**3GPP TSG-SA3 Meeting #112 *S3-23xxxx***

**Chicago, USA 06 - 10 November 2023** **(revision of xx-yyxxxx)**

**Source: Huawei, HiSilicon**

**Title: New SID on security enhancements of network slicing**

**Document for: Approval**

**Agenda Item: 6**

3GPP™ Work Item Description

Information on Work Items can be found at <http://www.3gpp.org/Work-Items>   
See also the [3GPP Working Procedures](http://www.3gpp.org/specifications-groups/working-procedures), article 39 and the TSG Working Methods in [3GPP TR 21.900](http://www.3gpp.org/ftp/Specs/html-info/21900.htm)

Title: Study on security enhancements of network slicing

Acronym: FS\_eNS4\_SEC

Unique identifier:

Potential target Release: Rel-19

# 1 Impacts

{For Normative work, identify the anticipated impacts. For a Study, identify the scope of the study}

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Affects: | UICC apps | ME | AN | CN | Others (specify) |
| Yes |  | x |  | x |  |
| No |  |  |  |  |  |
| Don't know | x |  | x |  | x |

# 2 Classification of the Work Item and linked work items

## 2.1 Primary classification

### This work item is a …

|  |  |
| --- | --- |
| x | Study |
|  | Normative – Stage 1 |
|  | Normative – Stage 2 |
|  | Normative – Stage 3 |
|  | Normative – Other\* |

**\* Other = e.g. testing**

## 2.2 Parent Work Item

For a brand-new topic, use “N/A” in the table below. Otherwise indicate the parent Work Item.

|  |  |  |  |
| --- | --- | --- | --- |
| Parent Work / Study Items | | | |
| Acronym | Working Group | Unique ID | Title (as in 3GPP Work Plan) |
| N/A |  |  |  |

### 2.3 Other related Work Items and dependencies

|  |  |  |
| --- | --- | --- |
| Other related Work /Study Items (if any) | | |
| Unique ID | Title | Nature of relationship |
| N/A |  |  |

# 3 Justification

Since Release 15, 3GPP SA2 and SA3 have introduced various functional/security features relevant to network slicing. Amongst them, the following are observed to have inconsistence issues or security implications. They deserve to be studied further in Release 19.

**Home control to a roaming UE:** In Release 15 of TS33.501**,** theincreased home control is introduced during Primary Authentication to prevent certain types of fraud, e.g. fraudulent registering a UE's serving AMF in UDM that the UE is not actually present in the visited network. The home control is realized through that the AUSF in the Home obtains confirmation that the UE has been successfully authenticated (cf. sub-clauses 6.1.3.1, 6.1.3.2, 6.1.4.1a of TS33.501). However, there is no home control feature during the UE’s slice authentication, i.e. the NSSAA procedure. This may cause a similar fraud, e.g. fraudulent registering a UE's serving AMF for slice A, but the UE is actually not registered or served by the slice in the visited network.

**Network Slice Access Stratum Group (NSAG):** The NSAG information specified in TS23.502/TS38.300 in Release 17 onwards is an identifier of a group of network slices. The NSAG values are broadcasted (part of SIBs) by gNBs for UE to perform Cell Reselection for the associated network slices. However, the NSAG has not been used in the registration procedure due to lack of study on whether NSAG may leak sensitive slice information during initial AS registration.

**Network Slice Simultaneous Registration Group (NSSRG):** The NSSRG information has been specified in TS23.501 and TS23.502 since the Release 17 in the UE’s subscription/configuration. It is used to restrict UE not to register to network slices in different NSSRG simultaneously. However, the security context for network slices in different NSSRG could still be shared in the cases that the UE is registered to one slice after de-registered another. It needs to study whether the NSSRG restriction should be applied to network slices registered consecutively as well. In addition, sharing security context for slices within the same NSSRG may also be investigated in order not to allow it if desirable.

# 4 Objective

The objectives of this study are to identify key issues, potential security and privacy requirements and solutions with respect to the following features:

* WT1: Study the NSSAA procedures in order to support the home control features in line with that in the Primary Authentication.
* WT2: Study the NSAG feature and investigate whether NSAG can be used in the AS registration procedure without leaking sensitive slice information.
* WT3: Study whether security context sharing amongst slices in the same or different NSSAG groups can be avoided.

## TU estimates and dependencies

|  |  |  |  |
| --- | --- | --- | --- |
| Work Task ID | TU Estimate  (Study) | TU Estimate  (Normative) | RAN Dependency  (Yes/No/Maybe) |
| WT1 | 1 | 0.5 | No |
| WT2 | 1 | 0.5 | Yes |
| WT3 | 1 | 0.5 | No |

Total TU estimates for the study phase: 3

Total TU estimates for the normative phase: 1.5

Total TU estimates: 4.5

# 5 Expected Output and Time scale

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| New specifications {One line per specification. Create/delete lines as needed} | | | | | |
| Type | TS/TR number | Title | For info  at TSG# | For approval at TSG# | Rapporteur |
| Internal TR | 33.xxx | Study on security enhancements to network slicing |  | SA#104 |  |
|  |  |  |  |  |  |

|  |  |  |  |
| --- | --- | --- | --- |
| Impacted existing TS/TR {One line per specification. Create/delete lines as needed} | | | |
| TS/TR No. | Description of change | Target completion plenary# | Remarks |
|  |  |  |  |
|  |  |  |  |

# 6 Work item Rapporteur(s)

# 7 Work item leadership

SA3

# 8 Aspects that involve other WGs

N/A

# 9 Supporting Individual Members

|  |
| --- |
| Supporting IM name |
| Huawei |
| HiSilicon |
|  |
|  |
|  |
|  |