3GPP TSG SA WG5 Meeting 137-e S5-213082rev1

electronic meeting, online, 10 - 19 May 2021

**Source: Huawei**

**Title: Requirements of management capability exposure for different management modes of NPN**

**Document for: Approval**

**Agenda Item: 6.4.1**

# 1 Decision/action requested

***Discuss and approve on the proposal.***

# 2 References

[1] TS 28.557 Management of non-public networks; Stage 1 and stage 2 v0.4.1

# 3 Rationale

According to the clause 4.3.1 in draft TR 28.557 [1], an NPN is managed by mobile network operator and a vertical who gets some management capabilities exposed from the mobile network operator. However, in order to avoid mis-operation or conflict, the mobile network operator shall restrict the scope of the exposed management capability (i.e. MnS component in TS 28.533) to NPN-SC, including the type of management capabilities and corresponding network resource.

Therefore, it is proposed to specify the different requirements of management capability exposure in different O&M modes in draft TS 28.557 [1].

# 4 Detailed proposal

This document proposes the following changes in TS 28.557 [1].

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| **1st Change** |

## NPN management aspects

### 4.3.1 Specific management aspects

Vertical industries have a very wide range of use cases with very diverse requirements comparing with management of traditional PLMN. Management of NPN has the following specific aspects:

* Assurance for diversified SLA requirements: The diversified SLA requirements from different kinds of vertical industries need to be guaranteed, e.g. manufacturing industry and medical care need ultra-reliable low-latency wireless connectivity and indoor, outdoor or hybrid coverage NPN deployments. Other than performance requirements (e.g. ultra-low latency, ultra-high reliability), functional and operational requirements should also be guaranteed in SLA, e.g. high-precision positioning, real-time monitoring, etc.
* Support of different O&M models: an O&M model allows specifying who is responsible for managing what part of the network. The various NPN scenarios, with a number of vertical use cases and a plenty of deployment variants, in some cases may lead to the definition of different O&M models. For example, many small and medium-sized enterprises (SME) do not have sufficient technical expertise for their NPNs' deployment and operation. Therefore, cooperation with PLMN Operators to obtain O&M of NPNs from PLMN Operators might be the most cost-effective way for such customers. On the other hand, large enterprises like electric utility companies might want to have their own O&M for their NPNs to fulfil specific requirements.
* Management capability exposure: this expresses the ability of an NPN-SP to expose some management capabilities, such as performance and KPIs monitoring and provisioning management capabilities, to the corresponding NPN-SC. The NPN-SP makes the selected NPN management capabilities available through well-defined APIs to allow the NPN-SC to consume these capabilities, as well as extending them with their own operation and maintenance systems, if needed. NPN-SC may provide their business objectives by intents and policies management to NPN-SP and no need to focus on detailed configuration parameters of NPNs.

Different management modes of NPN are listed in table 4.3-1.

* - **Mode 1a**: A PNI-NPN is fully managed by a mobile network operator who also plays the role of PLMN Operator. In this case, no specific spectrum resources are required and service continuity (e.g. roaming) with PLMN is ensured by the mobile network operator who manages both PNI-NPN and PLMN.
* - **Mode 1b**: A PNI-NPN is managed by a mobile network operator who also plays the role of PLMN Operator and a vertical who gets some management capabilities exposed from the mobile network operator according to business agreement between the two parties. The mobile network operator shall restrict the types (e.g., provisioning, fault supervision, performance assurance) of management capabilities and corresponding managed network resource (e.g., NRM fragments) exposed to a vertical. In this case, the management tasks for the PNI-NPN are performed mainly by the mobile network operator and the vertical with some management capabilities, and no specific spectrum resources are required and service continuity (e.g. roaming) with PLMN is ensured by the mobile network operator who manages both PNI-NPN and PLMN.
* - **Mode 2a**: An SNPN is fully managed by a mobile network operator. In this case, specific spectrum resources (e.g. unlicensed spectrums) are required, and cooperation with PLMN Operator may be needed if there is requested NPN connectivity to external PLMN resources (e.g. to allow UEs registered into the SNPN to access public network services).
* - **Mode 2b**: An SNPN is managed by a mobile network operator and a vertical who gets some management capabilities exposed from the mobile network operator according to business agreement between the two parties. The mobile network operator shall restrict the types (e.g., provisioning, fault supervision, performance assurance) of management capabilities and corresponding managed network resource (e.g., NRM fragments) exposed to a vertical. In this case, specific spectrum resources (e.g. unlicensed spectrums) are required, and cooperation with PLMN Operator may be needed if there is requested NPN connectivity to external PLMN resources (e.g. to allow UEs registered into the SNPN to access public network services). The management tasks for the SNPN are performed mainly by the mobile network operator and the vertical with some management capabilities.
* - **Mode 2c**: An SNPN is fully managed by a vertical. In this case, specific spectrum resources (e.g. unlicensed spectrums) are required, and cooperation with PLMN Operator may be needed if there is requested NPN connectivity to external PLMN resources (e.g. to allow UEs registered into the SNPN to access public network services).

Table 4.3-1 Different management modes of NPN

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| Management mode | NPN type | Management of NPN | **NPN Operator** | **Use case** |
| **Mode 1a** | PNI-NPN | An NPN is fully managed by a mobile network operator who also manages PLMN. | Mobile network operator | 5.1.2 |
| **Mode 1b** | PNI-NPN | An NPN is managed by a mobile network operator who also manages PLMN and a vertical who gets some management capabilities exposed from the mobile network operator according to business agreement between the two parties. | Mobile network operator and vertical  (Note x) | 5.1.2 |
| **Mode 2a** | SNPN | An NPN is fully managed by a mobile network operator. | Mobile network operator | 5.1.1.1 |
| **Mode 2b** | SNPN | An NPN is managed by a mobile network operator and a vertical who gets some management capabilities exposed from the mobile network operator according to business agreement between the two parties. | Mobile network operator and vertical  (Note x) | 5.1.1.1 |
| **Mode 2c** | SNPN | An NPN is fully managed by a vertical. | Vertical | 5.1.1.1 |

Note x: The mobile network operator shall restrict the exposure of management capabilities and corresponding managed resources to vertical.

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| **2nd Change** |

### 5.2.1 Generic requirements for management of NPN

**REQ-NPN-FUN-01** The 3GPP management system shall have the capability to monitor the performance measurements and KPIs associated with an NPN.

**REQ-NPN-FUN-02** The 3GPP management system shall have the capability to provide the performance measurements and KPIs associated with an NPN to authorized NPN service provider or NPN service consumer.

**REQ-NPN-FUN-03** The 3GPP management system shall have the capability to receive SLA requirements from authorized NPN service consumer and then translating the SLA requirements into service and network resources related requirements.

**REQ-NPN-FUN-04** The 3GPP management system shall have the capability to evaluate SLS assurance related to an NPN.

**REQ-NPN-FUN-0x** The 3GPP management system shall have the capability to restrict the exposure of management capabilities and corresponding managed resources to vertical.

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| **End of change** |