**3GPP TSG-WG SA2 Meeting #154H e-meeting *S2-23xxxx***

**Online, January 16th -20th, 2022 (revision of S2-220xxxx)**

**Source: Nokia, Nokia Shanghai Bell**

**Title: Considerations on the normative support of KI#3 and KI#5**

**Document for: Discussion and Agreement**

**Agenda Item: 9.14**

**Work Item / Release: eNS\_Ph3/Rel-18**

*Abstract: this paper comments on some aspects related to how to proceed with KI#3 and KI#5*

# 1. Introduction/Discussion

The KI#3 way forward agreed at SA2#154 is to keep the RA at TA granularity level and only provide sub-TA support information (the availability policy in TR conclusions) to the UE using some additional information indicating at cell level where a slice is supported if the operator prefers this approach for the network slice rather than replanning of the TAs. The RA formation can remain unaltered and needs not be evolved in accordance to KI#5.

Under this assumption, it is not required upgrading UEs to support the feature of partially allowed S-NSSAI or partially rejected S-NSSAI. Indeed a straightforward approach is to indicate all information as currently done today (Allowed NSSAI, RA), and then add an optional information for UEs that can understand it to cause the UE to modify the boundaries of the RA to be sub-TA. This is aligned with the conclusion of the study to provide slice availability information.

It is therefore proposed that for operators that do not upgrade the network to support KI#5 feature, it is sufficient to signal to the UE an additional cell level registration information (CLRI) that augments the RA information with the identification of the areas within a TA where a network slices in the Allowed NSSAI are supported, if the granularity is sub-TA in certain TAs of the RA. Other than that, the UE is provided with an Allowed NSSAI and a RA as normal.

If the operator evolves the RA formation to be in accordance to KI#5 requirements and conclusions, however, the UE support of the Partially Allowed S-NSSAI and Partially Rejected S-NSSAI concepts is required. In this case, we need to consider the possible feature interaction between these two KIs related features. One obvious interaction is the indication of the sub-TA support of a S-NSSAI using cell level information, if the operator for a certain slice considers advantageous to not replan the TAs where the slice is supported.

One discussion point is in order when the granularity of support is at cell level. The conclusion of the TR spells out this:

"Reconfiguration of TAs while keeping the uniform support of S-NSSAIs in cells within the TA to keep the end-to-end significance of slice unchanged, but if an operator do not want to change the TA borders, the operator configures the cells of a TA that are outside AoS to have no or **limited resources** using existing NG-RAN OAM configuration."

If limited resources are configured, the non supporting UE can assume the slice is operating across the whole TAs in RA, and will continue using each network slice in the Allowed NSSAI as if it was supported in the TA. This means in principle that a non supporting UE would enjoy service even outside the AoS proper as it assumes the slice still works in the whole TA, while a supporting UE would restrict itself from using the network slice.

**Observation 1: the allocation of limited resources outside the AoS seems to benefit only non supporting UEs (legacy UEs) and not upgraded UEs. Therefore it is proposed that the allocation of limited resources is used sparingly (if at all) and the cells where limited resource were configured to be available for a S-NSSAI should be considered part of the list of cells signalled to the UE where the S-NSSAI is supported.**

There is also another point to be considered: the allocation of limited resources outside the AoS seems to be specific to sub-TA granularity Support of S-NSSAI. It is not clear why the benefit of resources outside the AoS applies only when AoS does not map to existing TAs.

**Observation 2: it should be possible to expand the support of a slice to cells outside a TA that matches the AoS of a network slice.**

In summary:

- to support KI#3 it is sufficient to additionally provide to the UE an optional CLRI for the TAs where the Allowed NSSAI is not uniformly supported. The UE performs MRU when it exits area of support of the Allowed NSSAI taking the CLRI into account, if it can understand the CLRI. If some cells are configured to support >0 resources outside the AoS proper, the CLRI should be extended to cover these cells also unless the operator is happy to provide service outside the AoS only to legacy UEs. Otherwise, to avoid any service disparity, the cells outside the AoS should be configured with zero resources for the network slice.

- KI#5 feature can be deployed independently of support of Cell level granularity.

- To support KI#5 in a network where network slice can be supported at cell level granularity in some TA, the Partially allowed/rejected S-NSSAI availability information can be provided with information at cell level.

# 2. Proposal

it is proposed that the CRs in S2-23xxxx and, S2-23 xxxx are approved.