**3GPP TSG-SA WG2 Meeting #13xS2-20xxxxx**

**Source: Apple**

**Title: Solution for Key Issue #8: Including supported PLMN list in Allowed NSSAI**

**Document for: Approval**

**Agenda Item: x.x**

**Work Item / Release: FS\_eNS\_Ph2 / Rel-17**

*Abstract: This contribution proposes a solution for Key Issue # 8 – Area of service: impact on PLMN selection in roaming in TR 23.700-40.*

# 1. Introduction

Key issue #8 is about to study whether and how to support S-NSSAI-aware PLMN selection.

*START of CHANGE*

## 6.0 Mapping Solutions to Key Issues

Table 6.0-1: Mapping of Solutions to Key Issues

|  |  |  |
| --- | --- | --- |
| Solution#'s | Solution Titles | Key Issue#'s |
| 1 | PCF measurement based Network Slice SLA control for Maximum Number of UEs parameter | 1 |
| 2 | Max number of UEs per Network Slice control at registration | 1 |
| 3 | AMF/NSSF based counting of UEs in a Network Slice | 1 |
| 4 | NWDAF enhancements for supporting of network slice quota on the maximum number of UEs | 1 |
| 5 | NWDAF enhancements for supporting of network slice quota on the maximum number of PDU Sessions | 2 |
| 6 | PCF-based counting of PDU Sessions in a Network Slice | 2 |
| 7 | Support of Network Slice SLA for Maximum Number of PDU sessions parameter | 2 |
| 8 | AMF and O&M based solution | 1, 2 & 4 |
| 9 | Monitoring multiple quotas of number of UEs/PDU Sessions per S-NSSAI at NWDAF | 1, 2 & 4 |
| 10 | Max number of PDU Sessions per Network Slice control via NSQ function | 2 |
| x | Including supported PLMN list in Allowed NSSAI to influence PLMN selection | 8 |

*NEXT CHANGE (All text is new)*

## 6.X Solution #x: Including supported PLMN list in Allowed NSSAI to influence PLMN selection

### 6.X.1 Introduction

This is a solution to Key Issue #8, "Area of service: impact on PLMN selection in roaming":

If an S-NSSAI of the HPLMN can only be used with certain PLMNs in a country where the UE is roaming, then before a certain S-NSSAI of the HPLMN can be used the UE should perform selection of one of these PLMNs. It is assumed that:

1) The Preferred PLMNs in the visited country are not necessarily capable to provide all the possible Network Slices the HPLMN is required to market to their customers.

2) The PLMNs in the Preferred PLMNs list are not necessarily capable to provide ubiquitous 5GS coverage hence it is possible that the HPLMN has to use a non-preferred PLMNs in certain areas and not all of these PLMNs may support a desired Network Slice.

## 6.X.2 Functional Description

The solution proposes that AMF (via NSSF) shall additionally provide the "supported-PLMN-list" for each S-NSSAI present in the Allowed NSSAI as part of Registration Accept or UE Configuration Update Command.

NSSF shall store the list of supported PLMNs for each S-NSSAI, in each country where the operator has a roaming agreement. AMF queries the NSSF to retrieve the "supported-PLMN-list" for a S-NSSAI.

### 6.X.3 Procedures

The procedure in Figure: 6.X.3-1 shows a signalling flow in which "supported-PLMN-list" is sent to the UE as part of Allowed NSSAI during Registration procedure in the HPLMN:



Figure 6.X.3.1-1 – Providing "supported-PLMN-list" for Allowed NSSAI received as part of Registration procedure

1. UE sends Registration Request with the Requested NSSAI in HPLMN.

NOTE 1: UE could optionally add "request-PLMN-list" for each S-NSSAI in the Requested NSSAI. This could be beneficial in cases when UE already has a valid "supported-PLMN-list" for a S-NSSAI.

2. AMF queries the NRF to find the NSSF address.

3. NRF provides the address of NSSF.

4. AMF requests NSSF to provide the list of supported PLMNs for each S-NSSAI included in the Requested NSSAI. In this example, the Requested NSSAI contains S-NSSAI "a" and S-NSSAI "b". AMF uses the Nnssf\_NSSelection\_Get\_Request service for this request.

NOTE 2: AMF could also request the "supported-PLMN-list" for Configured S-NSSAI as well.

5. NSSF checks its internal database and retrieves the "supported-PLMN-list" for S-NSSAIs "a" and "b".

6. NSSF provides the "supported-PLMN-list" for S-NSSAI "a" and "b" to the AMF in Nnssf\_NSSelection\_Get\_Response.

7. AMF sends the Allowed NSSAI to the UE as part of the Registration Accept. Each S-NSSAI present in Allowed NSSAI contains the "supported-PLMN-list". The list includes the supported PLMNs in which the S-NSSAI is allowed to operate. When multiple entries are available in a "supported-PLMN-list" for a roaming country, the PLMNs are listed in priority order preferred by HPLMN.

NOTE 3: Assuming HPLMN uses an AF to update roaming agreements, the NSSF is notified by the AF about changes in the "supported-PLMN-list". NSSF updates the "supported-PLMN-list" for the affected S-NSSAIs and notify the AMF. AMF can perform the UE Configuration Update procedure to all the UEs that have an affected S-NSSAI part of the Allowed NSSAI or Configured NSSAI.

### 6.X.4 Impacts on existing entities & interfaces

- NSSF shall be able to maintain the list of supported PLMNs for each S-NSSAI.

- NSSF shall be able to provide the "supported-PLMN-list" for each S-NSSAI present in Requested, Allowed, or Configured NSSAI to the AMF.

- AMF shall be able to provide the "supported-PLMN-list" for each S-NSSAI present in Allowed NSSAI to the UE as part of the Registration/Configuration Update procedure.

*End of CHANGES*