3GPP TSG SA WG5 Meeting 137-e S5-213081rev1

electronic meeting, online, 10 - 19 May 2021

**Source: Huawei**

**Title: Modify 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

TR 28.557 [1] introduced the different management modes of NPN. As described in clause 4.3.1, an NPN is managed by a mobile network operator and a vertical in mode 1b and mode 2b, and a SNPN is fully managed by vertical in mode 2c.

To deal with the management of the network which is managed by the vertical, two common management sub-mode should be considered:

* A vertical customer, such as some large enterprises, may manage NPN with their own operation and maintenance systems.
* A vertical customer, such as some small and medium-sized enterprises, may utilize service provided by the third party O&M service provider to manage the network instead.

Therefore, it is necessary to clarify the management sub-mode of NPN in draft TS 28.557 [1].

In addition, some rewording to ease readability in some paragraphs are proposed.

# 4 Detailed proposal

This document proposes to modify management modes of NPN in TS 28.557 [1], as follows.

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| **1st Change** |

## 4.3 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**: **(applicable to PNI-NPN)**: The NPN operator role is entirely played by a mobile network operator, which also plays the Network Operator (NOP) role (see definition in TS 28.530 [2], clause 4.8) for PLMN. 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**: **(applicable to PNI-NPN)**: The NPN operator role is played by two parties: a mobile network operator, which also plays the NOP role for PLMN, and a vertical customer. The mobile network operator performs the main management tasks related to the PNI-NPN, while allowing the vertical to retain some control over this PNI-NPN. To that end, the vertical consumes the management capabilities exposed by the mobile network operator, being this exposure regulated according to the business agreement between the two parties. 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. The vertical can also outsource its PNI-NPN management tasks to other third party OAM service provider
* - **Mode 2a**: The NPN operator role is entirely played by a mobile network operator, which also plays the NOP role for PLMN. 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**: The NPN operator role is played by two parties: a mobile network operator, which also plays the NOP role for PLMN, and a vertical customer. The mobile network operator performs the main management tasks related to the SNPN, while allowing the vertical to retain some control over this SNPN. To that end, the vertical consumes the management capabilities exposed by the mobile network operator, being this exposure regulated according to the business agreement between the two parties. 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. The vertical can also outsource its SNPN management tasks to other third party OAM service provider.
* - **Mode 2c**: The NPN operator role is entirely played 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). The vertical can also outsource its SNPN management tasks to other third party OAM service provider

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 which also manages PLMN. | Mobile network operator | 5.1.2 |
| **Mode 1b** | PNI-NPN | An NPN is managed by a mobile network operator which 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 1) | 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 1) | 5.1.1.1 |
| **Mode 2c** | SNPN | An NPN is fully managed by a vertical. | Vertical(Note 1) | 5.1.1.1 |

 Note 1: The vertical can outsource its NPN management tasks to other third party OAM service provider to manage the NPN based on the management capabilities exposed from the mobile network operator.

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| **End of change** |