SOLUTION BRIEF

Baseband solutions for investment-protecting scaling

Enhancing network capacity, energy efficiency and future-proofness for CSPs and enterprises

NOKIA

AirScale baseband solutions take network performance to a new level

The rapid evolution of mobile networks requires advanced and scalable solutions to ensure superior performance, seamless network modernization and optimized total cost of ownership (TCO). Our AirScale baseband platform, based on ReefShark System-on-Chips (SoCs), is built to meet the evolving needs of 5G, toward Advanced 5G and future 6G networks. AirScale baseband solutions provide Communications Service Providers (CSPs) and enterprises with the capacity, flexibility and intelligence needed to enhance network performance, improve efficiency and future-proof their investments.

This solution brief explores the increasing demands in the mobile industry and how our AirScale baseband portfolio addresses these, maximizing the potential of CSPs' network assets. As networks evolve toward Advanced 5G, we continue to introduce innovative performance enhancements to our AirScale portfolio. Among the latest additions is the Dual Boost base station technology, designed to elevate network performance.

Driving Ultra-Capacity Mobile Networks:

The world's leading mobile operators rely on Nokia's modular and scalable baseband solutions, reinforcing our position as the preferred partner for next-generation networks. AirScale baseband is designed to be future-proof and AI-ready with in-built capabilities powered by ReefShark SoCs.

Our AirScale's modular design allows CSPs to scale processing capacity as needed, ensuring optimal TCO and enabling smooth evolution toward Advanced 5G and future 6G networks.

By delivering exponential network capacity, improved efficiency, energy savings and deployment flexibility, we empower CSPs and enterprises to accelerate network transformation, unlock new revenue streams and maintain a competitive edge in the ever-evolving mobile industry.

Our AirScale portfolio offers:

- Industry leading processing power
- Exceptional cell capacity
- Advanced power-saving capabilities
- Future- proof network evolution
- AI-readiness with built-in capabilities

Turning industry challenges into strategic opportunities

With increasing pressure to improve capacity, efficiency and agility, CSPs and enterprises must modernize their networks while preparing for what's next. Nokia's AirScale baseband platform empowers CSPs and enterprises to:

Support high-performance use cases:

New consumer and enterprise use cases require high capacity, bandwidth and speed. Data-intensive applications like UHD streaming, real-time industrial operations and AI-enabled services require baseband systems with superior uplink/downlink capacity and processing power.

- AirScale base stations rise to this challenge by opening new paths to revenue for CSPs by allowing them to offer premium, reliable and low-latency services to a diverse customer base.

Improve energy efficiency:

Enhancing network energy efficiency is vital to minimize costs and reduce environmental impact. As network scale increases, reducing energy usage becomes critical.

- AirScale delivers both hardware and software-level innovations to achieve energy-efficient scaling. Sustainability is a core pillar of our AirScale design.

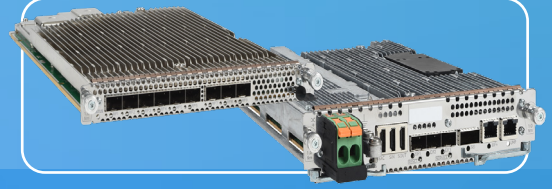
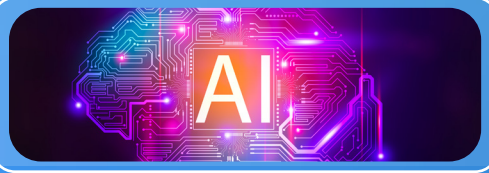
Ensure future-proof evolution:

CSPs and enterprises need AI-ready solutions that not only enhance today's performance but also provide investment protection and a clear evolution path to Advanced 5G and towards 6G.

- AirScale base stations provide CSPs and enterprises with the capacity, flexibility and intelligence needed to enhance network performance, improve efficiency and future proof their investments.

AirScale baseband portfolio scales up processing power for consumer and enterprise use cases

AirScale baseband portfolio

Exponential scalability & optimized TCO	Modular & scalable AirScale baseband		Indoor & outdoor sub-racks
Double capacity & reduced energy consumption	Capacity & control cards		High- and ultra-performance solutions
Compact baseband for every use case	Compact outdoor baseband solutions		Macro & small cells deployments 2G, 3G, 4G & 5G support
AI-ready to scale up AI compute	AirScale base station is AI-ready		Powered by ReefShark SoCs
Future-proof solutions	Network evolution toward Advanced 5G & future 6G		Investment-protecting scaling

Our AirScale baseband portfolio is engineered to address the evolving demands of modern networks, delivering exceptional performance and energy efficiency. AirScale baseband solutions provide industry-leading processing power and cell capacity, future-proofness and energy efficiency, scaling up processing power for consumer and enterprise use cases.

The modular design of AirScale baseband safeguards CSP investments while unlocking new revenue streams. It enables premium network services and richer customer experiences, allowing for:

Capacity for new use cases

AirScale baseband cards double capacity while reducing energy consumption.

Energy efficiency

Latest AirScale baseband cards use up to 90% less energy.

Future-proofness

Get ready for Advanced 5G and 6G with AirScale baseband, powered by ReefShark SoC.

AirScale modular baseband – indoor and outdoor

At the core of the AirScale baseband solution is a highly adaptable modular design, available in both indoor and outdoor sub-rack formats with capacity and control card slots. This design provides the flexibility CSPs need to scale deployments seamlessly—from small-scale configurations to high-density urban or remote networks.

With modular baseband options, CSPs can easily scale up processing capacity where it's needed most. The plug-in design enables incremental expansion using baseband capacity and control cards, ensuring operators can scale their networks efficiently as demand grows.

AirScale indoor modular baseband

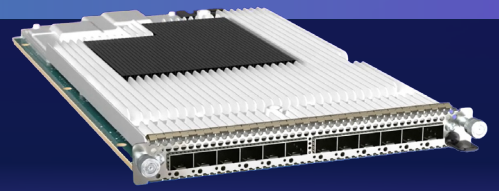
AirScale outdoor modular baseband

AirScale baseband cards for unmatched performance and efficiency

Our latest baseband cards double cell capacity while reducing power consumption, significantly improving uplink throughput to support uplink-intensive mobile services. The Levante, Lodos and Ponente cards deliver next-generation processing power while minimizing energy consumption.

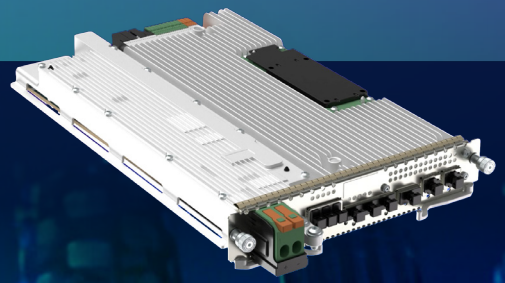
Levante:

The 4G/5G ultra-performance capacity card doubles the number of supported cells while delivering up to 80% energy savings, enabling high-capacity site configurations and supporting large-scale deployments.



Ponente:

This 2G, 3G, 4G and 5G ultra-performance control card increases throughput capacity while cutting energy usage per bit by up to 90%, supporting efficient, future-proof 5G evolution.



Lodos:

A high-performance 4G/5G versatile capacity card offering enhanced scalability and reducing energy consumption by up to 50%.

Together, these cards enhance network scalability, reduce operational costs and enable CSPs to meet rising performance demands without increasing footprint or energy use.

Compact outdoor baseband for CSP and enterprise use cases

The AirScale baseband portfolio includes compact outdoor products for both macro and small cells deployments. The Tuuli family of compact outdoor baseband units—Tuuli 6, 12, 24 and 26e—delivers baseband performance in space-efficient outdoor formats with versatile installation options - on building walls, poles or lamp posts—making them suitable for virtually any setting.

Tuuli 6 and Tuuli 12

are ideal for small to medium-capacity sites and enable easy deployment of additional baseband functionality.

- **Tuuli 6:** Optimized for small cells, with compact, efficient performance
- **Tuuli 12:** A versatile TDD and FDD unit for a broad range of deployment needs

Solutions for small- to medium-capacity sites

Tuuli 24 and Tuuli 26e provide high capacity while reducing power consumption. Support for all radio technology generations (2G–5G) allows seamless site modernization and simplifies network planning. In addition to bustling city centers, the Tuuli products are also ideal to rural deployments.

High-capacity compact outdoor solutions

The high-capacity, space-saving and standalone operation suits industrial and remote locations, offering high capacity in small form factor, from mining and defense to manufacturing and oil & gas.

Tuuli 24

A 4G and 5G solution for network capacity and coverage expansion

Tuuli 26e

A solution with 2G, 3G, 4G and 5G support, making it ideal for site modernization across all radio technology generations

Remote maintenance and commissioning

Maintenance and commissioning of the Tuuli compact outdoor products is simplified with WiFi Local Management Port (LMP), enabling technicians to access and manage units remotely in real time—from a nearby service vehicle, for example- without needing to physically interact with the hardware which might be installed in a busy city area directly on a wall or on a lamp post. This speeds up maintenance and enhances operational efficiency.

Maximizing base station potential with AirScale Dual Boost

As networks evolve toward Advanced 5G, we continue to introduce innovative performance enhancements to our AirScale portfolio. Among the latest additions is Dual Boost base station technology, designed to elevate network performance.

Nokia's AirScale Dual Boost technology takes base station performance to the next level, leveraging our advanced AirScale portfolio with latest ReefShark SoCs to deliver breakthrough uplink and downlink processing power for 5G Massive MIMO, a steppingstone to Advanced 5G premium performance.

Our AirScale Boost technology enhances Massive MIMO capabilities further, empowering CSPs to deliver high-throughput, low-latency services in ultra-dense areas. By amplifying uplink and downlink performance, Dual Boost helps networks meet growing demands for real-time data and immersive user experiences.

AirScale Dual Boost technology enables

- CSPs to maximize the potential of their base station assets
- A substantial increase in 5G Massive MIMO uplink and downlink processing power, enhancing network performance and user experience
- Seamless service and strong uplink support for data-heavy applications like HD video, gaming and conferencing
- Future-proof network evolution to Advanced 5G and towards 6G

AirScale base stations are AI-ready

The AirScale base station is designed to integrate seamlessly with evolving AI capabilities. AirScale base stations leverage Nokia ReefShark SoCs with advanced AI engines for intelligent network enhancements. This paves the way for future opportunities in leveraging base station computing capabilities for AI workloads and unlocking new revenue streams.

As the number and complexity of AI-for-RAN tasks continue to grow, our AirScale base stations are built to evolve alongside these demands. The modular AirScale baseband architecture, featuring six capacity card slots and two control card slots, enables seamless scaling of AI compute power. Powered by ReefShark SoCs with integrated AI engines, it allows CSPs and enterprises to simply plug in new cards as needed—scaling effortlessly to support extended AI workloads as networks become more intelligent and data-driven.

Energy solutions for sustainable radio site deployment

Our expanded portfolio of power solutions, tailored for AirScale baseband products, makes radio site deployments much more energy efficient, easier and faster with lower maintenance costs. The portfolio contains pre-integrated, All-in-one power cabinet solutions and Zero Footprint site solutions for all use cases.

The outdoor all-in-one cabinet solutions allow pre-integration of baseband units, most advanced cooling solutions, latest high-performance rectifiers and batteries into just one cabinet, available in different variants. These outdoor cabinets require no space-consuming shelters or buildings which would need separate cooling systems.

The Zero Footprint outdoor solution incorporates the baseband units with highly efficient AirScale power rectifiers and long-lasting lithium batteries in compact form factor that can be installed directly on a mast or a pole, eliminating the need for air conditioning. The Zero Footprint solution comes with solar-power capability for sustainable and cost-effective operations and can be remotely managed with MantaRay Network Management.

AirScale's proven performance across global deployments

Our AirScale baseband solutions are supporting large-scale network evolution projects around the world, enabling operators to expand 4G and 5G coverage, prepare for Advanced 5G, and modernize their infrastructure. These deployments span diverse markets—from dense urban environments to rural and industrial regions—and reflect the flexibility, scalability and performance of the AirScale platform.

Whether enhancing nationwide mobile broadband, supporting strategic spectrum rollouts, or enabling the first 5G launches in new markets, AirScale plays a central role in helping CSPs deliver high-quality, future-ready connectivity.

Why Nokia?

We stand at the forefront of ultra-capacity, next-generation network solutions, offering unparalleled advantages, including:

- **Industry leadership and trusted performance:** Our AirScale solutions power the world's leading operators globally, ensuring reliable and high-performance networks.
- **Investment protection through modularity:** A flexible, scalable design allows CSPs to expand capacity as needed while reusing existing assets and supporting smooth evolution to future technologies.
- **AI-ready:** AirScale base station is AI ready, leveraging ReefShark SoCs with advanced AI engines. AirScale baseband enables effortless scaling up of AI compute capacity.
- **Energy efficiency:** Our innovative solutions reduce energy consumption while increasing capacity, aligning with global sustainability goals and energy savings.
- **ReefShark SoC innovation:** Purpose-built silicon delivers powerful compute, AI acceleration and energy efficiency at the heart of AirScale baseband solutions.
- **High and ultra-performance baseband:** Our product variants deliver best-in-class cell capacity, throughput and performance, enabling CSPs to meet demanding capacity needs with confidence.
- **Nokia's performance innovation maximizes base station potential:** AirScale Dual Boost base station technology with the latest advanced AirScale portfolio enhances 5G Massive MIMO capabilities even further, providing considerable gains in both uplink and downlink processing power.
- **O-RAN compliance:** AirScale baseband solutions are O-RAN compliant.
- **Seamless path to Advanced 5G and towards 6G:** The AirScale baseband platform, based on ReefShark SoCs with built-in AI capabilities and scalable processing power, provides a robust platform for the evolution of mobile networks.
- **Comprehensive network support:** Our solutions cover all radio technology generations from 2G to 5G, with future-ready path for Advanced 5G and towards 6G, ensuring continuous technological advancement.

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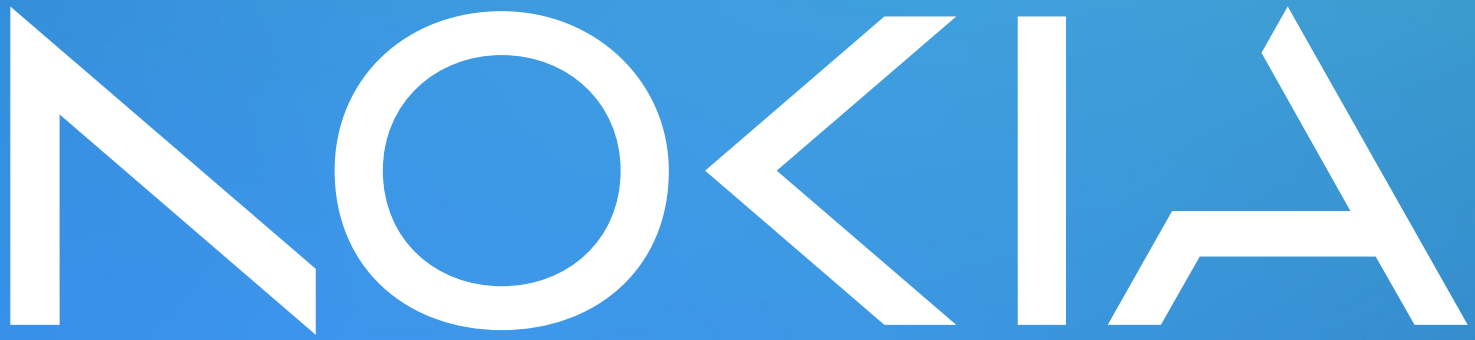

At Nokia, we create technology that helps the world act together.

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, which is celebrating 100 years of innovation.

With truly open architectures that seamlessly integrate into any ecosystem, our high-performance networks create new opportunities for monetization and scale. 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.