**SA WG2 Meeting #143eS2-210xxxx**

**Feb 24th – March 9th, 2021 ; Elbonia (revision of S2-210)**

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| *CR-Form-v12.1* | | | | | | | | |
| **CHANGE REQUEST** | | | | | | | | |
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|  | **23.501** | **CR** | **xx** | **rev** | **-** | **Current version:** | **16.7.0** |  |
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| *For* [***HE******LP***](http://www.3gpp.org/3G_Specs/CRs.htm#_blank)*on using this form: comprehensive instructions can be found at* [*http://www.3gpp.org/Change-Requests*](http://www.3gpp.org/Change-Requests)*.* | | | | | | | | |
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| ***Proposed change affects:*** | UICC apps |  | ME |  | Radio Access Network | **x** | Core Network | **X** |

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| ***Title:*** | SNPN with separate entity hosting subscription | | | | | | | | | |
|  |  | | | | | | | | | |
| ***Source to WG:*** | Nokia, Nokia Shanghai Bell | | | | | | | | | |
| ***Source to TSG:*** | S2 | | | | | | | | | |
|  |  | | | | | | | | | |
| ***Work item code:*** | eNPN | | | | |  | ***Date:*** | | | 2021-01-18 |
|  |  | | | |  | |  | | |  |
| ***Category:*** | **B** |  | | | | | ***Release:*** | | | Rel-17 |
|  | *Use one of the following categories:* ***F*** *(correction)* ***A*** *(mirror corresponding to a change in an earlier release)* ***B*** *(addition of feature),* ***C*** *(functional modification of feature)* ***D*** *(editorial modification)*  Detailed explanations of the above categories can be found in 3GPP [TR 21.900](http://www.3gpp.org/ftp/Specs/html-info/21900.htm). | | | | | | | | *Use one of the following releases: Rel-8 (Release 8) Rel-9 (Release 9) Rel-10 (Release 10) Rel-11 (Release 11) … Rel-15 (Release 15) Rel-16 (Release 16) Rel-17 (Release 17) Rel-18 (Release 18)* | |
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| ***Reason for change:*** | | TR 23.700-07 conclusion for the following item needs to be implemented in TS 23.501:  KI#2 T2:  To support service continuity for VIAPA:  Informative guideline for mapping 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 | | | | | | | | |
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| ***Summary of change:*** | | Implement the above conclusion as follows:   1. Provide guidance for mapping between standardized 5QI characteristics and DSCP values. 2. It is sufficient to provide the mapping for the services (voice, IMS signalling, video, best effort non-GBR services) that would be commonly using underlay-overlay network architecture. | | | | | | | | |
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| ***Consequences if not approved:*** | | eNPN conclution not implemented | | | | | | | | |
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| ***Clauses affected:*** | | Annex D.5 (new) | | | | | | | | |
|  | |  | | | | | | | | |
|  | | **Y** | **N** |  | | | |  | | |
| ***Other specs*** | |  | **x** | Other core specifications | | | | TS/TR ... CR ... | | |
| ***affected:*** | |  | **x** | Test specifications | | | | TS/TR ... CR ... | | |
| ***(show related CRs)*** | |  | **x** | O&M Specifications | | | | TS/TR ... CR ... | | |
|  | |  | | | | | | | | |
| ***Other comments:*** | |  | | | | | | | | |
|  | |  | | | | | | | | |
| ***This CR's revision history:*** | |  | | | | | | | | |

Annex D (informative):  
5GS support for Non-Public Network deployment options

# D.1 Introduction

This annex provides guidance on how 5GS features and capabilities can be used to support various Non-Public Network deployment options.

# D.2 Support of Non-Public Network as a network slice of a PLMN

The PLMN operator can provide access to an NPN by using network slicing mechanisms. The following are some considerations in such a PNI-NPN case:

1. The UE has subscription and credentials for the PLMN;

2. The PLMN and NPN service provider have an agreement of where the NPN Network Slice is to be deployed (i.e. in which TAs of the PLMN and optionally including support for roaming PLMNs);

3. The PLMN subscription includes support for Subscribed S-NSSAI to be used for the NPN (see clause 5.15.3);

4. The PLMN operator can offer possibilities for the NPN service provider to manage the NPN Network Slice according to TS 28.533 [79].

5. When the UE registers the first time to the PLMN, the PLMN can configure the UE with URSP including NSSP associating Applications to the NPN S-NSSAI (if the UE also is able to access other PLMN services);

6. The PLMN can configure the UE with Configured NSSAI for the Serving PLMN (see clause 5.15.4);

7. The PLMN and NPN can perform a Network Slice specific authentication and authorization using additional NPN credentials;

8. The UE follows the logic as defined for Network Slicing, see clause 5.15;

9. The network selection logic, access control etc are following the principles for PLMN selection; and

10. The PLMN may indicate to the UE that the NPN S-NSSAI is rejected for the RA when the UE moves out of the coverage of the NPN Network Slice. However, limiting the availability of the NPN S-NSSAI would imply that the NPN is not available outside of the area agreed for the NPN S-NSSAI, e.g. resulting in the NPN PDU Sessions being terminated when the UE moves out of the coverage of the NPN Network Slice. Similarly access to NPN DNNs would not be available via non-NPN cells.

11. In order to prevent access to NPNs for authorized UE(s) in the case of network congestion/overload and if a dedicated S-NSSAI has been allocated for an NPN, the Unified Access Control can be used using the operator-defined access categories with access category criteria type (as defined in TS 24.501 [47]) set to the S-NSSAI used for an NPN.

12. If NPN isolation is desired, it is assumed that a dedicated S-NSSAI is configured for the NPN and that the UE is configured to operate in Access Stratum Connection Establishment NSSAI Inclusion Mode a, b or c, see clause 5.15.9, such that NG-RAN receives Requested NSSAI from the UE and it can use the S-NSSAI for AMF selection.

# D.3 Support for access to PLMN services via Stand-alone Non-Public Network and access to Stand-alone Non Public Network services via PLMN



Figure D.3-1: Access to PLMN services via Stand-alone Non-Public Network

NOTE 1: The reference architecture in Figure D.3-1 and Figure D.3-2 only shows the network functions directly connected to the UPF or N3IWF and other parts of the architecture are same as defined in clause 4.2.

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

In the Figure D.3-1, the N1 (for NPN) represents the reference point between UE and the AMF in Stand-alone Non-Public Network. The Nwu (for PLMN) represents the reference point between the UE and the N3IWF in the PLMN for establishing secure tunnel between UE and the N3IWF over the Stand-alone Non-Public Network. N1 (for PLMN) represents the reference point between UE and the AMF in PLMN.



Figure D.3-2: Access to Stand-alone Non-Public Network services via PLMN

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.

In Figure D.3-2, the N1 (for NPN) represents the reference point between UE and the AMF in the Stand-alone Non-Public Network. The NWu (for NPN) represents the reference point between the UE and the N3IWF in the stand-alone Non-Public Network for establishing a secure tunnel between UE and the N3IWF over the PLMN. The N1 (for PLMN) represents the reference point between UE and the AMF in PLMN.

# D.4 Support for UE capable of simultaneously connecting to an SNPN and a PLMN

When a UE capable of simultaneously connecting to an SNPN and a PLMN is not set to operate in SNPN access mode, the UE only performs PLMN selection procedures as defined in clause 4.4 of TS 23.122 [17] using the Uu interface for connection to the PLMN.

A UE supporting simultaneous connectivity to an SNPN and a PLMN applies the network selection as applicable for the access and network for SNPN and PLMN respectively. Whether the UE uses SNPN or PLMN for its services is implementation dependent.

A UE supporting simultaneous connectivity to an SNPN and a PLMN applies the cell (re-)selection as applicable for the access and network for SNPN and PLMN respectively. Whether the UE uses SNPN or PLMN for its services is implementation dependent.

# D.5 Guidance for mapping between 5QI and DSCP values

In order to ensure consistent QoS support between underlay and overlay network when the UE is accessing SNPN services via PLMN and versa, following mapping between Standardized 5QI characteristics and DSCP values (used for marking in the transport network) is recommended.

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| --- | --- | --- |
| DSCP value | 5QI | Description |
| 0 | 6, 7, 8, 9 | Non-GBR Best Effort services |
| 40 | 5 | IMS/SIP signaling |
| 46 | 1, 2, 82 – 86 | Delay critical GBR services |
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