**3GPP TSG-SA WG2 Meeting #139S2-20XXXXX**

**Source: Motorola Mobility, Lenovo**

**Title: Solution for Key Issue#7: Preferred frequency bands in Configured NSSAI**

**Document for: Approval**

**Agenda Item: 8.8**

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

*Abstract: This contribution proposes a solution for KI#7. It is proposed that the preferred frequency bands information is included in the Configured NSSAI.*

# 1. Introduction

As described in the KI#7, 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 and thus it is possible that support for a particular S-NSSAI in a registration area is non-homogenous.

The UE is aware about which S-NSSAI is supported in which operating bands. The UE may use this information during cell selection procedure to select a cell operating in the frequency band for the S-NSSAI from the Allowed NSSAI.

# Proposal

It is proposed to add the following new key issue to 3GPP TR 23700-40.

*1st 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 | Preferred frequency bands in Configured NSSAI | 7 |

*2nd CHANGE*

## 6.X Solution #X: Preferred frequency bands in Configured 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 assumptions:

- The Rel-15 concept is retained that homogenous availability of S-NSSAIs from the Allowed NSSAI is provided within a Registration Area.

- If the UE registers to a single network slice identified by S-NSSAI which is accessible on some preferred frequency band(s), then the UE considers the list of preferred carrier frequencies of this S-NSSAI for Idle mode mobility.

- If the UE registers to multiple network slices which are accessible on different preferred frequency band(s), then the UE may consider implementation-specific prioritization of S-NSSAIs and derive corresponding carrier frequencies for Idle mode mobility.

- It is assumed that the AMF (or NSSF, or both) and the NG-RAN are configured with the preferred frequency band(s) per S-NSSAI. With this, signalling enhancements to the N2 MM and N2 SM signalling are not needed.

### 6.X.2 High Level Description

The high-level principle of this solution is that the UE is provided with preferred frequency bands information per network slice (e.g. target carrier frequencies per S-NSSAI) in the Configured NSSAI. The preferred frequency bands are applicable to the S-NSSAIs of the Serving PLMN. The UE uses this information for cell selection in order to select the correct cell offering the specific service.

It is assumed that the serving AMF provides to the UE with Allowed NSSAI as per principles known in Rel-16. However, the network (AMF or NSSF) in addition considers the RAN deployment and the frequency bands where the requested S-NSSAIs are available when creating the Allowed NSSAI.

The preferred frequency bands may be a parameter including a list of target carrier frequencies containing one or more entries, and for each entry a carrier frequency priority index may be associated as well. For example, the priority index indicating the priority for scanning/selecting of a carrier frequency.

Once the UE network slice configuration has been updated and the UE is in Idle state, the UE determines which S-NSSAIs it wants to register with, i.e. the S-NSSAIs to be included in the Requested NSSAI. Then, the UE performs cell selection procedure considering the frequency priority (and the priority index) for the S-NSSAIs to be included in the Requested NSSAI.

### 6.X.3 Procedures

The Configured NSSAI is provided to the UE during the Registration Accept message and UE Configuration Update Command from the AMF.

The generation of the Allowed NSSAI (and correspondingly the Rejected S-NSSAIs) in the AMF or NSSF should take into account the local configuration with the preferred frequency band(s) per S-NSSAI.

With respect to the cell selection procedure, the UE may first create a Requested NSSAI (e.g. based on the Configured NSSAI) to be included in the Registration Request message. The UE may then consider the list of target carrier frequencies for the S-NSSAI values included in the Requested NSSAI. If there are more than one S-NSSAIs in the Requested NSSAI, the UE may prioritize the S-NSSAIs, and consequently, prioritize the carrier frequencies to be used for cell selection. The prioritization of S-NSSAIs is up to UE internal configuration (e.g. from higher layers) or user priorities.

If a Service Request procedure or activation of UP resourced for a PDU Session procedure result in use of multiple network slices operated in different frequency bands, the NG-RAN node may decide to activate Dual Connectivity in order to used different frequency bands simultaneously.

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

- To AMF (or NSSF):

- Takes into account the preferred frequency bands per S-NSSAI when generating the Configured NSSAI, Allowed NSSAI and Rejected S-NSSAIs;

- Provides to the UE preferred frequency bands per S-NSSAI within the Configured NSSAI.

- To NG-RAN:

- If multiple multiple network slices operated in different frequency bands are to be used, the NG-RAN can activate Dual Connectivity based on local configuration.

- To UE:

- Takes into account the preferred frequency bands per S-NSSAI for Idle mode mobility.

*End of CHANGES*