Mission-critical microwave networks for public safety

Introducing Nokia Wavence

Wavence prepares backhaul networks for LTE/5G

Reliable communications are absolutely critical for public-safety first responders who must be connected to colleagues, their control center and have real-time situational awareness during emergencies. However, the requirements for public-safety communications networks are changing with the adoption of Long Term Evolution (LTE) and 5G. As a result, public safety agencies are replacing their dedicated legacy backhaul networks in preparation for the transition. Nokia's dedicated microwave backhaul solution, Wavence, provides a seamless solution for emergency services by offering a flexible, reliable and secure infrastructure for the backhaul of mission critical TDM voice, packet voice and video, as well as critical application data.

Mission-critical backhaul requirements

The wide adoption of IP-based, broadband applications in public safety communications creates new challenges for public safety decision-makers that require us to rethink the microwave public safety backhaul network. Wavence has all of these covered.

Strong network resiliency: Network outages are unacceptable in public safety work and can also have a negative financial impact. Operators must ensure these networks faults never occur. For this to happen operators require a unified, end-to-end network management solution that can provision services, monitor performance and troubleshoot problems proactively. Nokia

Network Services Platform (NSP) helps operators automate their IP, optical and microwave networks to ensure maximum service speed, performance, reliability and security.

Security protection: Nokia offers a multi-layered security solution that protects against security threats originating from inside or outside the network. Wavence supports the Advanced Encryption Standard (AES) 256 scheme to protect the radio channel and other advanced security options such as password protection and secure management interfaces. Nokia's security solution provides highly scalable and unified key management for any application deploying AES 256 RF encryption. Nokia also adopts a holistic approach to security with extensive penetration testing and vulnerability assessments to deliver the most secure industry solution available today.

Predictability and Traffic management:

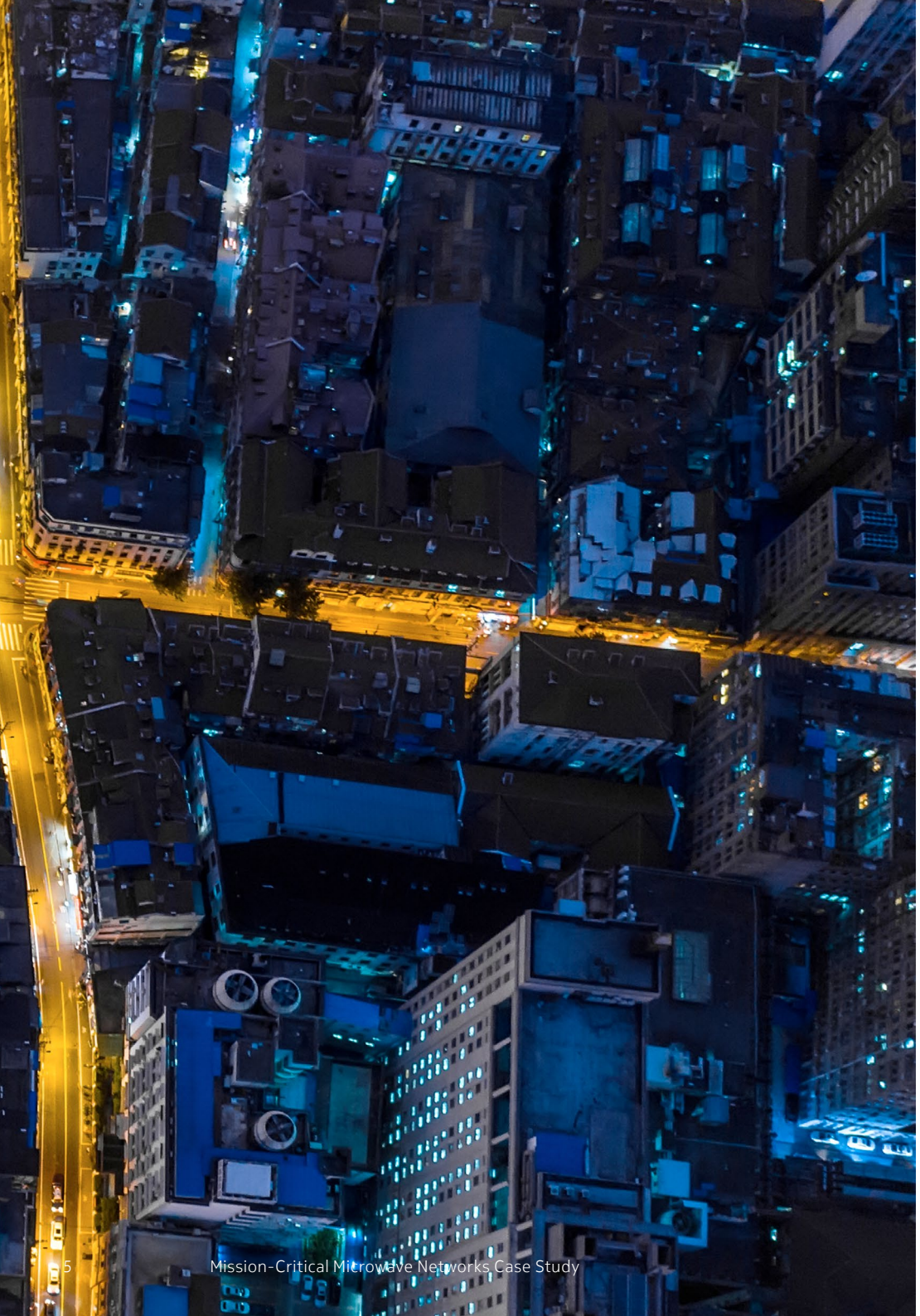
With a large number of applications competing for bandwidth, operators need to deliver traffic in the best possible way to meet the stringent quality of service levels required by an application. Wavence supports a strong QoS mechanism with advanced traffic management capabilities to ensure equitable network bandwidth utilization. In addition, Wavence recognizes any degradation due to changing weather conditions to a connected router and take rerouting actions accordingly.

Scalable network size and capacity:

An operator's network need scalability to accommodate future bandwidth growth and the deployment of more devices and applications. Wavence is future-proofed to meet all capacity requirements, and can be upgraded to a full gigabit of capacity and to multigigabit capacity through Carrier Aggregation.

Seamless legacy TDM migration:

While new operational applications are based on Ethernet and IP, legacy applications based on time-division-multiplex (TDM) technology still play a critical role. Operators need network flexibility to adapt to new applications while migrating legacy applications seamlessly onto a converged IP network. Wavence provides a full set of legacy interfaces to cover all scenarios.



Wavence Universal radio: Integration across all domains

Wavence is a single, seamless, managed platform that converges the IP and microwave domains. This integrated approach provides many benefits when deployed:

- One network management system instead of multiple platforms for different domains
- Convergence of multiple indoor units and routers into one platform
- Reduced equipment space, sparing requirements, power consumption and cooling needs
- Streamlined installation and operations management

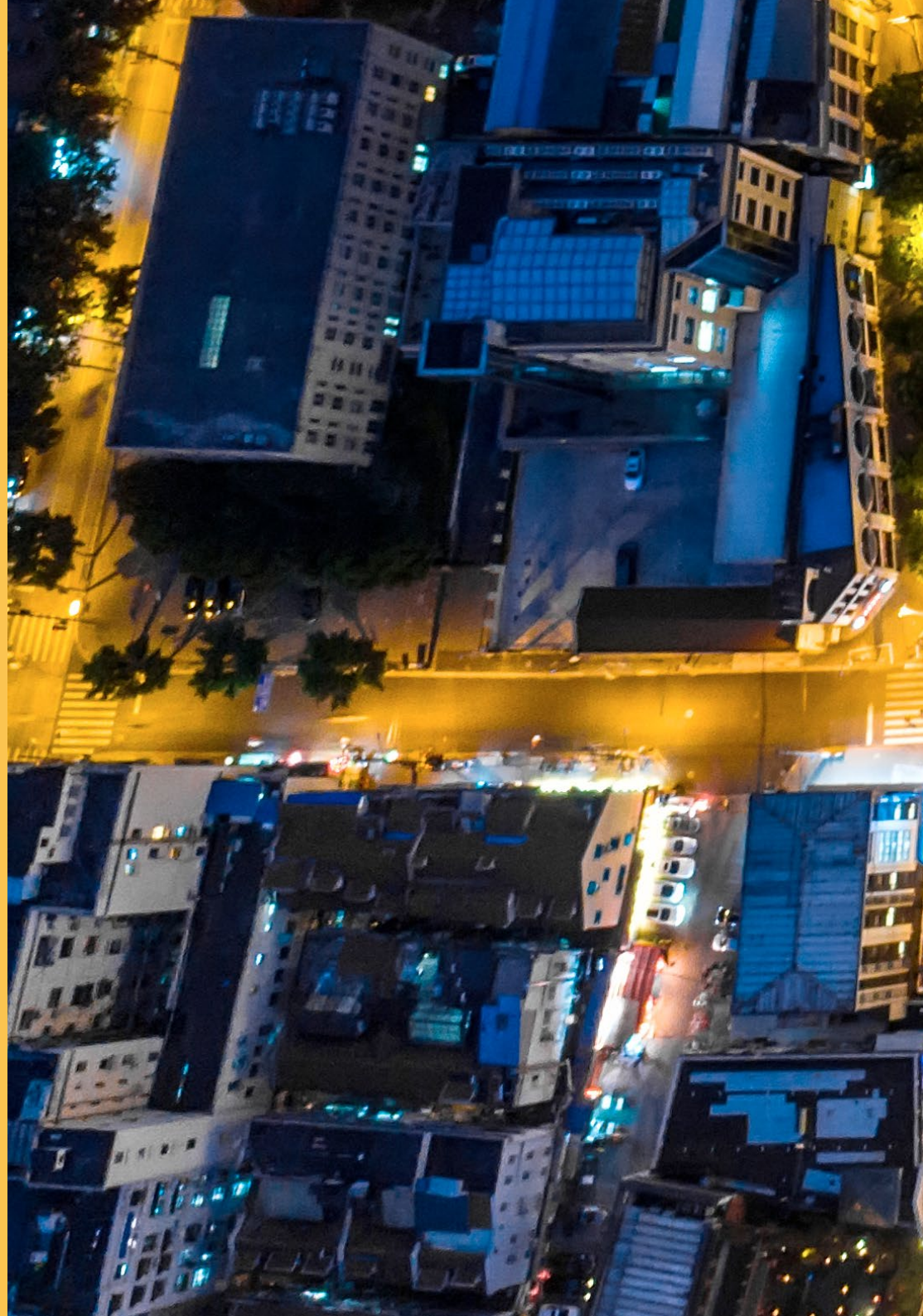
Wavence Universal radio: Integrated RAN and microwave domains

The Simplified RAN Transport (SRT) capability removes the boundary between Nokia RAN and transport backhauling by integrating Wavence with the transport part of the basestation inside the Nokia transport controller (NSP – Network Services Platform), to achieve an end-to-end service management and automation from RAN to core through the whole transport network. The SRT solution leverages the existing BTS transport resources uses the existing RAN management architecture.

Simplified RAN Transport provides the following benefits:

- Regarding provisioning it represents a possible mediation option
- Enables transport automation on legacy infrastructure
- Whoever has the drive of traffic engineering and planning, it enables for transport operators the capability to supervise the transport infrastructure e2e (BTS included).

In conclusion, SRT supports the introduction of an orchestrated architecture, being an option to complement the RAN with additional transport capabilities. It additionally supports transport operations in the day-to-day tasksSimplified RAN Transport provides the following benefits:



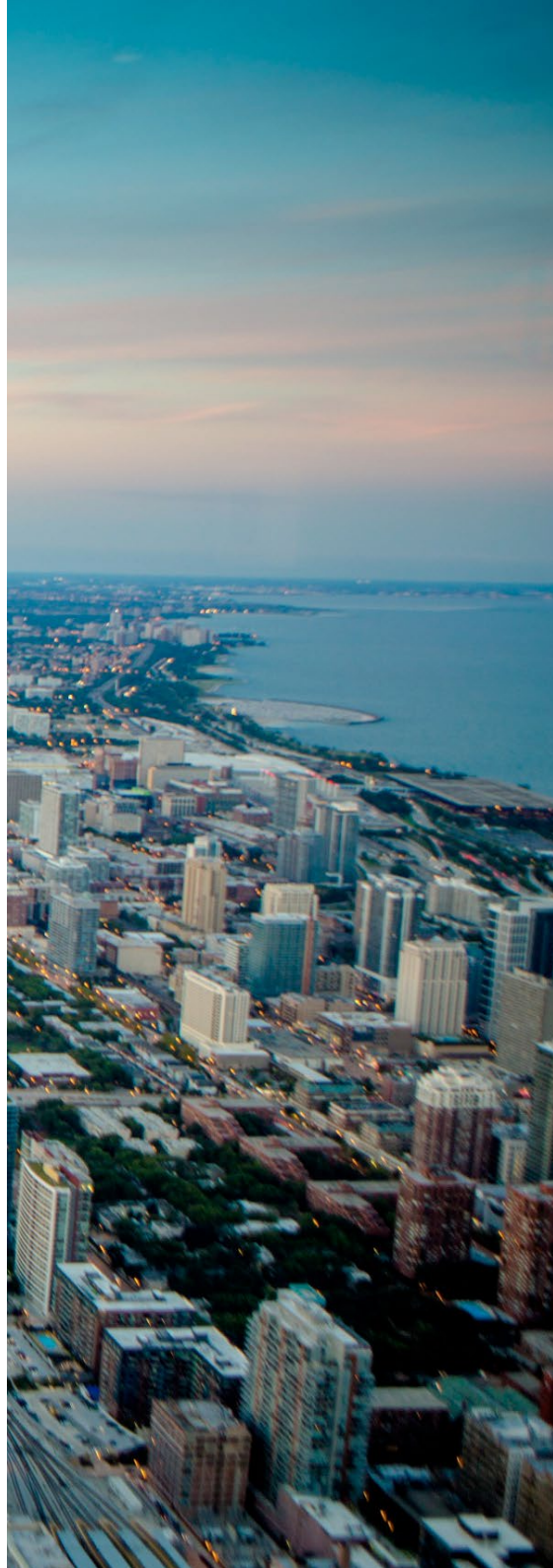
Evolving transport networks for 5G

A specific consideration for public safety is the diverse locations of radios required to support new use cases, which need agile transport network services to reach them. On top of a flexible combination of IP, microwave, optical and next-generation passive optical network (PON) technologies, the transport network opens the door to software-defined networking (SDN) capabilities for provisioning, assurance and optimization of the services and end-to-end SLAs as required to support different 5G mobile applications and slices.

Wavence: One platform that covers it all

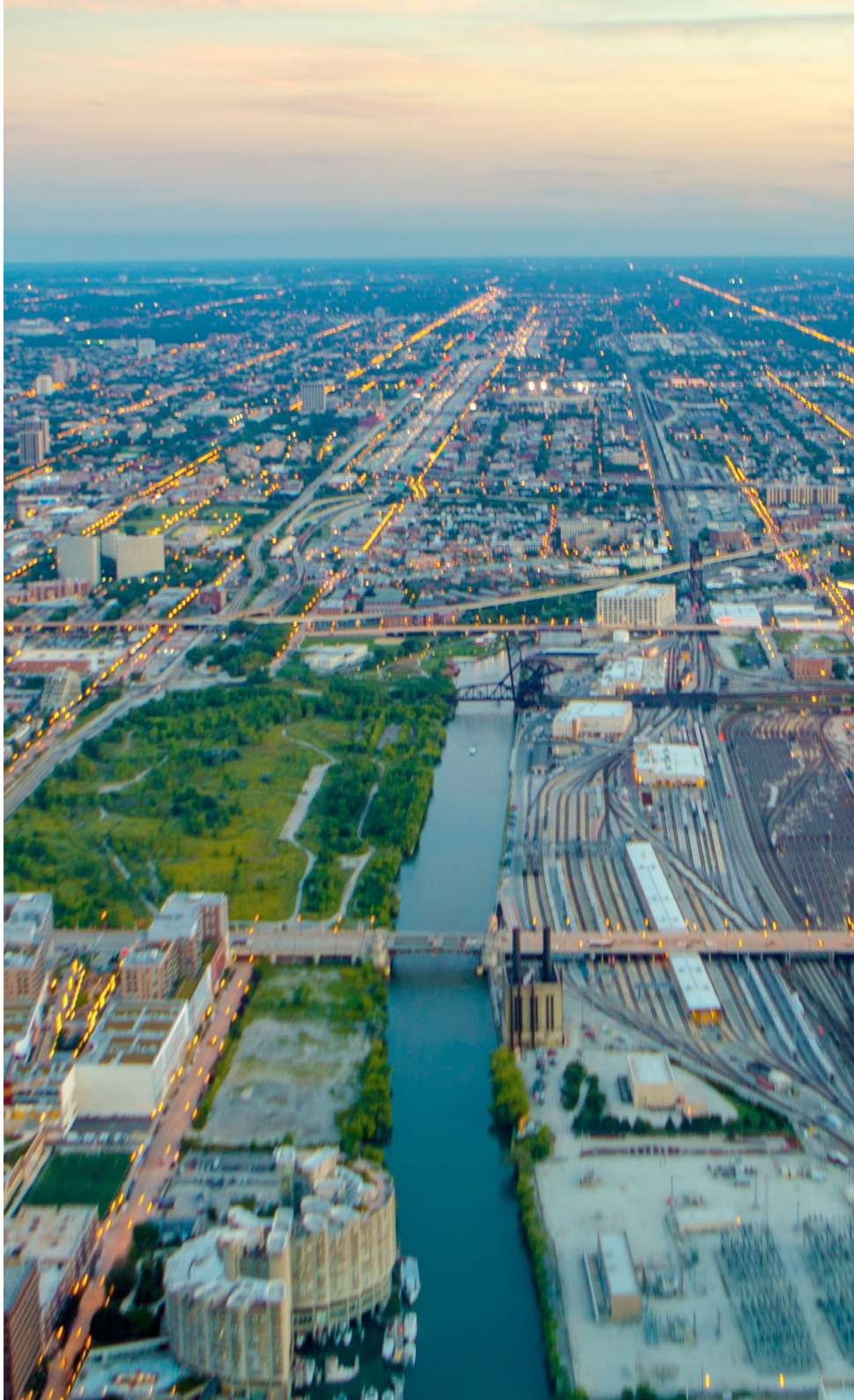
There are typically three hardware choices within the microwaveradio segment: Full Indoor, Split Mount and All Outdoor. FullIndoor means that the baseband and radio frequency (RF) components of the radio are installed indoors. Split mount means that the baseband unit is installed indoors while the RF unit is mounted on the tower. All Outdoor means that all components are mounted on the tower. Each choice of architecture is dictated by the specifics of the communication solution required and not all microwave radio suppliers offer all three architectures.

Wavence is unique in that all architectures are available providing the most flexibility and cost savings to the Mobile Operator. In the U.S., mission-critical operators have historically chosen the Full Indoor architecture for backhaul voice traffic for First Responders. This includes control signals for railroads, Teleprotection circuits for Power Utility companies or telemetry data for Gas or Water Utilities. This choice is driven by the desire to maintain all electronics within an easily accessible and protected enclosure. Split Mount or All Outdoor can be used for backhauling, particularly with regard to the Nokia Modular Private Wireless (MPW).Ipsus am, verumque vel in et volesse quid stat core venimporist pelit lia uste soluptae provid et volorem peribus. Daut aspicil maxima verepu distque plit, consed eicab inventiis de mosi accusae dene cor sendist ea iust.



The MPW solution is a wireless connectivity system with a modular architecture that addresses a wide variety of end-to-end business and mission critical use cases across a wide range of diverse industry segments. MPW delivers mobile broadband and IoT services, with options for voice and mission-critical push-to-talk and push-to-video services.

Whatever your microwave radio communication network need requires, the Nokia Wavence platform provides a solution.



About Nokia Wavence

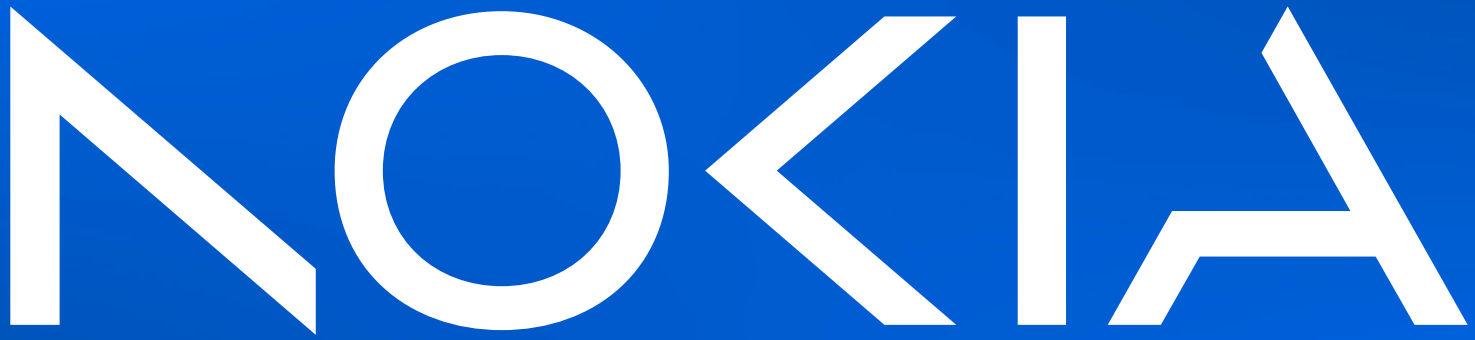
Next generation 5G microwave networks require cost-effective and reliable solutions that maximize radio link performance, support advanced packet networking and simplify operations.

Nokia's Wavence portfolio provides a complete microwave solution for all uses cases covering short-haul, long-haul, E-Band and SDN based management both for Service Providers and enterprises. The comprehensive Wavence portfolio provides best-in class microwave in traditional bands (6-42 GHz), and E-Band (80 GHz) leveraging Nokia Bell Labs innovation. It provides the maximum efficiency thanks to 100% Carrier Aggregation, including for all 5G backhaul use cases across different frequency bands. The family supports Zero-Footprint implementation for full-outdoor architectures and can be integrated directly with RAN and IP devices with common management. The SDN management enables E2E network slicing and one-click provisioning, analytics and workflow management which are essential fundamentals for next generation microwave transport networks.

Nokia OYJ
Karakaari 7
02610 Espoo
Finland

Tel. +358 (0) 10 44 88 000

CID 210952



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

As a B2B technology innovation leader, we are pioneering networks that sense, think and act by leveraging our work across mobile, fixed and cloud networks. In addition, we create value with intellectual property and long-term research, led by the award-winning Nokia Bell Labs.

Service providers, enterprises and partners worldwide trust Nokia to deliver secure, reliable and sustainable networks today – and work with us to create the digital services and applications of the future.