**3GPP TSG-SA3 Meeting #108e-adhoc *draft-S3-222612-r1***

**e-meeting, 10 - 14 October 2022**

**Source: OPPO**

**Title:** **New solution: AAnF discovery and selection for internal AF and NEF in AKMA roaming**

**Document for: Approval**

**Agenda Item: 5.6**

# 1 Decision/action requested

***This pCR proposes to solve the Key Issue #1 in TR 33.737[1]***

# 2 References

[1] 3GPP TR 33.737

[2] 3GPP TS 33.535

[3] 3GPP TS 23.003

[4] 3GPP TS 23.502

# 3 Rationale

In AKMA roaming secenario, whether the AF can require the application key from the vAAnF need further discussion. In this case, the AKMA security context (including the AKMA anchor key, A-KID, and SUPI) needs to be provided to the vAAnF in advance, e.g., the AUSF registers the AKMA security context to the vAAnF after KAKMA derivation.

Before the AF require the application key from the AAnF, the AF shall perform the AAnF discovery and selection. The AAnF discovery and selection have been specified in clause 6.7 of TS 33.535[1], which has not taken roaming into consideration.

*“The AAnF selection functionality in NF consumer or in SCP should consider the following factor:*

*- the UE's Routing Indicator.*

*NOTE 1: The AF/NEF obtains the Routing Indicator as part of the A-KID in the AKMA request. The AUSF obtains the Routing Indicator within the Nudm\_UEAuthentication\_Get Response from the UDM.*

*Internal AFs, the NEF and the AUSF shall select the same AAnF set based on the UE’s Routing Indicator.”*

As mentioned above, the UE's Routing Indicator is used in AAnF selection. However, the UE's Routing Indicator can only direct the AAnF selection to the hAAnF in the home network, as specified in TS 23.003[3]:

*“Routing Indicator, consisting of 1 to 4 decimal digits assigned by the home network operator and provisioned in the USIM, that allow together with the Home Network* *Identifier to route network signalling with SUCI to AUSF and UDM instances capable to serve the subscriber.”*

Hence, when performing the AAnF discovery and selection, there may be a situation that only the hAAnF can be selected even the AKMA security context has been registered in the vAAnF, and the AF which resides in the VPLMN cannot request the application key from the vAAnF. This solution specified the AAnF discovery and selection for internal AF and NEF which supports the KI#1 of TR 33.737[1] in AKMA roaming scenario. It is proposed that more information should be introduced excepted the UE's Routing Indicator.

# 4 Detailed proposal

SA3 is kindly requested to agree to the below pCR to TR 33.737 [1].

**\*\*\*\*** START OF CHANGE **\*\*\*\***

6.X Solution X: AAnF discovery and selection for internal AF and NEF in AKMA roaming

6.X.1 Introduction

This solution specified the AAnF discovery and selection for internal AF which supports case 1 and case 2 in KI#1 of TR 33.737[1] in AKMA roaming scenario.

6.X.2 Solution details

6.X.2.1 AAnF discovery and selection for internal AF



Figure 6.X.2.1: AAnF discovery and selection for internal AF in AKMA roaming

Pre-requisite: The AKMA security context ((including the AKMA anchor key, A-KID, and SUPI) has been provided to the VPLMN before, e.g., the AUSF has registered the AKMA security context to the vAAnF after KAKMA derivation.

1. When the internal AF is about to request AKMA Application Key for the UE from the AAnF, e.g. when UE initiates application session establishment request as in clause 6.2.1 of TS 33.535[2]. The internal AF preforms the AAnF selection, discovers an AAnF utilizing the NRF.

* If the internal AF resides in the HPLMN, the AF invokes the Nnrf\_NFDiscovery\_Request service from the hNRF to find the hAAnF, the input may include AF\_LOCATION\_IND which identifies the network where the AF resides, A-KID, and another parameter as specified in clause 5.2.7.3.2 of TS 23.502[3].
* If the internal AF resides in the VPLMN, the AF invokes the Nnrf\_NFDiscovery\_Request service from the vNRF to find the vAAnF, the input includes AF\_LOCATION\_IND which identifies the network where the AF resides, A-KID, and another parameter as specified in clause 5.2.7.3.2 of TS 23.502[3].

2. NRF performs the following operation:

* If the internal AF resides in the HPLMN, the hNRF provides the IP address or FQDN of the hAAnF instance or another parameter as specified in clause 5.2.7.3.2 of TS 23.502[3].
* Or if the internal AF resides in the VPLMN, the vNRF provides the IP address or FQDN of the vAAnF instance or another parameter as specified in clause 5.2.7.3.2 of TS 23.502[3].

3. Then the internal AF sends a Naanf\_AKMA\_ApplicationKey\_Get request to hAAnF/vAAnF with the A-KID to request the KAF for the UE. The internal AF also includes its identity (AF\_ID) in the request.

4. The hAAnF/vAAnF generates the KAF as specified in clause 6.2.1 of TS 33.535[2]

5. The hAAnF/vAAnF sends the response to the AF with the KAF, the KAF expiration time (KAF exptime), SUPI.

6.X.3 Evaluation

TBD.

**\*\*\*\*** END OF CHANGE **\*\*\*\***