**3GPP TSG-SA3 Meeting #106-e *S3-220215***

e-meeting, 14 – 25 February 2022

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| *CR-Form-v12.1* | | | | | | | | |
| **CHANGE REQUEST** | | | | | | | | |
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|  |  | **CR** |  | **rev** |  | **Current version:** |  |  |
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| *For* [***HE******LP***](http://www.3gpp.org/3G_Specs/CRs.htm#_blank)*on using this form: comprehensive instructions can be found at* [*http://www.3gpp.org/Change-Requests*](http://www.3gpp.org/Change-Requests)*.* | | | | | | | | |
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| ***Proposed change affects:*** | UICC apps |  | ME | **X** | Radio Access Network |  | Core Network | **X** |

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| ***Title:*** | UDM interaction for Anonymous SUCI | | | | | | | | | |
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| ***Source to WG:*** | Ericsson | | | | | | | | | |
| ***Source to TSG:*** | S3 | | | | | | | | | |
|  |  | | | | | | | | | |
| ***Work item code:*** | eNPN | | | | |  | ***Date:*** | | | 2022-02-07 |
|  |  | | | |  | |  | | |  |
| ***Category:*** | **F** |  | | | | | ***Release:*** | | |  |
|  | *Use one of the following categories:* ***F*** *(correction)* ***A*** *(mirror corresponding to a change in an earlier release)* ***B*** *(addition of feature),* ***C*** *(functional modification of feature)* ***D*** *(editorial modification)*  Detailed explanations of the above categories can be found in 3GPP [TR 21.900](http://www.3gpp.org/ftp/Specs/html-info/21900.htm). | | | | | | | | *Use one of the following releases: Rel-8 (Release 8) Rel-9 (Release 9) Rel-10 (Release 10) Rel-11 (Release 11) … Rel-15 (Release 15) Rel-16 (Release 16) Rel-17 (Release 17) Rel-18 (Release 18)* | |
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| ***Reason for change:*** | | In Annex I (normative), anonymous SUCI is needed for non-public networks, especially in the cases of Credential Holder and onboarding where there might not be a HN public key available but still need to conceal UE identifier.  This CR proposes clarifications to the UDM interaction in the case of using anonymous SUCI..  Further there is an E.N about UDM involvement in the procedures for authentication using EAP towards AAA ("Editor's Note: It is FFS why the existing UDM service with mandatory IE 'Authentication method' need to be invoked for an authentication based on credentials held by an external entity.")  It has been decided in CT4 (C4-214856) to add a new IE called ‘AuthAAA’ in the Nudm\_UEAU\_Get response that signals to the AUSF to use an external entity for authentication. When this new value is used the 'Authentication method value ('auth type') shall be set to 'NONE'. The procedures are updated to reflect the decision in CT4. By that, the E.N. should no longer be needed and is thus removed. | | | | | | | | |
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| ***Summary of change:*** | | Updating procedures in clause I.2.2.2 in order to make UDM interaction optional when anonymous SUCI is used. Aligning UDM response with decision in other groups. | | | | | | | | |
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| ***Consequences if not approved:*** | | Incomplete specification | | | | | | | | |
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| ***Clauses affected:*** | | 6.12, Annex I.2.2.2.2 | | | | | | | | |
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|  | | **Y** | **N** |  | | | |  | | |
| ***Other specs*** | |  | **X** | Other core specifications | | | | TS/TR ... CR ... | | |
| ***affected:*** | |  | **X** | Test specifications | | | | TS/TR ... CR ... | | |
| ***(show related CRs)*** | |  | **X** | O&M Specifications | | | | TS/TR ... CR ... | | |
|  | |  | | | | | | | | |
| ***Other comments:*** | |  | | | | | | | | |
|  | |  | | | | | | | | |
| ***This CR's revision history:*** | |  | | | | | | | | |

## \*\*\*\*\*\*\* FIRST CHANGE \*\*\*\*\*\*\*\*\*\*\*\*

## \*\*\*\*\*\*\* NEXT CHANGE \*\*\*\*\*\*\*\*\*\*\*\*

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#### I.2.2.2.2 Procedure

 Figure: I.2.2.2.2-1: Primary authentication with external domain

0. The UE shall be configured with credentials from the Credentials holder e.g. SUPI containing a network-specific identifier and credentials for the key-generating EAP-method used. As part of configuration of the credentials, the UE shall also be configured with an indication that the UE shall use MSK for the derivation of KAUSF after the success of the primary authentication. The exact procedures used to configure the UE are not specified in this document.

It is further assumed that there exists a trust relation between the SNPN and the Credentials holder AAA Server. These entities need to be mutually authenticated, and the information transferred on the interface need to be confidentiality, integrity and replay protected.

1. The UE shall select the SNPN and initiate UE registration in the SNPN.

For construction of the SUCI, existing methods in clause 6.12 can be used. If the home network public key of the SNPN is not provisioned in the UE, the UE shall create a SUCI using null scheme with anonymised SUPI as described in Annex B.

Editor's Note: It is FFS if only SUCI using null scheme with anonymised SUPI should be supported for this use case.

2. The AMF within the SNPN shall initiate a primary authentication for the UE using a Nausf\_UEAuthentication\_Authenticate service operation with the AUSF. The AMF shall select an AUSF based on the HNI of the SUCI (*i.e. realm for NSI SUPI type*) presented by the UE as specified in TS 23.501 [2].

Editor’s Note: It is FFS how does the AMF selects AUSF in step 2 using realm part of SUPI which is also used for NSSAAF to select AAA server in step 7, since the AUSF and AAA server is located in different domain.

3. If the received SUCI is anonymous , steps 3-5 may be omitted. Otherwise, the AUSF shall initiate a Nudm\_UEAuthentication\_Get service operation. The AUSF shall select a UDM also using the SUCI/SUPI provided by the AMF as specified in TS 23.501 [2].

NOTE 1: SUPI will be used instead of SUCI in the case of a re-authentication.

4. In case the UDM receives a SUCI, the UDM shall resolve the SUCI to the SUPI before checking the authentication method applicable for the SUPI. The UDM decides to run primary authentication with an external entity based on subscription data.

In case the UDM receives an anonymous SUCI, the UDM decides to run primary authentication with an external entity based the realm part of the SUPI in NAI format.

In case the UDM receives an anonymous SUCI that does not contain the realm part, the UDM shall abort the procedure. If contains, the UDM authorizes the UE based on realm part of SUCI and send the anonymous SUPI and the indicator to the AUSF as described in step5.

The anonymous SUPI shall be a NAI format as described in clause B.2.1.2.2.

5. The UDM shall provide the AUSF with the SUPI or anonymous SUPI and shall indicate to the AUSF to run primary authentication with a AAA Server in an external Credentials holder.

When a Credentials Holder using AAA Server is used for primary authentication, the AUSF uses the MSK to derive KAUSF. It is strongly recommended that the same credentials that are used for authentication between UE and the 5G SNPN are not used for the authentication between the UE and a non-5G network, assuming that 5G SNPN and non-5G network are in different security domains.

NOTE 2: MSKs obtained from the non-5G network could be used to impersonate the 5G SNPN towards the UE.

6. Based on the indication from the UDM, or decided based on realm part of anonymous SUPI/SUCI (if steps 3-5 were omitted), the AUSF initiates a Nnssaaf\_AIWF\_Authenticate service operation towards that NSSAAF as defined in clause 14.4.2. The AUSF selects NSSAAF as defined in 23.501 [2].

7. The NSSAAF shall select AAA Server based on the domain name corresponding to the realm part of the SUPI. The NSSAAF shall perform related protocol conversion and relay EAP messages to the AAA Server.

Editor's Note: It is FFS if the SUPI needs to be sent to the external entity (AAA).

Editor's Note: The details of the interface and protocol between AUSF and AAA are FFS.

8. The UE and AAA Server shall perform mutual authentication. The AAA Server shall act as the EAP Server for the purpose of primary authentication. The EAP Identity received by the AAA Server in the EAP-Response/Identity message in step 7 may contain anonymised SUPI. In such cases, AAA Server uses the EAP-method specific EAP Identity request/response messages to obtain the UE identifier as part of the EAP authentication between the UE and the AAA Server.

9. After successful authentication, the MSK and the SUPI (i.e., the UE identifier that is used for the successful EAP authentication) shall be provided from the AAA Server to the NSSAAF.

10. The NSSAAF returns the MSK and the SUPI to the AUSF using the Nnssaaf\_AIWF\_Authenticate service operation response message. The SUPI received from the AAA shall be used when deriving 5G keys (e.g., KAMF) that requires SUPI as an input for the key derivation.

11-13. The AUSF verifies that the SUPI corresponds to a valid subscription in the SNPN by informing the UDM about the authentication result for the received SUPI using a Nudm\_UEAuthentication\_ResultConfirmation Request service operation. The UDM stores the authentication state for the SUPI and if there is not a subscription corresponding to the SUPI, the UDM shall return an error.

If the verification of the SUPI is not successful, then the AUSF rejects the UE access to the SNPN based on a failed authorization.

Editor's Note: The details of the interface and protocol between AUSF and AAA are FFS.

14. The AUSF shall use the most significant 256 bits of MSK as the KAUSF. The AUSF shall also derive KSEAF from the KAUSF as defined in Annex A.6.

15. The AUSF shall send the successful indication together with the SUPI of the UE to the AMF together with the resulting KSEAF.

16. The AMF shall send the EAP success in a NAS message.

17. The UE shall derive the KAUSF from MSK as described in step 11 according to the pre-configured indication as described in step 0.

Editor's note: It is FFS if and how clause 1.2.2.3 aligns with TS 23.501 5.30.2.9.2 Credentials Holder using AAA Server for primary authentication and authorization.

## \*\*\*\*\*\*\* END OF CHANGES \*\*\*\*\*\*\*\*\*\*\*\*