**SA WG2 Meeting #S2-153E S2-2208774r22**

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**Source: Ericsson, LG Electronics**

**Title: KI #4: Conclusion of Key Issue #4**

**Document for: Agreement**

**Agenda Item: 9.4**

**Work Item / Release: FS\_eNPN\_Ph2 / Rel-18**

*Abstract of the contribution: This paper proposes a conclusion for Key Issue #4.*

# Discussion

This paper based on the current evaluation for Key Issue#4 proposes conclusion to support UE discover/select/access hosting network.

**The revision r01 provides a merge of S2-2208291, S2-2208293, S2-2208294, S2-2208297, S2-2208317, S2-2208444, S2-2208774, S2-2208973, S2-2209005, S2-2209167, S2-2209175.**

# Proposal

Add the following conclusion to TR 23.700-08.

\*\*\* BEGIN CHANGES \*\*\*

## 8.4 Key Issue #4: Enabling UE to discover, select and access NPN as hosting network and receive localized services

Editor's note: The following are interim conclusions for KI#4, and to be taken as basis for further work i.e. also what has been agreed as to be included as a conclusion is candidate for being changed.

### 8.4.1 General

The conclusion for KI #4 is made for each component that is evaluated in clause 7.4.

When UE accesses the Hosting network using the subscription/credentials of its Home network, only two cases are considered:

- If Home network is PLMN, the Hosting network can be PNI-NPN or SNPN.

- If Home network is SNPN, the Hosting network can be only SNPN

If the UE accesses the Hosting network using the other credentials rather than the subscription/credentials from the UE Home network, the determination of the subscription used to access the Hosting network is by implementation specific prior to automatic network selection as described in NOTE 1 of clause 5.30.2.4.2 of TS 23.501 [3].

### 8.4.2 Conclusion for the content of the localized service information

The following interim conclusions are reached. Final conclusions for normative work are expected for SA2#154 i.e. whether to proceed with Alt.1 and/or Alt.2.

Alt.1. The localized service information is provided to UE for UE to discover and select hosting network to receive desired localized service. The content of the localized service information can include the following elements:

a. Identifier/name of the localized service.

b. Validity conditions for the localized service, e.g. duration of remaining service operation ,time and location.

Editor’s note 2-1 a: It is FFS whether a PVS address / captive portal information need to be provided as an optional information to the UE. In the Localized service information. If not How will UE be provided this address is FFS.

d. Hosting network related information, per hosting network in case of SNPN as hosting network:

i. hosting network identifier, e.g. SNPN ID, GIN;

ii. Validity condition, e.g. time and/or location (optional)

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Editor's Note 2-1b: It is FFS whether Validity condition is to be possible to be set per localized service, hosting network or both.

e. Hosting network related information, per hosting network in case of PNI-NPN as hosting network:

i. PLMN ID of the PNI-NPN.

ii. Optionally, if hosting network is associated with CAG IDs, a list of CAG IDs corresponding to the localized service.

Editor's Note 2-2: It is FFS whether it is beneficial to provide CAG information within the localized service information, given that there is existing procedure to update UE with CAG information, and whether CAG ID is used to identify hosting network. It is also FFS whether CAG IDs needs to be associated with localized service when sent to the UE.

Editor's note 2-3: It is FFS whether more hosting network related information can be sent as to better enable a user selection of hosting network, e.g. balance/service rate information to access the hosting network for the localized service, quality of the service.

Alt.2. The UE is provided with:

a. a list of prioritized hosting networks (i.e. SNPN ID or GIN) for localized services, in case of SNPN as hosting network.

b. allowed CAG ID list, in case of PNI-NPN as hosting network and the PNI-NPN is associated with CAG ID.

NOTE: The home network / hosting network map localized services to hosting network ID (e.g. SNPN ID, GIN, CAG ID).

Editor's Note 2-4: It is FFS whether the UE receives list a/list b per localized service ID, or the lists are used for localized services in general.

Editor's Note 2-5: It is FFS whether necessary to associate validity conditions with the list in a and ba above, and what are the conditions, e.g. time and/or location.

Editor's Note 2-6: It is FFS what localized service information needs to be provided to UE in b above, in case PNI-NPN as hosting network does not support CAG.

Editor's Note 2-7: Alt.1 provides UE with necessary information as a first step, and then the UE based on the received information derives how to perform other activities in later steps, e.g. network selection, credential determination and provisioning, etc. Alt.2 provides UE with information directly used for network selection, but requires that UE/network knows beforehand whether the desired localized service is provided by the hosting networks in the lists.

### 8.4.3 Conclusion for from where and how UE obtains the localized service information

The following interim conclusions are reached. Final conclusions for normative work are expected for SA2#154 i.e. whether to proceed with Alt.1 and/or Alt.2.

Alt.1 (complementary to Alt.1 in clause 8.4.2):

1. The localized service information is formulated as application data that can be stored in the home network or hosting network.

2. The external parameter provisioning procedure in TS 23.502 [4] clause 4.15.6 is extended to support the provisioning of localized service information to home or hosting network, or the OAM method is used to provision the data to home network.

3. The localized service information can be preconfigured in the UE or dynamically provisioned via signaling. For dynamic provisioning, the UE requests the desired application data (e.g. by specifying the identifier or name of the localized service) from either home network, hosting network or serving network via new UE policy.

NOTE: How UE obtains localized service identifier or name to make the request for dynamic provisioning is out of 3GPP scope.

Editor’s note 3-1: it’s FFS the benefit of UE requesting desired localized service information.

5. If PNI-NPN as hosting network is associated with CAG ID, separated from other localized service information, the UE obtains the Allowed CAG ID list from the home network as per clause 5.30.3.3 TS 23.501[3].

a. The home network may send the updated Allowed CAG ID list to the UE

Editor's note 3-2b: It is FFS how UE can associate the Allowed CAG IDs to the localized service if sent without any association to the localized service.

Editor's note 3-2c: The trigger for the home network to send the updated Allowed CAG ID list to the UE is FFS.

Alt.2 (complementary to Alt.2 in clause 8.4.2):

6. The information for localized service and hosting network discovery, selection and access can be preconfigured in the UE or dynamically provisioned by the hosting network or home network (via the VPLMN when roaming).

7b. In case of SNPN as hosting network, the dynamic provisioning of prioritized list of hosting network information can be done via SoR.

NOTE: How SOR-AF and/or UDM acquires hosting network information is outside the scope for 3GPP.

ii. The home network UDM may determine to update UE with prioritized list of hosting network information using SoR procedure. Following triggers may apply:

- UE location as part of Registration procedure.

- UE subscription data change, e.g., via external parameter provisioning.

7d. (Complementary to Alt.1 in clause 8.4.2 also) In case of SNPN as hosting network, Tthe hosting network may broadcast the supported localized service information (e.g. service identifiers and/or human readable service information, such as name, cost, service description) to help UEs discover the service and the hosting network. The localized service identifier may be pre-configured in the UE as per clause 8.4.2. The human readable service information is used for manual hosting network selection. UE may acquire this information from hosting network also via on-demand SIB while UE is RRC\_IDLE or RRC\_INACTIVE state in serving network.

Editor Note: FFS with SA3 on if 7d is feasible from security aspect.

NOTE: Given the potential large content of SIB information for manual selection, on demand SIB solution as already defined in TS 38.331 can be used. Details of this option are to be determined by RAN2.

7e. When UE has accessed with the hosting network, UE may query for further information on the localized service information hosted by this hosting network during the initial registration, AMF can provide the latest localized service information to UE as part of Registration procedure (Mobility Update) or UE Configuration Update procedure.

8. In case of PNI-NPN as hosting network, the dynamic provisioning of allowed CAG ID list reuses existing procedure in clause 5.30.3.3 TS 23.501 [3].

### 8.4.4 Conclusion for how the localized service information is used by UE

The following principles based on the evaluation in clause 7.4.4 are recommended for the normative work:

1. If UE uses home network credential to access a hosting network:

a. When the end user intends to access localized service and the validity conditions of localized service are met, the UE initiates hosting network selection using the hosting network related information received as part of the localized service information as in principle 1 in clause 8.4.2, or using the lists as in principle 2 in clause 8.4.2.

i. For SNPN as hosting network, he UE can switch between PLMN selection and hosting network selection following Rel-17 specification for SNPN selection. How the UE switches among the network selections is up to UE implementation.

ii. For PNI-NPN as hosting network associated with CAG ID, the UE only considers an entry in the Allowed CAG list valid if and while all conditions (if there is any) for that entry are met. This may potentially initiate a new registration procedure to a PLMN.

NOTE: Whether a new network selection mode is required for UE to initiate hosting network selection is to be determined by WG CT1.

NOTE: Details regarding priority list for hosting network selection, including if a new selection mode is required, is up to WG CT1 to decide.

b. Hosting network selection needs to be authorized by the home network, via UE initiated SoR procedure with SoR information including certain authorized criteria e.g. time. After the home network authorization, the UE is allowed to initiate hosting network selection, applicable for both automatic and manual hosting network selection.

ii. For manual hosting network selection, the UE presents available localized service information it has received in clause 8.4.3 to the end user.

Editor's Note 4-1: It is FFS whether the home network authorization is needed before the UE performs manual selection of a hosting network.

c. When authorized criteria of the hosting network selection are no longer met, the UE stops hosting network selection.

2. If the UE needs to obtain a new set of credentials/subscription to access the hosting network:

a. It is up to UE implementation to decide how to switch to the new subscription profile for accessing hosting network.

3. The UE determines SNPN access mode is activated/de-activated using implementation specific means as specified in existing Release 17, or using received localized service/hosting network assistance information as input.

### 8.4.5 Conclusion for what credentials are used to access hosting network and how to obtain them

The following principles based on the evaluation in clause 7.4.X are recommended for the normative work in case of SNPN as hosting network:

1. The UE checks whether it is possible to use home network credentials to access the hosting network:

a. If the hosting network related information indicates support of CH credentials, the UE determines that home network credential can be used if the SNPN ID of the hosting network is included in the SNPN priority lists associated with home network subscription.

b. If the UE obtains hosting network selection information from the home network, the UE uses the credentials provided by the home network to access the hosting network.

2. If new credentials for accessing hosting network are needed, the UE may use the existing credential onboarding mechanism as per Rel-17.

Editor's note 5-1: It is FFS whether an extension of the Rel-17 onboarding mechanism is needed to support provisioning of credentials to use for localized services. Onboarding configuration information (which Includes PVS address(es) stored in UPF/AMF/PCF may need to be stored corresponding to different Localized services.

NOTE: The method of delivering credentials needs to be evaluated by SA3.

The following principles based on the evaluation in clause 7.4.X are recommended for the normative work in case of PNI-NPN as hosting network:

3. Only UEs equipped with a USIM configured with PLMN credentials can access a hosting network which is a PNI-NPN. When the UE requests to access the hosting network, the home PLMN credential(s) are used during authentication procedure.

### 8.4.6 Conclusion for how localized service is accessed in hosting network per agreed conditions

The following principles based on the evaluation in clause 7.4.Y are recommended for the normative work:

1. Validity conditions provided to the UE as part of the localized service information can be used to restrict the UE's access of the hosting network.

2. Existing methods, such as network slicing, forbidden area restriction, service area restriction, CAG, LADN, URSP rules can also be utilized to restrict UE's access, i.e. no need for additional normative work for access control in hosting network.

3. In order to restrict access to a hosting network to a specific area, a hosting network operator may deploy and broadcast multiple hosting network IDs, i.e. SNPN IDs for SNPN case and CAG IDs in case of PNI-NPN, in different areas depending on localized service area validity. Each localized service is mapped to a specific hosting network ID. Multiple localized service areas can be mapped to the same hosting network ID if their allowed service areas are the same. Validity conditions are also used by hosting network to restrict access.

\*\*\* END CHANGES \*\*\*