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

**Source: Apple**

**Title: Solution for Key Issue#7: Support of 5GC assisted cell selection to access network slice**

**Document for: Approval**

**Agenda Item: 8.8**

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

*Abstract: This contribution proposes a solution for 5GC assisted cell selection to access network slice. The solution is based on the assumption that UE may simultaneously register on slices that are* ***not*** *accessible on the same operating frequency band.*

# 1. Introduction

As highlighted in this key issue, an operator may only support certain network slices on certain operating frequency bands. One registration area may consist of multiple NG-RAN cells belonging to different operating bands.

In this paper, we propose to provide the UE assistance in Configuration Update/Registration procedure so the UE is aware about which slice is supported on which operating bands.

As an alternative solution, we propose that NG-RAN may redirect/handover the UE to appropriate frequency band which supports the S-NSSAI the UE includes in the RRC Connection Setup.

*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 operating frequency bands in Allowed NSSAI  | 7 |

*NEXT CHANGE (All text is new)*

## 6.X Solution #x: Including supported operating frequency bands in Allowed NSSAI

### 6.X.1 Introduction

This solution is for Key Issue #7, "Support of 5GC assisted cell selection to access network slice". The solution is based on the following architectural assumption:

* The UE may simultaneously register to slices that are not all accessible on the same operating band(s). In other words, the UE may have S-NSSAIs in the Allowed NSSAI that are not all available in a common operating.

### 6.X.2 High Level Description

The UE may receive the Allowed NSSAI as part of the Configuration Update/Registration procedure as defined in TS 23.502 [6]. In this solution, it is proposed that for each allowed S-NSSAI, AMF shall additionally provide the list of operating frequency band(s) where this S-NSSAI is supported by the operator. Alternatively, in case the operator slice deployment is governed by frequency ranges, e.g. FR1 vs. FR2, instead of explicitly listing out all the operating bands where the Allowed NSSAI is supported, the AMF may indicate whether NSSAI is supported on: [FR1 only], [FR2 only] or [FR1+FR2].

Once the UE learns the supported S-NSSAIs on the currently camped operating band, if the UE is interested to access an S-NSSAI which is not supported on the currently camped operating band, the UE may choose to re-select to the new operating band and initiate the radio connection. Alternatively, a network assisted mobility scenario may speed up the procedure, thus, when the UE initiates the radio connection on the existing frequency band, based on the S-NSSAI included by UE in RRC connection procedure, NG-RAN may redirect/handover the UE to the appropriate operating band.

### 6.X.3 Procedures

1. In addition to the procedures in TS 23.501 [2], clause 5.15.5.2.1, for each allowed S-NSSAI, NSSF shall also determine the supported operating frequency bands, and pass this along with the Allowed NSSAI to the AMF.

2. The Registration Accept message and UE Configuration Update Command from the AMF to the UE in TS 23.502 [6] are updated to include permissible operating frequency band(s) of each S-NSSAI in the Allowed NSSAI. Alternatively, AMF may indicate whether each S-NSSAI in the Allowed NSSAI is supported on: [FR1 only], [FR2 only] or [FR1+FR2].

3. When the UE receives the Registration Accept message, UE may evaluate to continue to remain on currently camped operating frequency band, or attempt to move to the appropriate operating frequency band which supports the S-NSSAI the UE is interested to access.

4. Additionally, as part of the N2 message sent during the Registration procedure to NG-RAN as specified in TS 23.502 [6] clause 4.2.2.2.2, the AMF may update NG-RAN about the supported operating frequency band for each allowed S-NSSAI for the UE.

5. When the UE initiates a radio connection, based on the S-NSSAI included in the RRC Connection procedure, NG-RAN may decide to redirect/handover the UE to appropriate operating frequency band.

Editor’s Note: Above step should be defined in details in RAN WGs.

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

- NSSF shall be able to provide the supported operating frequency band(s) for each allowed S-NSSAI(s) to the AMF.

- AMF shall be able to provide supported operating frequency band(s) for each allowed S-NSSAI(s) to the UE as part of Configuration Update/Registration procedure.

- AMF shall be able to provide supported operating frequency band(s) for each allowed S-NSSAI(s) to NG-RAN as part of N2 message.

 - NG-RAN shall be able to redirect/handover the UE to appropriate operating frequency band which supports the S-NSSAI included in the RRC connection setup procedure.

- UE shall be able to re-select to appropriate operating frequency band which supports the S-NSSAI the UE is interested to access.

*End of CHANGES*