3GPP TSG CT WG1 Meeting #141e C1-232105

Online, 17-21 April 2023 (revision of C1-230748)

**Source: China Mobile, China Southern Power Grid**

**Title: New WID on network selection of an underlay network to access an overlay network**

**Document for: Approval**

**Agenda Item: 18.1.1**

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: New WID on network selection of an underlay network to access an overlay network

Acronym: NetSel\_UO

Unique identifier:

Potential target Release: Rel-18

# 1 Impacts

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Affects: | UICC apps | ME | AN | CN | Others (specify) |
| Yes |  | X |  |  |  |
| No |  |  | X |  | 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 …

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

\* Other = e.g. testing

## 2.2 Parent Work Item

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

### 2.3 Other related Work Items and dependencies

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

# 3 Justification

The following requirement has been defined in Rel-16 TS 22.261 by SA1 for non-public networks:

*Subject to an agreement between the operators and service providers, operator policies and the regional or national regulatory requirements, the 5G system shall support for non-public network subscribers:*

*- access to subscribed PLMN services via the non-public network;*

*- seamless service continuity for subscribed PLMN services between a non-public network and a PLMN;*

*- access to selected non-public network services via a PLMN;*

*- seamless service continuity for non-public network services between a non-public network and a PLMN.*

To support this stage 1 requirement, SA2 specified underlay/overlay NPN deployment options in TS 23.501. An underlay network can be an SNPN or a PLMN. In Rel-16/Rel-17, when the subscribed SNPN is an overlay network, a PLMN is an underlay network; when the HPLMN is an overlay network, a SNPN is an underlay network.

Since SNPN is for non-public use, the service access and association between SNPNs and PLMNs are different from those between PLMNs for public users. The following scenarios or requirements need to be considered when the UE selects an underlay network for an overlay network in specific deployment environments.

1) Some SNPNs as an overlay network provide selected services allowing accessing via a preferred PLMN.

2) Some SNPNs as an overlay network require specific QoS requirement fulfilled by PLMNs as an underlay network.

3) Some SNPNs and PLMNs as an underlay network require an agreement and SLA to support accessing an overlay network.

In addition, the SLA between an underlay network and an overlay network has already been considered in Rel-17 TS 23.501.

Meeting the above requirements corresponding to the specific deployments, SNPN and PLMN selection procedures in current TS23.122 has limitations and insufficiency thus require enhancements.(Issue#1)

* On the SLA aspect and for the scenario access to SNPN services via PLMN, when PDU session via which the UE accesses the SNPN services is home routed, the SLA enforcement is among the UPF in the VPLMN, UPF in the HPLMN and N3IWF in a subscribed SNPN. When PDU session via which the UE accesses the SNPN services uses LBO, the SLA enforcement is between UPF in the VPLMN and N3IWF in the subscribed SNPN. The current PLMN selection parameter is just to meet the SLA/agreement between PLMNs for roaming services and does not consider an agreement/SLA between the subscribed SNPNs and VPLMNs.
* On the SLA aspect and for the scenario access to PLMN services via SNPN, the SLA enforcement is between UPF in the SNPN and N3IWF in the HPLMN. In Rel-16, SNPNs as underlay networks are subscribed SNPN. In Rel-17, non-subscribed SNPN is introduced. Without an enhancement, an SNPN UE selecting a non-subscribed SNPN could not access a PLMN.

Except for SLA/agreement requirement, there are other issues need to be considered:

TS 23.501 specified the following, so in the scenario “Access to SNPN services via PLMN”, the UE accesses a PLMN 5GC via NG-RAN. Not all the access technologies in the current PLMN selection procedure apply to selecting a PLMN as an underlay network. (Issue#2)

*To access SNPN services, a UE that has successfully registered with a PLMN over 3GPP access may perform another registration via the PLMN User Plane with an SNPN (using the credentials of that SNPN) following the same architectural principles as specified in clause 4.2.8 (including the optional support for PDU Session continuity between PLMN and SNPN using the Handover of a PDU Session procedures in clauses 4.9.2.1 and 4.9.2.2 of TS 23.502 [3]) and the PLMN taking the role of "Untrusted non-3GPP access" of the SNPN, i.e. using the procedures for Untrusted non-3GPP access in clause 4.12.2 of TS 23.502 [3]. Annex D, clause D.3 provides additional details.*

*In order to obtain access to Non-Public Network services when the UE is camping in NG-RAN of a PLMN, the UE obtains IP connectivity, discovers and establishes connectivity to an N3IWF in the Stand-alone Non-Public Network.*

TS 23.501 specified that an SNPN-enable UE could have multiple SNPN subscriptions. It could access to any of its subscribed SNPN, when an agreement/SLA is required, how the PLMN selection assures the access to multiple SNPNs needs to be considered. (Issue#3)

Therefore, it is suggested to enhance the current SNPN/PLMN selection procedures to support underlay/overlay network access in the specific deployment that SLA/agreement required, fulfill Rel-16/17 SA2 requirement of underlay/overlay network access.

# 4 Objective

The work item is proposed to enhance the current SNPN/PLMN selection procedures to support selecting an underlay network in the specific deployment that SLA/agreement required (issue#1), and cover the requirement/case in issues#2#3.

The following areas of work are expected to be covered (non-exhaustive):

**CT1**

1. Enhancement of PLMN selection:
	1. To support selecting a PLMN as an underlay network in the specific deployment that SLA/agreement required.
	2. To consider specific RATs in selecting a PLMN as an underlay network.
	3. To consider the case an SNPN UE has multiple SNPN subscriptions.
2. Enhancement of SNPN selection:
	1. To support selecting a SNPN as an underlay network in the specific deployment that SLA/agreement required.

# 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 |
| 23.122 | Enhance the current SNPN/PLMN selection procedures to support selecting an underlay network in the specific deployment that SLA/agreement required, and consider specific RATs, multiple SNPN subscriptions. | TSG CT #102 (December 2023) |  |

# 6 Work item Rapporteur(s)

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# 7 Work item leadership

CT1

# 8 Aspects that involve other WGs

# 9 Supporting Individual Members

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| Supporting IM name |
| China Mobile |
| China Southern Power Grid |
| vivo |
| ZTE |
| China Unicom |
| Huawei |
| Hisilicon |
| Xiaomi |
| CATT |
| OPPO |