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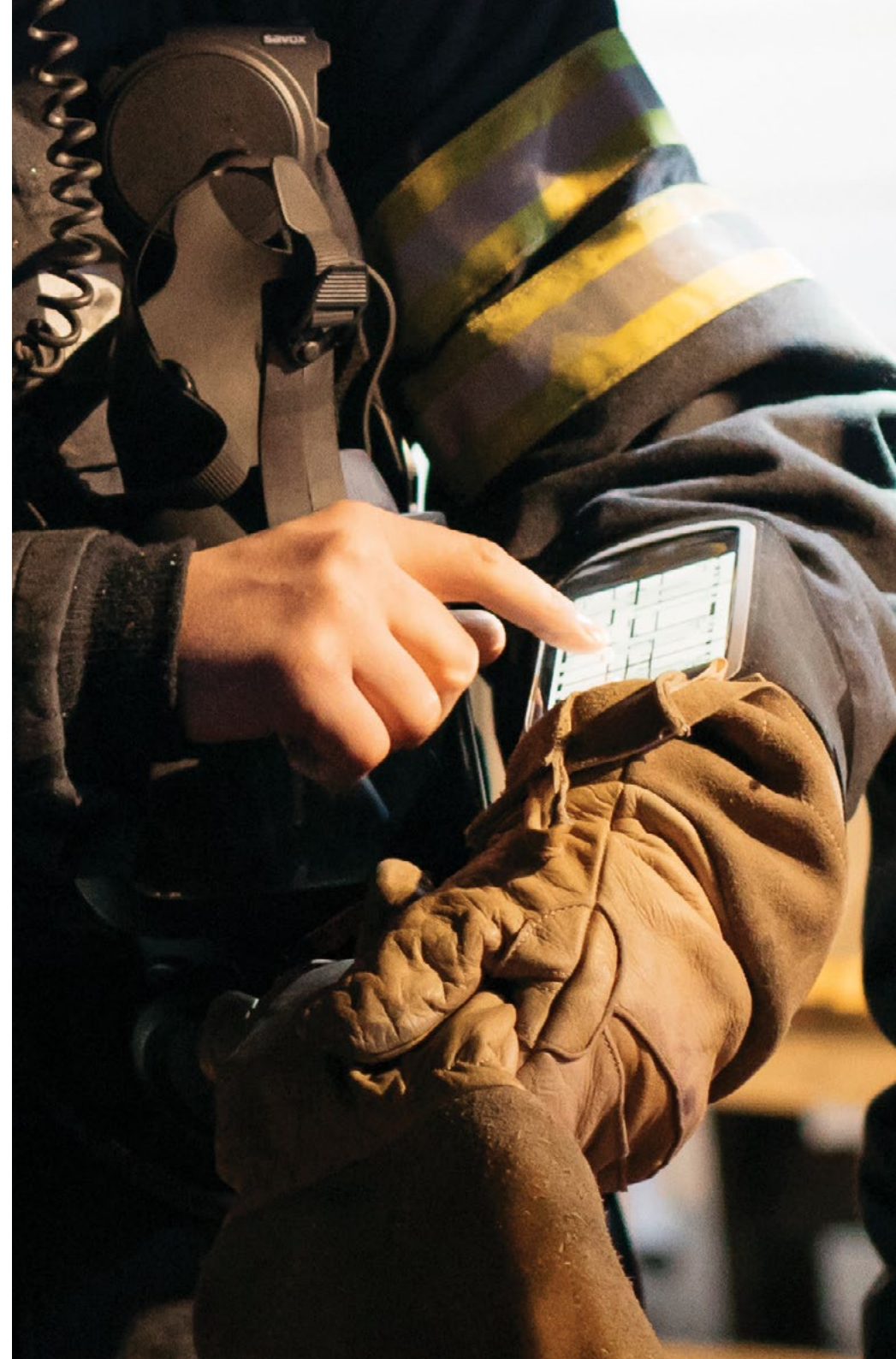


Secure MVNO
- building a network fit for heroes

Mission-critical broadband transforms public safety

We are entering a new era in mission-critical communications. First responders can now take advantage of real time video, access databases on the move and use vital insights from Internet of Things (IoT) sensors. These capabilities enable greater situational awareness in emergency situations, helping to save lives. Adding mission-critical broadband to complement their narrowband networks boosts their ability to achieve their goals.

There are many ways in which a public safety agency can evolve to mission-critical broadband LTE, including building its own dedicated network, operating in a Secure Mobile Virtual Network Operator (S-MVNO) model over existing commercial operator networks or using a commercial network.



Choosing the right path to broadband

What do critical communications users need to consider when looking to adopt broadband?

Essentially, public safety agencies need communication networks that provide:

- Reliable connectivity wherever they work
- Enough network capacity to support their operations
- Efficient and secure communications at all times
- Low latency connectivity to support video and other advanced communications
- Priority communications to ensure vital traffic always gets through
- Rapid deployment of new services
- Support for IoT

To achieve these goals, public safety organizations can choose to build their own dedicated broadband networks, which can be expensive. Alternatively, they can opt for a broadband service from a commercial operator. However, this does not provide the control that public safety agencies need.

S-MVNO model - a win-win proposition

The S-MVNO model is a compelling win-win proposition for both public safety agencies and commercial operators.

Public safety agencies get the control they need, while also benefiting from:

- Rapid setting up of the network
- Professional management from an experienced operator
- Lower costs compared to building a dedicated network
- An extensive network running from day one

Operators benefit from:

- New revenue streams from high average revenue per user (ARPU) customers
- Access to valuable new spectrum to boost capacity
- Financial support to help improve radio sites and expand network coverage
- New capacity and extended coverage to benefit existing customers
- Boosted brand image by hosting public safety services



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A total solution for all public safety demands

Nokia's vision for the future of public safety mission-critical broadband is based around the Bell Labs Future-X architecture, which identifies the layers and functions that create an end-to-end solution for large scale networks supporting an IoT and Industry 4.0 environment.

The Nokia S-MVNO solution offers 3GPP standard based reliable, high availability and secure communications, with the integrated 4G/5G radio networks. These deliver the mission-critical broadband that public safety agencies demand, while ensuring interoperability with existing legacy public safety networks.

Network Availability

Coverage: The operator needs to extend its radio coverage to serve the rural and the few industrial locations that have insufficient or no service and improve signal quality.

Resilience: Network resilience needs to be improved by implementing Isolated Operation for Public Safety (IOPS), building redundant core network and transmission elements and hardening the sites and network.

Interoperability: The Broadband Mission Critical PTT must be able to work with the existing narrow band PTT.

Network Performance

The S-MVNO solution ensures first responders get the right level of service and priority on the host network, even when an incident creates huge levels of commercial traffic from consumers. It implements several prioritization mechanisms standardized by 3GPP to support mission-critical services.

Network Security

Nokia safeguards the public safety broadband LTE network and its end users by securing the network assets as well as end user devices.

We use the key building blocks that are already available with LTE standards and look to enhance these with additional key solutions. The outcome is an end-to-end solution based around mission-critical availability that is ready to evolve towards 5G.

All Nokia products conform to the Nokia Design For Security (DFSEC) product safety process that has been implemented in all our products and solutions.

Cloud Capability

The Nokia S-MVNO solution is cloud-based, which means the network elements are implemented as software-based virtualized network functions (VNF). Cloud capability enables faster access to new services, more cost-effective revenue growth with new cloud-based services and a better customer experience. Cloud computing can also help develop new features more quickly and can require less storage for spare devices.

Delivering secure, capable broadband for public safety

Nokia has extensive mission-critical experience and leadership in LTE and MVNO activation, allowing it to build networks that meet mission-critical availability, performance and security requirements.

Nokia has the unique ability to provide local delivery and operations center capabilities in key regions across the world to serve strategic public safety customers. Our focus for public safety is the smooth transition from legacy Land Mobile Radio to LTE. We have strong experience in deploying mission-critical networks around the world.

Our global scope and reach are underlined by the fact that we have six Global Delivery Centers, four Delivery hubs, 13 Local Delivery Centers and four special scope Delivery Centers supporting an established service presence in more than 150 countries across the world.

We develop tailored solutions for specific markets - our Care Enhanced local support service provides high level local dedicated experts with accredited security clearance compliance.

We also fully understand the PMR to LTE network transformation has a significant impact on network operations and loosely managed changes can pose a risk to the reputations of both public safety network operators and their end-users. Hence Nokia's Startup and Quick Launch service offers a flexible, modular approach to the transformation of network operations. We also offer network assessment services to continuously monitor network performance to deliver uninterrupted public safety services.

Nokia OYJ
Karakaari 7
02610 Espoo
Finland

Tel. +358 (0) 10 44 88 000

CID: 206678

nokia.com

NOKIA

At Nokia, we create technology that helps the world act together.

As a B2B technology innovation leader, we are pioneering the future where networks meet cloud to realize the full potential of digital in every industry.

Through networks that sense, think and act, we work with our customers and partners to create the digital services and applications of the future.

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