous to the NSSAA procedure in TS 23.502. Changes to Registration procedure to enable UUAA are to be documented in TS 23.502 while UAS specific details are in TS 23.256.*

*The name UUAA-MM is proposed here to be used when referring to USS UAV Authentication and Authorization (UUAA) performed during 5GS Registration procedure. Similarly, it is proposed to use the name UUAA-SM for the UUAA performed during PDU Session establishment procedure. These distinct names/acronyms should help easily identify the specific context (during an SM or MM procedure) in which UUAA is performed. For example, it should be more concise and clearer to refer to USS/UTM triggered re-authentication "using UUAA-MM" (or UUAA-SM). Alternatives like "using UUAA at Registration" or "when the UUAA was performed at Registration" may be respectively confusing/incorrect or too circumvoluted. The term UUAA can be used when referring to the UAV authentication and Authorization in generic terms.*

# Proposal

*It is proposed to add the following to TS 23.256.*

\* \* \* First Change \* \* \* \*

### 5.2.2 UUAA At Registration in 5GS (UUAA-MM)

#### 5.2.2.1 General

The UUAA-MM procedure is triggered for a UE requiring UAV authentication and authorization by a USS/UTM when registering with 5GS. The UUAA-MM procedure is triggered by the AMF during a Registration procedure, specified in TS 23.502, clause 4.2.2.2, following a primary authentication, when the UE has Aerial UE subscription information and based on local operator policy, or when the USS/UTM that authenticated the UAV triggers a re-authentication.

The UAV is authenticated and authorized by USS/UTM using a CAA-level UAV ID and credentials, different from the 3GPP subscription credentials (e.g. SUPI and credentials used for PLMN access). During UUAA-MM procedure, the AMF communicates with the USS/UTM via a UAS-NF and forwards authentication messages transparently between UE and UAS-NF.

The UUAA-MM procedure requires the use of a GPSI which means a subscription that has Aerial UE information shall include at least one GPSI.



Figure 5.2.2.1-1: UUAA in the context of the Registration procedure (UUAA-MM)

1. The UE (UAV) sends a Registration request message and shall provide a CAA-level UAV ID and optionally a signed USS/UTM address when registering for UAS services.

2. If Primary authentication is required (e.g., if this is an initial Registration), AMF invokes it as described in TS 23.502 Figure 4.2.2.2.2-1 – step 14 . Subsequently AMF retrieves UE subscription data from UDM as described in TS 23.502 Figure 4.2.2.2.2-1 – step 14 (not shown in the figure).

3. AMF shall determine whether UUAA-MM is required for the UAV. The AMF decides that UUAA is required if:

a) the UE has Aerial UE subscription information;

b) UUAA is to be performed during Registration according to local operator policy;

c) there is no valid UUAA result from a previous UUAA-MM procedure.

4. If AMF determines in step 3 that a UUAA-MM is to be performed, AMF shall include a pending UUAA-MM indication in the Registration Accept message. The AMF stores in the UE context that a UUAA is pending. The UE shall wait for completion of the UUAA-MM procedure without attemtpting to register for UAS services or to use any service to connect to USS/UTM or UAV-C. If AMF determines that UE is not allowed to perform UUAA or if a UUAA-MM result from a previous UUAA indicates the UAV is not authorized the AMF shall reject the Registration Request with an appropiate cause value. If AMF determines that UUAA is not to be performed during Registration procedure, AMF continue performing Registration procedure as described in TS 23.502 (i.e., UUAA may be triggered during PDU Session Establishment as described in clause 5.2.3).

Editor's Note: Other configuration and service restriction aspects in the Registration Accept are FFS.

5. If required based on step 3 determination, UUAA-MM procedure (see clause 5.2.2.2) is executed at this step. Once the UUAA-MM procedure is successfully completed for the UAV, the AMF stores UAV authorization information received from the USS/UTM in the UE context and shall trigger a UE Configuration Update procedure (see TS 23.502, clause 4.2.4.2) to deliver authorization information to the UE. The AMF may deliver an authorized CAA-level UAV ID, security information to be used by the UAV to set up a secure connection to the USS/UTM when using a PDU session used for communicating with USS/UTM. If UUAA fails, based on local network policy, the AMF may decide to de-register or keep the UE registered and shall indicate an appropriate cause value in the De-Registration Request message.

NOTE 1: Security details will be determined by SA WG3.

Editor's Note: Other configuration and service restriction aspects in the UCU are FFS.

#### 5.2.2.2 UUAA-MM Procedure



Figure 5.2.2.2-1: UUAA-MM procedure

1. For a UE that requires UUAA or when triggered by re-authentication by USS/UTM, the AMF triggers a UUAA-M procedure.

2. AMF to UAS-NF: Authentication Request, shall include the GPSI and CAA-level UAV ID. May include signed USS/UTM address (e.g., FQDN). UAS-NF resolves the USS/UTM address based on CAA-level UAV ID or uses the provided USS/UTM address.

NOTE 2: Security details will be determined by SA WG3.

3. UAS-NF to USS/UTM: Authentication Request, shall include the GPSI and CAA-level UAV ID.

4. [Conditional] Multiple rount-trip messages as required by the authentication method used by USS/UTM. Authentication Response messages from USS/UTM shall include GPSI and may include a authentication message based on authentication method used that is forwarded transparently to UE over NAS MM transport messages.

5. USS/UTM to UAS-NF: (final) Authentication Response, shall include: GPSI, a UUAA result (success/failure), may include: an authorized CAA-level UAV ID, security info to be used to secure communications with USS/UTM, a final authentication message (e.g., indicating success or failure) based on authentication method used that is forwarded transparently to UE over NAS MM transport messages.

6. UAS-NF to AMF: (final) Authentication Response, forwards information received from USS/UTM in step 5.

7. AMF to UE: (final) NAS MM transport message forwarding authentication message from USS/UTM including authentication/authorization result (success/failure).

8. [Conditional] if UUAA-MM succeeded, AMF triggers a UE Configuration Update procedure to deliver to the UAV authorization information from USS/UTM, as described in clause 5.2.2.1. If UUAA-MM fails during a Re-authentication and Re-authorization and there are PDU session(s) established using UAS services, the AMF shall initiate the PDU Session release procedure (as specified in TS 23.502, clause 4.3.4) to release the PDU Sessions with the appropriate cause value.

9. [Conditional] if UUAA-MM fails, based on network policy the AMF may trigger Network-initiated Deregistration procedure described (as specified in TS 23.502, clause 4.2.2.3.3) and it shall include in the explicit De-Registration Request the appropriate rejection cause value.

#### 5.2.2.3 USS/UTM triggered UAV Re-authentication and Re-authorization procedure

Editor's Note: This clause will specify the UAV re-authentication triggered by USS/UTM using UUAA-MM.

#### 5.2.2.4 USS/UTM triggered UAV authorization revocation procedure

Editor's Note: This clause will specify the UAV authorization revocation triggered by USS/UTM when UUAA-MM was previously performed.

\* \* \* End of Change \* \* \* \*