**3GPP TSG-CT WG4 Meeting #106-eC4-215xyz**

**E-Meeting, 11th – 15th October 2021 (revision of CP-212103)**

**Source: Ericsson**

**Title: Revised WID on CT aspects of Enhanced support of Non-Public Networks**

**Document for: Endorsement**

**Agenda Item: 5**

**2. Reason for Change**

- In Aug 2021, SA2 agreed S2-2106722 stating that credentials for NSSAA and/or PDU session secondary authentication can be provided also when the UE is registered in SNPN using SNPN credentials or CH credentials. This impacts CT1 and CT4.

- In Aug 2021, SA1 agreed LS S1-213120 indicating that there is no need to prioritise SNPNs supporting PWS over SNPNs not supporting PWS for SNPN selection. This impacts CT1 as "Possible updates on SNPN selection for PWS over SNPN" need to be removed.

- In Aug 2021, SA2 agreed S2-2105792 stating that the DCS provides the UE specific PVS address/FQDN to the AMF, AMF sends it to SMF and SMF to PCF. SMF finally provides this info to the UE. No UE Policies are used to send this information to the UE. This impacts CT3.

-In Aug 2021, SA2 agreed S2-2105031, indicating that the PVS address/FQDN is included as part of the SDF template in the PCC Rule. This impacts CT3.

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: CT aspects of Enhanced support of Non-Public Networks

## Acronym: eNPN

## Unique identifier: *910016*

Potential target Release: Rel-17

## 1 Impacts

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

## 2 Classification of the Work Item and linked work items

### 2.1 Primary classification

This work item is a:

|  |  |
| --- | --- |
|  | Feature |
| X | Building Block |
|  | *Work Task* |
|  | Study Item |

### 2.2 Parent Work Item

|  |  |  |  |
| --- | --- | --- | --- |
| Parent Work / Study Items | | | |
| Acronym | Working Group | Unique ID | Title (as in 3GPP Work Plan) |
| eNPN | SA2 | 900015 | Enhanced support of Non-Public Networks |

### 2.3 Other related Work Items and dependencies

|  |  |  |
| --- | --- | --- |
| Other related Work Items (if any) | | |
| Unique ID | Title | Nature of relationship |
| 840024 | Study on enhanced support of Non-Public Networks | SA2 study item. |
| 880008 | Study on enhanced security support for Non-Public Networks | SA3 study item. |
| 890049 | Enhancement of Private Network Support for NG-RAN | RAN work item. |

**Dependency on non-3GPP (draft) specification**: none

## 3 Justification

SA2 has studied enhancements of support for non-public networks under study item "*Study on enhanced support of Non-Public Networks*" (FS\_eNPN). SA2 study is now concluded. The conclusions of the SA2 study are captured in 3GPP TR 23.700-07 and provide a good overview of what is to be continued into normative phase and of what impacts to other working groups are expected in normative phase.

Furthermore, SA plenary approved work item "*Enhanced support of Non-Public Networks*" (eNPN) for SA2 normative work.

SA3 has studied enhancements of security support for non-public networks in 3GPP TR 33.857 under study item "*Study on enhanced security support for Non-Public Networks*" (FS\_eNPN\_SEC). The outcomes of the SA3 study are captured in 3GPP TR TR 33.857.

RAN plenary approved work item "*Enhancement of Private Network Support for NG-RAN*" for RAN normative work. Work in RAN WGs is expected to start and conclude within Rel-17 timeframe.

Considering the above, impacts on protocols and interfaces under CT WGs' responsibilities are foreseen and the related work in CT WGs should be carried out within Rel-17.

When needed, updates of the WID will be made based on progress of SA2, SA3 and RAN WGs.

CT1 received SA1 LS S1-210368/C1-212823 indicating that SA1 sees a need to introduce support of PWS over SNPN in Rel-17. Furthermore, Jun 2021 SA plenary approved a WID for SA1 (SP-210585) for PWS over SNPN in Rel-17.

## 4 Objective

The objective of this work item is to provide stage-2 and stage-3 requirements in specifications under remit of CT WGs for the stage 2 requirements agreed under the stage 2 work item eNPN.

Work will start only when normative stage 2 requirements are available.

The following areas of work are expected to be covered (non-exhaustive, additional areas can be identified based on progress in SA3 and in normative work in SA2):

**CT1:**

- for enhancements to support SNPN along with credentials owned by an entity separate from the SNPN:

- impact to the UE for updates of SNPN selection, to enable the UE with credentials from the entity separate from the SNPN to select the SNPN.

- impact to the UE for specification of UE's configuration for SNPN selection consisting of the separate entity controlled information for SNPN selection and user controlled information for SNPN selection.

- impact to the UE and the network for enabling the network to configure the UE with the separate entity controlled information for SNPN selection, using a NAS procedure.

- impact to the UE for enabling of mobility among networks when the UE operates in SNPN access mode.

- for NPN enhancements to enable support for Video, Imaging and Audio for Professional Applications (VIAPA):

- documentation of usage of existing signalling for VIAPA needs.

- for support of IMS voice and emergency services for SNPN:

- impact to the UE for extension of IMS specifications to enable use of IMS Credentials (IMC) when USIM or ISIM is not available in a UE accessing IMS via an SNPN.

- impact to the UE, the AMF, the SMF and the IMS for enabling emergency services (excluding emergency services fallback) when the UE is in SNPN, including network selection for emergency services and enabling emergency service in 5GMM, in 5GSM and in IMS specifications.

- impact to the UE for extension of network selection of a voice centric UE to not select an SNPN in 3GPP access if IMS voice over PS Session in 3GPP access was not supported in the SNPN.

- for support of UE onboarding and remote provisioning:

- to enable UE onboarding over an Onboarding Network (ON) (O-SNPN or PLMN) and remote provisioning using user plane mechanisms for SNPN credentials:

- impact to the UE due to SNPN selection enabling selection of onboarding SNPN.

- potential impact to the UE due to changes related to unified access control and RRC establishment cause determination.

- impact to the UE due to establishment of NAS signalling connection to SNPN including interactions with lower layers along with indication that the NAS signalling connection is established for onboarding.

- impact to the UE and the AMF for updates of registration procedure in SNPN to enable registration for onboarding.

- impact to the UE and the AMF for de-registration once onboarding is finished.

- impact to the UE due to enabling usage of Default UE credentials in authentication procedure.

- for remote provisioning of the subscription-owner-SNPN credentials using user plane mechanism:

- impact to the UE and potentially to the AMF to support establishment of restricted PDU session dedicated for the remote provisioning.

- impact to the UE, the AMF, the SMF and the PCF for providing provisioning server address for remote provisioning using user plane mechanisms, where the provisioning server address can be provided using PCO parameter, during registration procedure or using service specific UE policies.

NOTE: protocol for providing subscription-owner-SNPN credentials via remote provisioning using user plane mechanisms are out-of-scope of 3GPP.

NOTE: remote provisioning of the subscription-owner-SNPN credentials using control plane mechanism is part of 3GPP TR 23.700-07 but is not included in SA2 WID.

- to enable UE with PLMN credentials, SNPN credentials or CH credentials to perform onboarding and remote provisioning of credentials for NSSAA and/or PDU session secondary authentication, using control and user plane mechanisms:

- updates for enabling of remote provisioning of the credentials used for NSSAA and/or PDU session secondary authentication, using user plane mechanism and using control plane mechanism.

- in case of remote provisioning using user plane mechanism:

- impact to the UE, the AMF, the SMF and the PCF for providing provisioning server address, S-NSSAI and DNN for remote provisioning using user plane mechanisms, where the provisioning server address, S-NSSAI and DNN can be provided during registration procedure or after registration procedure.

NOTE: protocol for providing the PNI-NPN credentials used for NSSAA and/or PDU session secondary authentication via remote provisioning using user plane mechanisms is out-of-scope of 3GPP.

- impacts for introduction of support of PWS over SNPN

**CT3:**

- for enhancements to support SNPN along with credentials owned by an entity separate from the SNPN:

- impact to cover the interactions between the AUSF or the new NF and the AAA server, for scenarios with the separate entity offering the AAA server.

for NPN enhancements to enable support for Video, Imaging and Audio for Professional Applications (VIAPA):

- informative mapping table between standardized 5QI/ARP and DSCP marking to enable the PLMN and SNPN to use the same mapping values for UL and DL user plane traffic within SNPN and PLMN.

- for support of UE onboarding and remote provisioning:

- to enable UE onboarding over an Onboarding Network (ON) (O-SNPN or PLMN) and remote provisioning using user plane mechanisms for SNPN credentials:

- potential impact on the PCF to cover the delivery of the provisioning server (PS) address to the UE via PCC rules.

- impact to cover the interactions between the AUSF or the new NF and the Default Credential Server (DCS).

- for support of user plane remote provisioning of SO-SNPN credentials:

- potential impact on the NEF to support AF-based service parameter provisioning procedures for the provisioning of onboarding configuration data.

**CT4:**

- for enhancements to support SNPN along with credentials owned by an entity separate from the SNPN:

- potential impact to cover the interactions between the AMF and the AUSF or the new NF, for scenarios with the separate entity offering a AAA server.

- potential impact to the UDM to instruct the AUSF to complete primary authentication with the separate entity offering a AAA server, in case new NF is not defined.

- potential impact to the UDM of the entity separate from the SNPN for updating the separate entity controlled prioritized list of preferred SNPNs over the control plane in the UE.

- for support of UE onboarding and remote provisioning:

- to enable UE onboarding over an Onboarding Network (ON) (O-SNPN or PLMN) and remote provisioning using user plane mechanisms for SNPN credentials:

- potential impact to cover the interactions between the AMF and the AUSF or the new NF, for interacting with a Default Credential Server (DCS) for authentication of the UE with default UE credentials.

- documentation of usage of existing means for enabling restricted PDU session for UP provisioning.

- to enable UE with PLMN credentials, SNPN credentials or CH credentials to perform onboarding and remote provisioning of credentials for NSSAA and/or PDU session secondary authentication, using control and user plane mechanisms:

- impact to the UDM for extension of control plane provisioning mechanisms (e.g., the UE parameters update via UDM control plane procedure) for delivering of credentials for accessing PNI-NPN.

- potential core network stage-3 impacts for introduction of support of PWS over SNPN

## 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 |
|  |  |  |  |  |  |

|  |  |  |  |
| --- | --- | --- | --- |
| **Impacted existing TS/TR** *{One line per specification. Create/delete lines as needed}* | | | |
| TS/TR No. | Description of change | Target completion plenary# | Remarks |
| 23.003 | Potential impact for identities related to UE onboarding and remote provisioning and for enhancements to support SNPN along with credentials owned by an entity separate from the SNPN. | CT#95 (Mar 2022) | CT4 responsibility |
| 23.041 | Updates to support PWS over SNPN in similar way as per PLMN | CT#95 (Mar 2022) | CT1 responsibility |
| 23.122 | Updates of SNPN selection in idle mode procedures  Possible enhancement of the control plane solution for steering of roaming in 5GS.  Possible impact to the "list of subscriber data" to support PWS related configuration over SNPN when USIM is available  Update to the "list of subscriber data" to support PWS related configuration over SNPN when USIM is not available | CT#95 (Mar 2022) | CT1 responsibility |
| 24.008 | Possible specification of new PCO parameter(s) | CT#95 (Mar 2022) | CT1 responsibility |
| 24.167 | Possibly new UE configuration parameters in IMS MO. | CT#95 (Mar 2022) | CT1 responsibility |
| 24.229 | Updates to enable use of IMC when USIM or ISIM is not available in a UE accessing IMS via an SNPN, emergency services in SNPN, and extension of IMS specifications to enable use of USIM credentials for IMS AKA when USIM is available in a UE accessing IMS via an SNPN. | CT#95 (Mar 2022) | CT1 responsibility |
| 24.368 | Possibly new UE configuration parameters in NAS configuration MO. | CT#95 (Mar 2022) | CT1 responsibility |
| 24.501 | Updates of NAS signalling connection handling and related NAS procedures. | CT#95 (Mar 2022) | CT1 responsibility |
| 24.526 | Possible specification of new service specific UE policy(ies) for providing provisioning server address for remote provisioning using user plane mechanism of the subscription-owner-SNPN credentials | CT#95 (Mar 2022) | CT1 responsibility |
| 27.007 | Possible updates of AT commands for passing information (e.g. provisioning server address) within the ME. | CT#95 (Mar 2022) | CT1 responsibility |
| 29.168 | Possible updates for support of PWS over SNPN | CT#95 (Mar 2022) | CT4 responsibility |
| 29.502 | AMF sending PVS FQDN/Address to the SMF. | CT#95 (Mar 2022) | CT4 responsibility |
| 29.503 | Extension of control plane provisioning mechanisms (e.g., UPU) for updating the separate entity controlled prioritized list of preferred SNPNs  Potential impact to the UDM to instruct the AUSF to complete primary authentication with the separate entity offering a AAA server, in case new NF is not defined | CT#95 (Mar 2022) | CT4 responsibility |
| 29.505 | Subscription data for NPN credentials and the separate entity controlled prioritized list of preferred SNPNs | CT#95 (Mar 2022) | CT4 responsibility |
| 29.509 | Potential impact to cover the interactions between the AMF and the AUSF, for scenarios with the separate entity offering a AAA server. | CT#95 (Mar 2022) | CT4 responsibility |
| 29.513 | Impact to cover the provisioning of PS address to the UE.  Informative mapping table between standardized 5QI/ARP and DSCP marking to enable the PLMN and SNPN to use the same mapping values for UL and DL user plane traffic within SNPN and PLMN | CT#95 (Mar 2022) | CT3 responsibility |
| 29.518 | Transfer of a UE on boarding Indication to T-AMF during inter-AMF mobility.  Possible updates for support of PWS over SNPN | CT#95 (Mar 2022) | CT4 responsibility |
| 29.522 | Potential impact to support AF-based service provisioning procedures for the provisioning of onboarding configuration data. | CT#95 (Mar 2022) | CT3 responsibility |
| 29.512 | Impact to cover the provisioning of PS address to the UE via PCC rules | CT#95 (Mar 2022) | CT3 responsibility |
| 29.561 | Impact on the interactions between the AUSF or the new NF and the AAA server, for scenarios with the separate entity offering a AAA server.  Impact to cover the interactions between the AUSF or the new NF and Default Credential Server (DCS) | CT#95 (Mar 2022) | CT3 responsibility |

## 6 Work item Rapporteur(s)

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## 7 Work item leadership

CT1

## 8 Aspects that involve other WGs

None

## 9 Supporting Individual Members

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| --- |
| Supporting IM name |
| Ericsson |
| LG Electronics |
| Lenovo |
| Motorola Mobility |
| CISCO |
| China Mobile |
| China Telecom |
| Charter Communications |
| ZTE |
| OPPO |
| MediaTek Inc. |
| Intel |
| vivo |
| Huawei |
| HiSilicon |
| Hewlett Packard Enterprise |
| Qualcomm Incorporated |
| Nokia |
| Nokia Shanghai Bell |
| CableLabs |