Deploying stand-alone Non-Public 5G Networks for media production

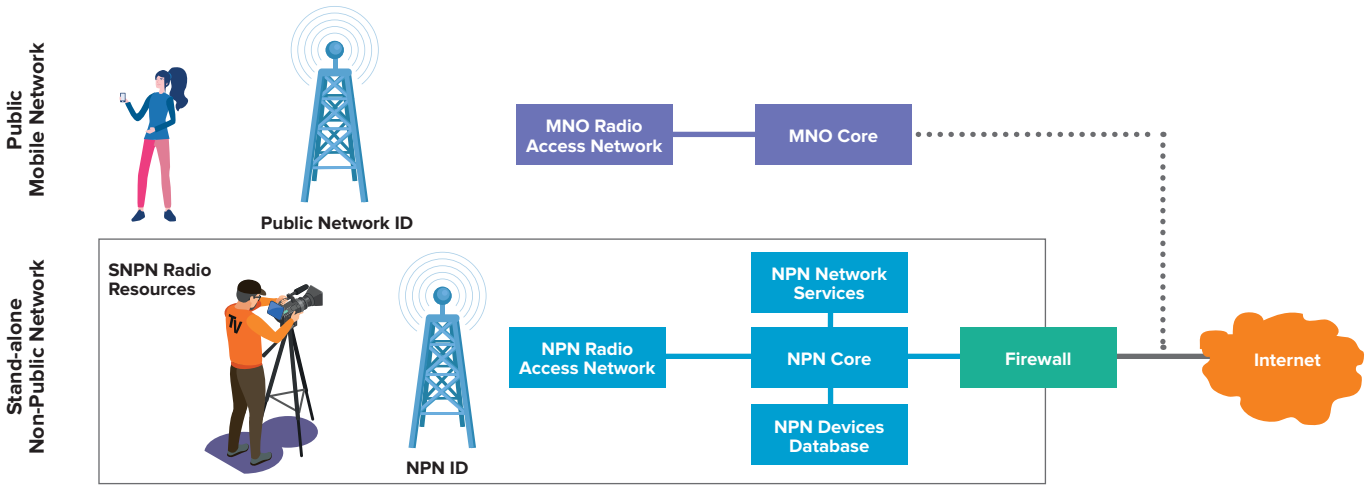
Non-Public Networks (NPNs) offer a variety of deployment configurations and options. Depending on the requirements of media organizations and the type of production or contribution scenario, stand-alone NPNs or NPNs with varying degrees of integration with public networks may be considered.

What is a stand-alone NPN?

A stand-alone Non-Public Network (SNPN) is an isolated network whose radio access network (RAN) and core network functions and services do not rely on a public mobile network. SNPNs may be deployed as fixed or nomadic networks, managed either by the entity making use of the NPN or a third party. They have full control and management capabilities for the network functions and services provided by the SNPN.

For media organizations, SNPNs can support specific media production and contribution requirements that may not be met by public mobile networks, which usually target general public usage.

The SNPN, based on 3GPP-defined technologies, has its own dedicated NPN ID and can host specific vertical industry devices (e.g. PSME equipment). All network functions are deployed inside the SNPN and isolated from public networks. This setup does not exclude the possibility of accessing public services through a firewall or establishing roaming agreements with public network operators if required.

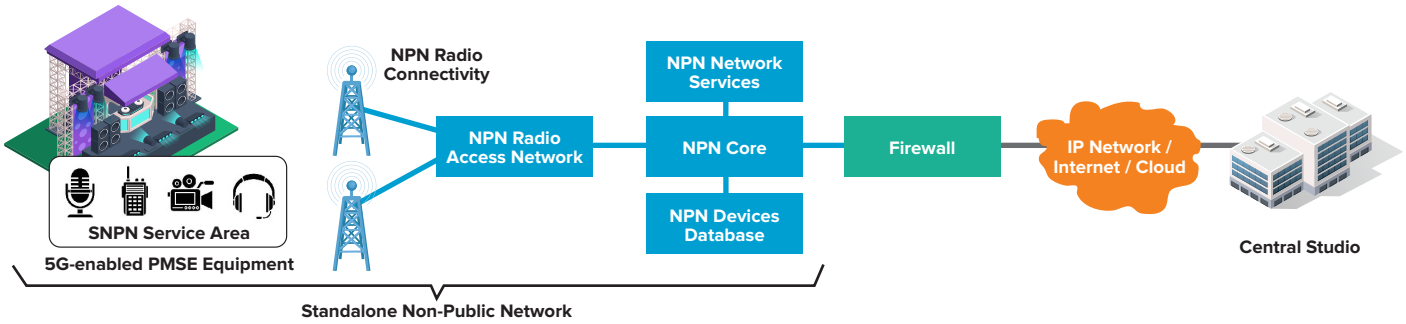


Main characteristics	
Quality of service	Full customization of key parameters for media production (e.g. low latency, high-throughput, uplink-downlink ratios, high reliability, real-time monitoring, etc.)
Isolation	Device subscription data, communication data flows, and operation and management data are internal to the SNPN
IT security and integrity	Guaranteed security and privacy for media-related data, accessible only under authorization
Operation and management	Self-operation and management is possible, with full autonomy
5G infrastructure	5G network infrastructure is provided by the party acting as SNPN operator
Cost	All costs, including infrastructure and terminals, are carried by the media organization
Coverage	Provided and defined by the SNPN
Liability	Responsibility lies with the media organization
Spectrum	Possibility to use dedicated spectrum outside of traditional mobile spectrum bands

Applications for the media industry

ON-SITE PRODUCTION AND VENUES

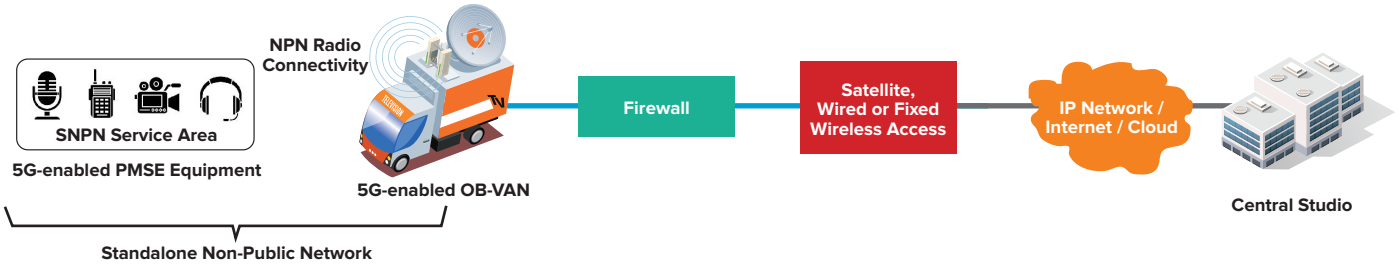
Live events usually take place in theatres, concert halls, stadiums or production studios, and can be outdoors or indoors. 5G wireless connectivity provided by an SNPN at the venue would allow wireless production equipment required to capture and produce an event to be connected on-site within a local network. Connectivity would be limited to the event area and under the full control of the media organization, with all audio and video processing done in real-time during operation.



Different wireless video and audio sources and devices, such as cameras, microphones, in-ear monitoring (IEM) systems, lighting, etc., can be automatically and quickly provisioned through the network and locally addressable. Content can be captured at the highest quality possible while ensuring its integrity and robustness. With high quality and extremely reliable radio links, tolerance of QoS (quality of service) impairments is very low. Audio/video streams are ingested or received into and out of the SNPN with 5G links that replace legacy OFDM technologies. It is also possible to provision computing capabilities on-site for processing, and internet access to enable, for example, remote control.

SPECIAL EVENTS COVERAGE

This scenario is typical of self-contained small-scale production environments such as those used in news and sports reporting. An SNPN may be provisioned temporarily in a given location allowing user and control data to remain confined within the SNPN and operated and managed by the SNPN owner or a third party. This scenario envisages contribution links from 5G-enabled equipment and a self-provisioned 5G network (e.g. located at a small outdoor broadcast van) to the cloud and/or central studios. Internet access for remote control may also be provisioned.



5G-MAG and stand-alone NPNs

5G-MAG members are engaging in the standardization of NPNs in 3GPP, analysing the most relevant applications for media production, PMSE equipment requirements, and regulatory and spectrum aspects. See our general Explainer on NPNs for more details (5g-mag.com/explainers).

Useful Links

- 3GPP TS 22.263 v17.3.0 “Service requirements for Video, Imaging and Audio for Professional Applications (VIAPA)”
- 3GPP TS 23.501 v16.7.0 “System architecture for the 5G System (5GS)”
- 3GPP TR 28.807 v17.0.0 “Study on management aspects of Non-Public Networks”
- 3GPP TR 23.700-07 v1.2.0 “Study on enhanced support of Non-Public Networks (NPN)”