**SA WG2 Meeting #143E S2-20xxxxx**

**24 February-09 March 2021, Elbonia (revision of S2-20xxxx)**

**Source: Ericsson (Rapporteur)**

**Title: FS\_eNPN moderated email discussion**

**Document for: Information**

**Agenda Item: TBD**

**Work Item / Release: FS\_eNPN / Rel-17**

*Abstract of the contribution: This contribution includes the moderated email discussions for the FS\_eNPN open issues.*

# 1. Introduction

More FS\_eNPN study time was requested to resolve the outstanding issues as listed in the TR cover sheet in S2-2009250.

To make the resolution of those open issues as smooth as possible and spend as little meeting time as possible on the study phase at SA#143E, this documents includes a request for companies to provide their opinion on the above mentioned open issues.

The result will be used as an input to a proposed conclusion at SA2#143E, and possibly we will target a working assumption at CC#1.

For each question the company should also include an opinion whether the eNPN WID should be updated with a resolution of the issue.

# 2. Issues

## KI#1-Q1: Additional SIB information for SNPN selection

TR conclusion in clause 8.1.4 includes an EN as:

Editor's note: Need for additional SIB information is FFS.

NOTE: There is already SIB information concluded for KI#1, se TR conclusion, i.e. EN is if there is any need for more SIB information beyond what is already concluded.

**Question**: Is there a need for additional SIB information for SNPN selection for UEs with an SNPN subscription of a Separate Entity?

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| **Company name** | **Answer****(Y/N)** | **Should the WID be updated with a resolution of the issue?****(Y/N/)** | **Comments (optionally more details e.g. reasoning and what needs to be updated, if any)** |
| Intel | N | N | Existing information in clause 23.700-07 8.1.4 is sufficient. |
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## KI#1-Q2: Simultaneous connections for UEs with one subscription

The TR includes an empty conclusion clause "8.1.3 Conclusions for simultaneous data service from both V-SNPN and a separate entity owning the credentials (PLMN or SNPN)".

**Question**: Should simultaneous access, via separate PDU Sessions, to data services available via SNPN (LBO) and via Separate Entity (UPF in Separate Entity) be supported for UEs with one subscription?

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| **Company name** | **Answer****(Y/N)** | **Should the WID be updated with a resolution of the issue?****(Y/N/)** | **Comments (optionally more details e.g. reasoning and what needs to be updated, if any)** |
| Intel | Y | Y | We think that access to services from the Separate Entity should be supported for UE with one subscription (via UPF in Separate Entity), the separate entity being an SNPN. The simultaneous access (via two PDU Sessions) is then a natural consequence. The WID should be updated with an objective pointing to the conclusions in 23.700-07 clause 8.1.3. |
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## KI#1-Q3: Credentials for SNPN service continuity

SA2 asked SA1 the following questions (in LS S2-2007828):

*Q1: support for access to (and related service continuity) for services provided by an SNPN separate from the serving SNPN (i.e. services provided by the SNPN that issued the UE's subscription). One example could be access to voice services provided by the SNPN.*

*In case these, or other service continuity requirements for SNPNs exists, SA2 would like to ask SA1 the following additional questions:*

*Q2: whether only PLMN credentials (and respective authentication methods) can be used to register to a target network (i.e. which may be an SNPN with or without credentials being owned by separate entities, or a PLMN), given the various service continuity scenarios.*

*Q3: whether in addition to PLMN credentials, also non-3GPP identities and credentials (and respective alternative authentication methods) can be used to register to a target network, given the various service continuity scenarios.*

NOTE: SA1 has not yet replied.

**Question A**: Should the standard support access to (and related service continuity for) services provided by an SNPN separate from the serving SNPN?

**Question B**: If answer to A is yes, what type of credentials should be supported e.g. PLMN only, or both PLMN and non-3GPP identities and credentials?

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| **Company name** | **Answer question A****(Y/N)** | **Should the WID be updated with a resolution of the issue?****(Y/N/)** | **Comments (optionally more details e.g. reasoning and what needs to be updated, if any)** |
| Intel | Y | Y | **A**: In our opinion access to services provided by an SNPN separate from the serving SNPN should be supported for UE with one subscription, as per our answer to KI#1-Q2.**B**: If access to services provided by an SNPN separate from the serving SNPN is supported for UE with one subscription, then there the following two cases to consider:**Case 1**: UE moves from one serving SNPN (SNPN1) to another serving SNPN (SNPN3), while the service is anchored in SNPN2. UE uses only the credentials of SNPN2.**Case 2**: UE moves from a serving SNPN (SNPN1) to a serving PLMN, while the service is anchored in SNPN2. In this cases UE uses PLMN credentials to register with the PLMN, and then uses the Rel-16 OTT approach to resume service continuity with SNPN2 using SNPN2 credentials.  |
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## KI#1-Q4: AAA-S providing subscription information

TR conclusion in clause 8.1.1 includes an EN as:

Editor's note: It is FFS if the AAA server supports providing the subscription information needed for registration and session management procedure.

**Question**: Should it be possible for AAA-S to provide subscription information to SNPN?

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| **Company name** | **Answer****(Y/N)** | **Should the WID be updated with a resolution of the issue?****(Y/N/)** | **Comments (optionally more details e.g. reasoning and what needs to be updated, if any)** |
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## KI#1-Q5: Other UE ID than SUPI towards AAA

TR conclusion in clause 8.1.1 includes an EN as:

Editor's note: Need for and details of using a UE ID other than the SUPI are FFS.

**Question**: Is there a need to support other UE ID than SUPI towards AAA?

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| **Company name** | **Answer****(Y/N)** | **Should the WID be updated with a resolution of the issue?****(Y/N/)** | **Comments (optionally more details e.g. reasoning and what needs to be updated, if any)** |
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## KI#1-Q6: Additional mechanisms to update list of preferred SNPNs

TR conclusion in clause 8.1.7 includes an EN as:

Editor's note: Need for additional mechanisms (e.g. URSP or new policy using UPU) to update the separate entity controlled prioritized list of preferred SNPNs in the UE is FFS.

**Question**: Should it be possible to use additional mechanisms (e.g. URSP or new policy using UPU) to update the separate entity controlled prioritized list of preferred SNPNs in the UE?

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| **Company name** | **Answer****(Y/N)** | **Should the WID be updated with a resolution of the issue?****(Y/N/)** | **Comments (optionally more details e.g. reasoning and what needs to be updated, if any)** |
| Intel | N | N | We don’t see the need for any additional mechanisms to update the prioritized lists on top of those defined in 23.700-07 clause 8.1.7. |
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## KI#2-Q1: Continuity for single radio UE using N3IWF

In SA2#141E, a conclusion is agreed that single radio UE is able to achieve PDU session continuity by using the existing handover procedure between 3GPP access and non-3GPP access. Such conclusion is aligned with the statement in clause 5.30.2.7 and 5.30.2.8 in TS 23.501.

In SA2#142E, there was a debate regarding whether single radio UE is sufficient to fulfill the service continuity when using N3IWF. But no conclusion is agreed.

Service continuity defined in TS 23.501 is quoted as below:

**Service Continuity:** The uninterrupted user experience of a service, including the cases where the IP address and/or anchoring point change.

**Question**: With existing mechanism, is single radio UE sufficient to support service continuity of VIAPA service when using N3IWF?

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| **Company name** | **Answer****(Y/N)** | **Should the WID be updated with a resolution of the issue?****(Y/N/)** | **Comments (optionally more details e.g. reasoning and what needs to be updated, if any)** |
| Intel  | Depends on the direction | N | According to 22.263 clause 5.5: “*The 5G system shall be able securely reconnect within a short period of time (<1s) from UE starting first network reconnection attempt after the UE has detected a UE network connection loss.*”Assuming the following cases: **Case 1**: UE is initially connected directly to SNPN. After losing SNPN coverage, UE registers directly with PLMN and then OTT with the SNPN, to resume service continuity. We think in this direction it will be **difficult** to achieve a service break lower than 1s.**Case 2**: UE is initially connected directly to PLMN and then OTT with the SNPN. After losing PLMN coverage, UE registers directly with SNPN and resumes service continuity. We think in this direction it is **possible** to achieve a service break lower than 1s. |
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## KI#2-Q2: Network trigger for UE to register to N3IWF

TR conclusion in clause 8.2 includes an EN as:

Editor's note: Whether the network trigger the UE register to the target network via N3IWF before it lose the radio coverage is FFS.

To shorten the time spent during the mobility procedure, it has been proposed to let network to indicate the UE to register to the target network via N3IWF, assuming the service subject to the mobility is accessible from DN of both source and target network.

**Question**: Should the standard support a network trigger for the UE to register to the target network via N3IWF before UE lose radio coverage?

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| **Company name** | **Answer****(Y/N)** | **Should the WID be updated with a resolution of the issue?****(Y/N/)** | **Comments (optionally more details e.g. reasoning and what needs to be updated, if any)** |
| Intel | N | N | We think that the trigger for initiating registration with an N3IWF should be determined by the UE itself e.g. based on deterioration of radio link quality. |
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## KI#2-Q3: Latency to resume a service provided by the overlay network

TR conclusion in clause 8.2 includes an EN as follows in relation to statement about improving the latency to resume a service provided by the overlay network:

Editor's note: Further details of the indication and the conditions for the 5GC sending the indication to NG-RAN is FFS, and whether existing QoS flow information can be used to derive whether it is preferred to release a UE to RRC-Inactive is FFS.

In order to address the paging aspect of the key issue, it has been proposed to keep UE stay in CM-CONNECTED in both underlay network and overlay network. The method to keep UE in CM-CONNECTED state in overlay network is agreed to use existing Rel-16 mechanisms. The method to keep UE in CM-CONNECTED state in underlay network is proposed to always release a UE to RRC-Inactive in the underlay network, if the UE has a connection to an overlay network via the user plane of the underlay network. But it is FFS regarding if it is necessary to keep UE in CM-CONNECTED state in underlay network for addressing the paging aspect of the key issue.

Further details of the indication and the conditions for the 5GC sending the indication to NG-RAN to decide whether it is preferred to release a UE to RRC-Inactive is FFS, and whether existing QoS flow information can be used to derive whether it is preferred to release a UE to RRC-Inactive is FFS.

**Question**: Is there a need to support additional mechanisms to improve the latency to resume a service provided by the overlay network?

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| **Company name** | **Answer****(Y/N)** | **Should the WID be updated with a resolution of the issue?****(Y/N/)** | **Comments (optionally more details e.g. reasoning and what needs to be updated, if any)** |
| Intel | N | N | We think that the use of keepalive packets in the overlay networks (e.g. for NAT traversal) will also keep the underlying network in CM-CONNECTED state. |
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## KI#2-Q4: New QoS notification information between NPN and PLMN

TR conclusion in clause 8.2 includes an EN as:

Editor's note: It is FFS if any new information is needed or not for the QoS notification between NPN and PLMN

Overlay network can act as an AF to subscribe "QoS Sustainability Analytics" provided by the NWDAF of the underlay network via NEF. So the overlay network is able to be notified if there is QoS degradation in the underlay network and take actions accordingly. The opposite way is also possible that the underlay network to subscriber "QoS Sustainability Analytics" from the overlay network.

**Question**: Is there a need to standardize new QoS notification information to enable VIAPA services between SNPN and PLMN?

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| **Company name** | **Answer****(Y/N)** | **Should the WID be updated with a resolution of the issue?****(Y/N/)** | **Comments (optionally more details e.g. reasoning and what needs to be updated, if any)** |
| Intel | N | N | We don’t see the need for standardizing a new QoS notification. |
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## KI#3-Q1: Support for IMS deployment scenarios – with IMS in Separate Entity

KI#1 architecture supports UEs accessing an SNPN by using credentials from a Separate Entity. IMS deployment scenarios when KI#1 architecture with credentials from a Separate Entity is supported by an SNPN needs to be understood, e.g. whether the Separate Entity can also support IMS.

**Question**: Should a deployment with an SNPN supporting KI#1 functionality and the Separate Entity providing also IMS be supported?

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| **Company name** | **Answer****(Y/N)** | **Should the WID be updated with a resolution of the issue?****(Y/N/)** | **Comments (optionally more details e.g. reasoning and what needs to be updated, if any)** |
| Intel | Y | Y | We think this should be supported. This is also linked to the services supported in the Separate Entity (via UPF in Separate Entity), the Separate Entity being SNPN as discussed in KI#1-Q2. |
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## KI#3-Q2: Support for IMS deployment scenarios – separate IMS and access provider

SA1 answered in the LS in S2-2009531 the following to an SA2 question:

***For the question*** *if “The SNPN can have an SLA agreement with a third party (different Administrative Domain) IMS provider to provide IMS services”?*

***Answer:*** *Although there is no explicit SA1 requirement,* [*3GPP TS 22.228*](https://www.3gpp.org/DynaReport/22228.htm) *Annex B gives various examples how an IMS provider can have a relationship with Access Network Operator.*

The TS 22.228 Annex B states:

"*The IMS shall support at least the following operator's domain relationships:*

*…*

*a.2) Access network and the IMS it connects to, belong to different operators having an interconnection as shown in figure B.2.*

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**Question**: Should the IMS deployment scenario as described in TS 22.228 Annex B a.2 be described in TS 23.228?

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| **Company name** | **Answer****(Y/N)** | **Should the WID be updated with a resolution of the issue?****(Y/N/)** | **Comments (optionally more details e.g. reasoning and what needs to be updated, if any)** |
| Intel | Y | Y | Given this deployment scenario for non-roaming case is supported for PLMN, we support extending this scenario for SNPN in order to support additional flexible deployment options. |
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## KI#4-Q1: CP provisioning

TR conclusion in clause 8.4.1 includes an EN as:

Editor's note: SA WG3 feedback will need to be taken into account for including of the CP based provisioning.

KI#4 conclusions for " **Remote provisioning for SNPN credentials (Component 2 of KI#4)**" includes support for remote provisioning via CP as well as UP. However, there is an Editor's note stating "SA WG3 feedback will need to be taken into account for including of the CP based provisioning".

**Question**: Should CP provisioning be supported for SNPN?

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| **Company name** | **Answer****(Y/N)** | **Should the WID be updated with a resolution of the issue?****(Y/N/)** | **Comments (optionally more details e.g. reasoning and what needs to be updated, if any)** |
| Intel | Y | N | Preference for Rel-17 is to focus and support only UP provisioning. In addition, with a single provisioning mechanism there will be no need for selection (KI#4-Q2) between UP or CP (when both are supported) which avoids additional complexity. |
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## KI#4-Q2: Selection of CP or UP

TR conclusion in clause 8.4.1 includes an EN as:

Editor's Note: How the network instructs the UE whether to use control plane or user plane provisioning is for FFS.

The logic of selecting either CP or UP provisioning for a specific UE, when both mechanisms are supported by the standard has not been concluded.

**Question**: If the standard support both CP and UP, how is a method selected?

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| **Company name** | **Answer****Not applicable** | **Should the WID be updated with a resolution of the issue?****(Y/N/)** | **Comments (optionally more details e.g. reasoning and what needs to be updated, if any)** |
| Intel  | Not applicable | N | As already indicated in comments for KI#4-Q1, our preference for Rel-17 is to focus and support only UP provisioning and hence do not see the need for selection. |
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# 3. Summary

## 3.1 KI#1

## 3.2 KI#2

## 3.3 KI#3

## 3.4 KI#4

# 4. Proposed Way Forward