**SA WG2 Meeting #S2-162 S2-2404378r01**

**15 - 19 April, 2024, Changsha, China (revision of S2-240xxxx)**

**Source: ZTE, NTT DOCOMO**

**Title: KI#1, update the solution 1**

**Document for: Approval**

**Agenda Item: 19.12**

**Work Item / Release: FS\_5G\_Femto / Rel-19**

*Abstract of the contribution: This paper proposes to update the solution 1 to resolve the EN.*

# 1. Proposal

It is proposed to accept the change to 23.700-45.

>>>> Start of Change <<<<

6.1 Solution #1: Provisioning of CAG info to the network that 5G Femto serves

6.1.1 Description

This solution mainly addresses two aspects that KI#2 states:

i) *"The provisioning/updating of CAG info to the network that 5G Femto serves [..] will be considered".*

ii) *"consider the scenario of allowing the access to a CAG cell in the [..] visited network".*

This solution introduces a new NF called 5G-CAS. 5G-CAS is a UDM-like repository in the Serving PLMN to store CAG info. The CAG info includes Allowed CAG list and associated time validity information for the UE as per TS 23.501 [2] clause 5.30.3. An authorized administrator inputs CAG info via NEF of the Serving PLMN to 5G-CAS. Either AMF retrieves the CAG info from 5G-CAS or 5G-CAS notifies AMF of the CAG info update. AMF then sends it to gNB, when applicable, and to UE.

CAG info in 5G CAS is deployed per UE and provisioned by the authorized administrator per UE. AMF retrieves the CAG info and is notified of the CAG info update per UE.

NOTE 1: 5G-CAS is conceptually the same as EPS CSS.

NOTE 2: Control to allow only an authorized administrator to access NEF relies on the CAPIF functionality. That is not part of this solution.

NOTE 3: Provisioning of CAG info into 5G CAS can be performed via OAM instead of via NEF.

This solution works also for the non-roaming case; 5G-CAS stores CAG info for non-roaming UEs as well.

6.1.2 Procedures

6.1.2.1 Registration procedure



**Figure 6.1.2.1-1: Retrieval of CAG configuration provisioned in the Serving PLMN**

1-4. The same as steps 1, 14a and 14b in clause 4.2.2.2.2 of TS 23.502 [3].

5. The subscription data may contain a flag that suggests the Serving PLMN-specific subscription data needs to be retrieved from 5G CAS.

NOTE: According to inter-operator SLA, the AMF can be pre-configured whether to retrieve the Serving PLMN-specific CAG subscription data. In this case, the flag is not needed.

6-7. The same as steps 14c in clause 4.2.2.2.2 of TS 23.502 [3].

8-9. If the subscription data contains the flag, or according to Service Level Agreement with HPLMN, the serving AMF retrieves the Serving PLMN-specific subscription data containing Allowed CAG list for the UE from 5G CAS.

10-11. AMF subscribes to the notification of update of CAG info from 5G CAS.

12. AMF concatenates the Allowed CAG list for the Serving PLMN retrieved from the subscription data in HPLMN and the Allowed CAG list retrieved from 5G CAS in the Serving PLMN and creates an Allowed CAG list. AMF provides this Allowed CAG list to gNB, when applicable, and to UE.

6.1.2.2 Parameter provisioning

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**Figure 6.1.2.2-1: CAG configuration provisioning to the Serving PLMN**

1-4. The same as steps 1,2,5 and 6 in clause 4.15.6.2 of TS 23.502 [3], except for that CAG information is provisioned. The CAG info is provisioned per UE basis.

NOTE 1: Control to allow only an authorized administrator to access NEF relies on the CAPIF functionality. That is not part of this solution.

NOTE 2: Provisioning of CAG info into 5G CAS can be performed via OAM instead of via NEF.

6.1.2.3 Parameter update to UE

This procedure applies when UE has registered and AMF has subscribed to the notification of update of CAG info from 5G CAS during the registration procedure (See steps 10-11 in Figure 6.1.2.1-1).



**Figure 6.1.2.3-1: CAG configuration update to UE**

1. 5G CAS sends to AMF a notification of the Serving PLMN-specific subscription data update per UE basis.

2-3. AMF concatenates the locally stored Allowed CAG list and the Allowed CAG list contained in the notification and creates an Allowed CAG list. Then, the same steps as steps 1, 2a, and 2b in clause 4.2.4.2 of TS 23.502 [3] applies. (When needed, the same step as step 2c in clause 4.2.4.2 of TS 23.502 [3] also applies.)

6.1.3 Impacts on services, entities and interfaces

The solution has the following impacts:

5G CAS:

- This stands for 5G CAg subscriber Server. 5G CAS is a new NF that is in the Serving PLMN and stores the Serving PLMN-specific subscription data for both non-roaming UEs and roaming UEs. 5G CAS supports a subset of service operations that UDM supports.

UDM:

- Access and mobility subscription data may contain a new flag that suggests AMF that the Serving PLMN-specific subscription data needs to be retrieved from 5G CAS.

AMF:

- AMF checks the above-mentioned flag, or local configuration based on Service Level Agreement and accesses 5G CAS when needed. AMF creates an Allowed CAG list for the Serving PLMN per UE by concatenating Allowed CAG lists, one of which is retrieved from HPLMN and the other of which is retrieved in the Serving PLMN.

NEF:

- NEF in the serving network receives CAG info related inputs from an administrator and stores/updates it to 5G CAS.

NOTE: OAM can be used instead of NEF.

gNB and UE are not impacted.

>>>> End of Change <<<<