**SA WG2 Meeting #S2-140E S2-200xxxx**

**19 August - 01 September, 2020, Electronic, Elbonia**

**Source: Orange, Telecom Italia**

**Title: KI #4, Sol #39: Update to resolve Editor's Notes**

**Document for: Approval**

**Agenda Item: 8.2**

**Work Item / Release: FS\_eNPN / Rel-17**

*Abstract:* *.*

# Proposal

\*\*\* Start of changes \*\*\*

### 6.39.2 Functional Description

The UE is manufactured with Default credentials that consist in a USIM profile that will be used only for UE onboarding. This USIM profile can be issued by any PLMN operator the manufacturer has an agreement with. In what follows, this PLMN is referred to as "HPLMN". The UDM (or HSS) of the HPLMN plays the role of Default Credential Server (DCS) and the Provisioning Server (PS) is in a DN that the HPLMN provides access to.

As part of the agreement between the UE manufacturer and the HPLMN, the UE subscription in the HPLMN allows access to a DN that provides connectivity to the Provisioning Server.

Any PLMN available at the location where the UE is when performing UE onboarding can be used as Onboarding Network (ON), as long as it has a roaming agreement with the HPLMN.

At power-up, the UE does not have information for SNPN selection and therefore performs normal PLMN selection, registers and establishes a PDU Session using normal procedures. The UE subscription corresponding to the USIM profile contains a default Subscribed S-NSSAI and a default DNN that are appropriate to reach the Provisioning Server; consequently a PDU Session that provides access to the Provisioning Server is established without the UE having to indicate any NSSAI or DNN information.

The UE connects to the Provisioning Server through the established PDU Session. The HPLMN provides the GPSI of the UE subscription to the Provisioning Server using secondary authorization/authentication. Upon establishment of connectivity to the Provisioning Server, the UE is provisioned with NPN credentials (for the SNPN that will own the UE's subscription) and additional configuration data. Then the UE deregisters from the PLMN and, using the information acquired during UE onboarding, performs a new network selection and registers using the provisioned NPN credentials with the SNPN owning the UE's subscription.

### 6.39.3 Procedures



Figure 6.39.3-1: High-level flow for onboarding of the UE into an SNPN

The procedure consists in the following steps:

A) UE pre-configuration: the UE is equipped with a USIM containing Default credentials that allows for successful authentication of the device during the PLMN access step (step B).

B) PLMN access: In this step, the UE discovers and selects the PLMN to be used as ON using regular procedures. The UE performs a Registration procedure as specified in TS 23.502 [6] clause 4.2.2.2.2, without providing any Requested NSSAI. The AMF uses the S-NSSAI marked as default in the Subscribed S-NSSAIs of the UE subscription.

C) PDU Session Establishment: The UE establishes a PDU session as specified in TS 23.502 [6] clause 4.3.2.2, without providing any DNN. The AMF determines the DNN for the requested PDU Session by selecting the default DNN present in the UE's Subscription Information.

C1) During the PDU Session establishment, secondary DN authorization without DN authentication (as specified in TS 23.502 [6] clause 4.3.2.3 and TS 29.561) is triggered by the SMF with the Provisioning Server acting as DN-AAA server. The SMF provides the GPSI to the Provisioning Server. If the GPSI is part of an onboarding list configured in the Provisioning Server, the Provisioning Server authorizes the PDU Session establishment and correlates the GPSI with the IPv4 address and/or IPv6 prefix allocated (by the SMF or by the Provisioning Server). Alternatively, this procedure can be performed with DN authentication; in this case the UE's Default credentials include, in addition to the USIM profile, credentials for this procedure.

D1) The device discovers and connects, at application level, to a provisioning server address (that was preconfigured in the UE in step A or is derived from the application identifier and/or Service Provider Identifier provided by the user in step B) for retrieving its own personalized information. The Provisioning Server identifies the UE by its IP address and deduces the GPSI based on the correlation made at step C1. Alternatively, the Provisioning Server authenticates the UE at application level; in this case the UE's Default credentials include, in addition to the USIM profile, credentials for this authentication.

D2) The Provisioning Server contacts the future SNPN owning the subscription, identified by comparing the GPSI with a configured onboarding list, to retrieve the network credentials for access to the SNPN owning the subscription, as well as other UE configuration parameters (e.g. PDU session parameters, such as SNSSAI, DNN, URSPs, QoS rules, and other required parameters to access the SNPN and establish a regular PDU session).The Provisioning Server selects the SNPN owning the subscription in one of the following ways:

- If the UE is pre-configured with the identity of the future SNPN, the UE provides this identity to the Provisioning Server.

- Otherwise, the Provisioning Server determines the future SNPN by comparing the GPSI with a configured onboarding list.

NOTE: In scenarios where the UE is not preconfigured with the identity of the future SNPN (e.g. an off-the-shelf UE), this solution requires that the Provisioning Server be configured with onboarding list information from the device vendor. However, it cannot be assumed that the device vendor always has information about the specific SNPN where a specific UE is to be used.

D3) The Provisioning Server pushes the UE's NPN credentials for the SNPN and other configuration information into the UE.

NOTE: With GSMA solution for remote provisioning of credentials the new USIM credential does not overwrite the old USIM credential. In this solution the USIM credential is also not overwritten.

E) De-registration: Upon a successful provisioning in the previous step, the device releases the PDU Session and deregisters from the ON.

F) Normal service: Upon a successful de-registration as per step E, the device initiates a regular procedure, including selection of an SNPN, Registration using the provisioned NPN credentials with the SNPN owning the subscription, and PDU Session establishment(s).

### 6.39.4 Impacts on services, entities and interfaces

UE:

- The UE is to be pre-configured with provisioning server address or derive it, and initiate a connection to this address.

Network configuration:

- Network needs to be pre-configured with N6/SGi tunnels to Provisioning Server.

- UE's onboarding subscription needs to enable selection of a specific Provisioning Server.

\*\*\* End of changes \*\*\*