**SA WG2 Meeting #143E** **S2-2100222r09**

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**Source: Ericsson**

**Title: UUAA in PDU Session Establishment**

**Agenda item: 8.7**

**Document for: Approval**

**WorkItem/Release:** **ID\_UAS / Rel-17**

*Abstract of the contribution: This contribution proposes a procedure for the UUAA in the PDU Session Establishment as agree in the study phase.*

# Discussion

The procedures for UUAA at PDN Connection/PDU Session Establishment are introduced in TS23.256 as concluded in the TR23.754.

The below procedure for 5GS is based on the proposed Option 1 in the CR *S2-210xxx* for the new clause "Secondary authorization/authentication using SBI during the PDU Session establishment" in TS 23.502. This procedure will be updated in accordance to the approved the procedure in TS23.502. Same is valid for the EPS interworking procedure. (Related CR for TS 23.501 is in S2-2100375)

# Proposal

It is proposed to add the following to TS 23.256.

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

# 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".

[???] 3GPP TS 23.401: "General Packet Radio Service (GPRS) enhancements for Evolved Universal Terrestrial Radio Access Network (E-UTRAN) access".

\* \* \* Second Change \* \* \* \*

### 5.2.3 UUAA At PDN Connection/PDU Session Establishment

#### 5.2.3.1 General

Clause 5.2.3 defines the USS UAV Authorization/Authentication (UUAA) procedures at PDU Session Establishment in 5GS and the PDN Connection Establishment in the Attach procedure for EPS using the interworking functionality.

The UUAA procedure is based on the "Secondary authorization/authentication using API during the PDU Session establishment" in TS 23.502 [3] and in the below figures and text UUAA relevant information is added. Messages and procedure step descriptions are taken from TS 23.502 [3] for explanatory purposes only. These descriptions are in *italic text* and shall not be modified by the UUAA procedures. It cannot be assumed that the messages and procedure step descriptions that are taken from TS 23.502 [3] will be updated when modifications or corrections are performed for TS 23.502 [3]. If there are any discrepancies for these messages and procedure step descriptions TS 23.502 [3] takes precedence.

#### 5.2.3.2 USS UAV Authorization/Authentication (UUAA) during the PDU Session Establishment

Editor's Note: Below procedure is based on a generic "Secondary authorization/authentication using API during the PDU Session establishment" to be included in TS 23.502 [3].

The USS UAV Authorization/Authentication (UUAA) is triggered by the SMF during the PDU Session Establishment, specified in TS23.502 [3], clause 4.3.2.2. The UUAA is triggered by the SMF based on the Aerial UE subscription information obtained from UDM, if the UE provides the CAA-level UAV ID in the PDU Session establishment request.



Figure 5.2.3.2 -1: UUAA during PDU Session Establishment

Editor's Note: The naming and definition of the SBI/API in steps 1, 1a, 2x, 2a, 2f, 2g, 3a, and 3 needs further investigation. The containers referenced below needs also further investigation.

The procedure assumes that the UE/UAV has already registered on the AMF.

0. Steps 1 - 5 as in 3GPP TS23.502[3] figure 4.3.2.2.1-1.  
  
*The SMF determines that it needs to invoke NEF service operation for authentication/authorization of the PDU session establishment request. The SMF identifies the NEF server based on local configuration or using the DN-specific identity provided by the UE inside the SM PDU DN Request Container provided by the UE in the PDU Session Establishment request.*  
  
The UAV includes the USS address and CAA-Level UAV ID, etc. in SM PDU DN Request Container provided by the UE in the PDU Session Establishment request..

Editor's Note: How the CAA-Level UAV ID, USS address are included within the SM PDU DN Request Container is FFS.

1. This is step 1 to 3 in 3GPP TS 23.502 [3] clause 4.3.2.x Secondary authorization/authentication using API during the PDU Session establishment.  
  
*The SMF invokes Nnef\_Auth\_Request, including the DN specific identity, external authenticating server address if it was provided by the UE, GPSI, PEI if available and UE IP Address.*  
  
In addition to above parametersthe CAA-level UAV ID, USS address, , etc are included in the Nnef\_Auth\_Request.  
  
The NEF selects a USS based on either CAA-Level UAV ID or the USS address.

1a. From NEF to USS: T8\_Auth\_Request forwarding the received information from the SMF.

2. All steps 2x to 2g is optional.

2x. From USS to NEF: T8\_Auth\_Response is sent depending required authentication/authorization method used.

*2a. The NEF sends Nsmf\_Auth\_InfoRequest towards the SMF.*

*2b. Transfer of DN Request Container information received from NEF towards the UE.*

*In non-roaming and LBO cases, the SMF invokes the Namf\_Communication\_N1N2MessageTransfer service operation on the AMF to transfer the DN Request Container information within N1 SM information sent towards the UE.*

*In the case of Home Routed roaming, the H-SMF initiates a Nsmf\_PDUSession\_Update service operation to request the V-SMF to transfer DN Request Container to the UE and the V-SMF invokes the Namf\_Communication\_N1N2MessageTransfer service operation on the AMF to transfer the DN Request Container information within N1 SM information sent towards the UE. In Nsmf\_PDUSession\_Update Request, the H-SMF additionally includes the H-SMF SM Context ID.*

Editor’s Note: The interaction will be further updated once TS 23.502 is updated to include impacts from this work.

*2c: The AMF sends the N1 NAS message to the UE*

*2d-2e. Transfer of DN Request Container information received from UE towards the NEF.*

*When the UE responds with a N1 NAS message containing DN Request Container information, the AMF informs the SMF by invoking the Nsmf\_PDUSession\_UpdateSMContext service operation. The SMF issues an Nsmf\_PDUSession\_UpdateSMContext response.*

*In the case of Home Routed roaming, the V-SMF relays the N1 SM information to the H-SMF using the information of PDU Session received in step 2b via a Nsmf\_PDUSession\_Update service operation.*

*2f: The SMF (In HR case it is the H-SMF) sends the content of the DN Request Container information (authentication message) in Nsmf\_Auth\_InfoResponse to the NEF.*

2g. From NEF to USS: T8\_Auth\_Request is sent depending required authentication/authorization method used.

*Step 2 may be repeated until the NEF confirms the successful authentication/authorization of the PDU Session.*

3a. The USS validates the request on application level e.g. including CAA-Level UAV ID and GPSI and optionally PEI. Upon successful authorization, the USS notifies the NEF on the authentication/authorization result within a UUAA Authorization Payload in the T8\_Auth\_Response, optionally including new CAA-level UAV ID and security info to be used by the UAV to set up a secure connection to the USS using the PDU session.  
From USS to NEF: T8\_Auth\_Response.

NOTE 2: The USS stores a mapping between CAA-Level UAV ID and the External Identifier. The External Identifier and/or UAV IP Address can be used at a later point by the USS for accessing various services exposed by 3GPP network e.g. location information retrieval, monitoring event configuration etc.  
The External Identifier and/or UAV IP Address can be used at a later point by the USS for requesting dedicated policies for e.g. C2, etc.

3. *The NEF confirms the successful authentication/authorization of the PDU Session. The NEF may provide:*

*- an UUAA authorization payload within SM PDU DN Response Container to the SMF to indicate successful authentication/authorization;*

*- DN Authorization Data as defined in TS 23.501 [2] clause 5.6.6;*

4. *The PDU Session establishment continues and completes. In the step 7b of the Figure 4.3.2.2.1-1, if the SMF receives the DN Authorization Profile Index in DN Authorization Data from the NEF, it sends the DN Authorization Profile Index to retrieve the PDU Session related policy information (described in TS 23.503 [20] clause 6.4) and the PCC rule(s) (described in TS 23.503 [20] clause 6.3) from the PCF. If the SMF receives the DN authorized Session AMBR in DN Authorization Data from the NEF, it sends the DN authorized Session AMBR within the Session AMBR to the PCF to retrieve the authorized Session AMBR (described in TS 23.503 [20] clause 6.4). For PDU Session of Ethernet type, the SMF may instruct the UPF to handle VLAN information of the Ethernet frames related with the PDU Session received and sent on N6 or N19 or internal interface, as described in TS 23.501 [2] clause 5.6.10.2.*  
  
The UUAA result is transferred from SMF to the UAV/UE in a UUAA Authorization Payload within the DN Response Container as in step 5, 12 and 13 in 3GPP TS 23.502 [3] figure 4.3.2.2.1-1.

NOTE 3: If C2 and pairing related information is available from USS during the initial PDU Session Establishment procedure the SMF can interact with the PCF to set up PCC rule(s) for the C2 communication and/or UAV/UAVC pairing.

#### 5.2.3.3 USS UAV Authorization/Authentication (UUAA) during default PDN connection at Attach

In the figure 5.2.3.3-1 two options are specified for the execution of the UUAA. Option 1 (i.e. step 2 in figure 5.2.3.3-1) can be used if the timing of the UUAA is not seen as an issue to perform the Attach procedure. Option 2 (i.e. step 4 in figure 5.2.3.3-1) has to be used if the timing for the UUAA is seen as too long and may have negative effects on the Attach procedure e.g. the Attach procedre can time-out before response have been received from USS.



Figure 5.2.3.3-1: UUAA during Attach procedure in EPS

0. Steps 1 - 13 in TS23.401 [???] figure 5.3.2.1-1 and steps 1 - 2 in TS23.502 [3] figure 4.11.1.5.2-1 or clause 4.11.2.4.1 in TS23.502 [3].  
UAV/UE sends Attach Request including including the signed USS address and CAA-Level UAV ID, etc. in the PCO to the SMF+PGW-C.   
The MME may determine the UAV has an aerial subscription and selects the Default APN for connectivity with the USS.

Editor's Note: How the CAA-Level UAV ID, USS address are included within the PCO is FFS

1. [OPTION 2] SMF+PGW-C configures an Access Control List (ACL) in UPF+PGW-U to stop any traffic over the default PDN Connection.

2. [OPTION 1] UUAA is performed as described in steps 1, 1a, 3a and 3 in figure 5.2.3.2-1.

Editor's note: Optional step 2 in figure 5.2.3.2-1 is not supported in current release of EPC.

3. Steps 14 - 22 in TS23.401 [???] figure 5.3.2.1-1 and steps 3 - 6 in TS23.502 [3] figure 4.11.1.5.2-1 or clause 4.11.2.4.1 in TS23.502 [3].

4. [OPTION 2] UUAA is performed as described in steps 1, 1a, 3a and 3 in figure 5.2.3.2-1.

5. Steps 23 - 24 in TS23.401 [???] figure 5.3.2.1-1.

6. [OPTION 2] The PCO including the UUAA result is transferred from SMF+PGW-C to UAV/UE within a UUAA Authorization Payload in Update Bearer Request and Downlink NAS Transport (step 6a - 6c). The UAV/UE confirms the update in steps 6d - 6f.

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