



Ericsson

Ericsson Fronthaul 6000

Serves all RAN
connectivity with
superior and flexible
5G solutions



Purpose-built DWDM system for radio networks

The transport infrastructure is key to securing the best performance for all those 200+ foreseen use cases enabled by 5G. Add to that the introduction of Cloud RAN and the significance of building a superior transport network becomes vital.

The evolution of radios, interfaces, and deployment architectures, all drive the need for increased capacity and connectivity, lower latency, and support of increased traffic volumes in 5G transport networks.

Wavelength Division Multiplexing (WDM) delivers increasing speeds and new models of RAN connectivity in a world where telecommunication capacity is increasing, and fiber availability is limited. It's a mature and well-established technology capable of improving fiber efficiency by multiplexing multiple services over just a single fiber strand.

WDM is based on colored optical modules, filters and optionally transponders that together combined allow an extremely efficient centralization of CPRI, eCPRI or Ethernet at any bit rate, reducing fiber cost and increasing throughput.

As mobile networks move toward cloud and centralization, this also brings new benefits and challenges in the transport domain. More operators see the need to build fronthaul networks. Optical Fronthaul can be tightly integrated with the Radios, simplifying the rollout of the remote sites and so reducing transport deployment and maintenance costs.

Combined with RAN, our extensive transport portfolio and pre-verified solutions let you design, build, upgrade, and maintain a transport network that supports the evolution of your mobile network and the potential introduction of Cloud RAN; in a cost-efficient way with minimal risk.



Fronthaul solutions for any 5G need

5G requires 5G transport

New interfaces and deployment architectures drive the need for high capacity, connectivity, lower latency, and support for increased traffic volume in 5G transport networks.

Operators around the world are working to build and commercialize 5G networks where densification is a key aspect. By adding small cells operating on the millimeter wave frequencies, to the existing radio network and utilizing the high-band spectrum, operators can provide gigabit speeds over the air. Any issues relating to propagation are mitigated by using smaller and more closely spaced cells at street level. The growing demand for mobile broadband capacity and the increasing cost of radio spectrum have also resulted in radio features such as Coordinated Multipoint (CoMP) and Carrier Aggregation (CA) necessitating innovative network configurations.

Centralized RAN

The introduction of a more centralized deployment architecture which is designed to support improved spectral and network efficiency can support both new radio features and increased network densification. Centralized RAN (C-RAN) is where baseband units are deployed centrally in so-called baseband hotels (BBH) and are connected to multiple remote radio units (RRU). Pooling baseband functionality allows efficient radio coordination across multiple sites lending a new level of flexibility in the rapidly changing cellular landscape.

The Fronthaul network

Centralization in radio networks requires a distant connection between the basebands and the remote radios; this connection is called Fronthaul. Fronthaul needs to provide operators with the highest capacity and the lowest latency to ensure that even the most stringent transport requirements of 5G are met. Several interfaces, such as OBSAI, Ethernet and (e)CPRI, need to be handled by the Fronthaul network.

The DWDM technology

Dark fiber (fiber with no transport equipment in the circuit) is the preferred medium for fronthaul, because it grants the lowest latency. However, for carriers, this means leasing of fiber lines and utilizing them as efficiently as possible. Dense wave division multiplexing (DWDM) allows carriers to maximize the amount of data that can be transmitted across each fiber as multiple services can be transported. It is a low-cost technology, mature and reliable, and a single fiber working (SFW) application further reduces the TCO as only one fiber strand is used instead of a pair.

The need of high-capacity interfaces

The configurations of fronthaul networks need to be tailored to the needs of the individual sites. Some sites may only require a few high-capacity interfaces (like 10G). Other sites need a much higher density of 10G, 25G, or even 100G interfaces. Front-haul should allow any mix of services with a variety of products to match these needs.

The need for modularity and flexibility

All networks are different and with unique fiber infrastructure, and there is an increased need for deployment flexibility. Fronthaul need not only support both indoor and outdoor environments but be used in centralized networks with a variety of network topologies to make the best use of an operators existing infrastructure.

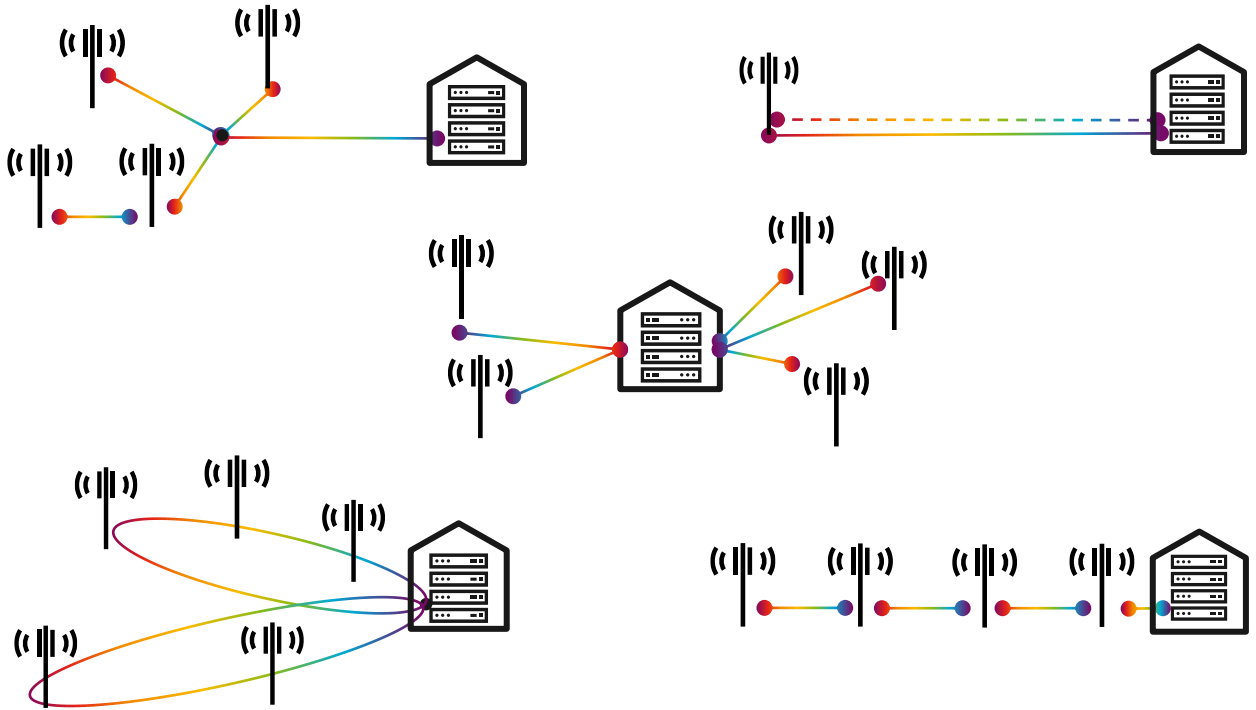
The need of a simplified installation and commissioning

Network roll out efficiency is fundamental while deploying new sites and can be improved in terms of time and cost by using self tunable colored optics. Such modules can vary their frequency automatically, so reducing spares, inventory, and dramatically simplifying new site deployments with faster installation and commissioning time.

The need protocol agnostic and low power consumption

As networks migrate from 4G to 5G, the Fronthaul ability to support both CPRI, and (e)CPRI are acknowledged as a major advantage, as well as the possibility to carry Ethernet services for the Radio whit embedded baseband functionality. Achieving this while offering a zero impact on power consumption is critical for numerous use cases within the 5G network.

Centralization of any network topology



Simplification of any remote site



Future-proof transport solutions supporting mobile evolution

The future-proof Fronthaul 6000 portfolio offers a variety of building blocks to be used to support any RAN connectivity, of which some are highlighted in the picture below. Its modularity and flexibility support any network size, even as the network grows. A complete set of pluggable modules based on SFP+ and SFP28 technology provides connectivity at 10Gbps and 25Gbps. Colored optics are available in fixed and full tunable variants, efficiently supporting any indoor and outdoor applications. By investing when and where necessary, without over dimensioning, excessive spending and high up-front costs can be avoided in all applicable deployments.

1. Small cell centralization

- Optimized enclosures for limited total space
- Concealment important for faster permitting
- Small in size. Rail, pole and handhole options
- Lowest costs for thousands of deployments

2. Macro cell centralization

- Optimized transponders from 10 to 25G
- Lower operation costs, easy provisioning
- Extra low latency is essential for longer distance
- Possible interworking with 3PP Radio and Baseband

3. Indoor connectivity

- Certified solution with Ericsson Radio DOT system
- Multiple Radio DOTs connected with a single fiber strand
- Lower operation costs, easy provisioning
- Flexible deployment with many network topologies



4. Street macro connectivity

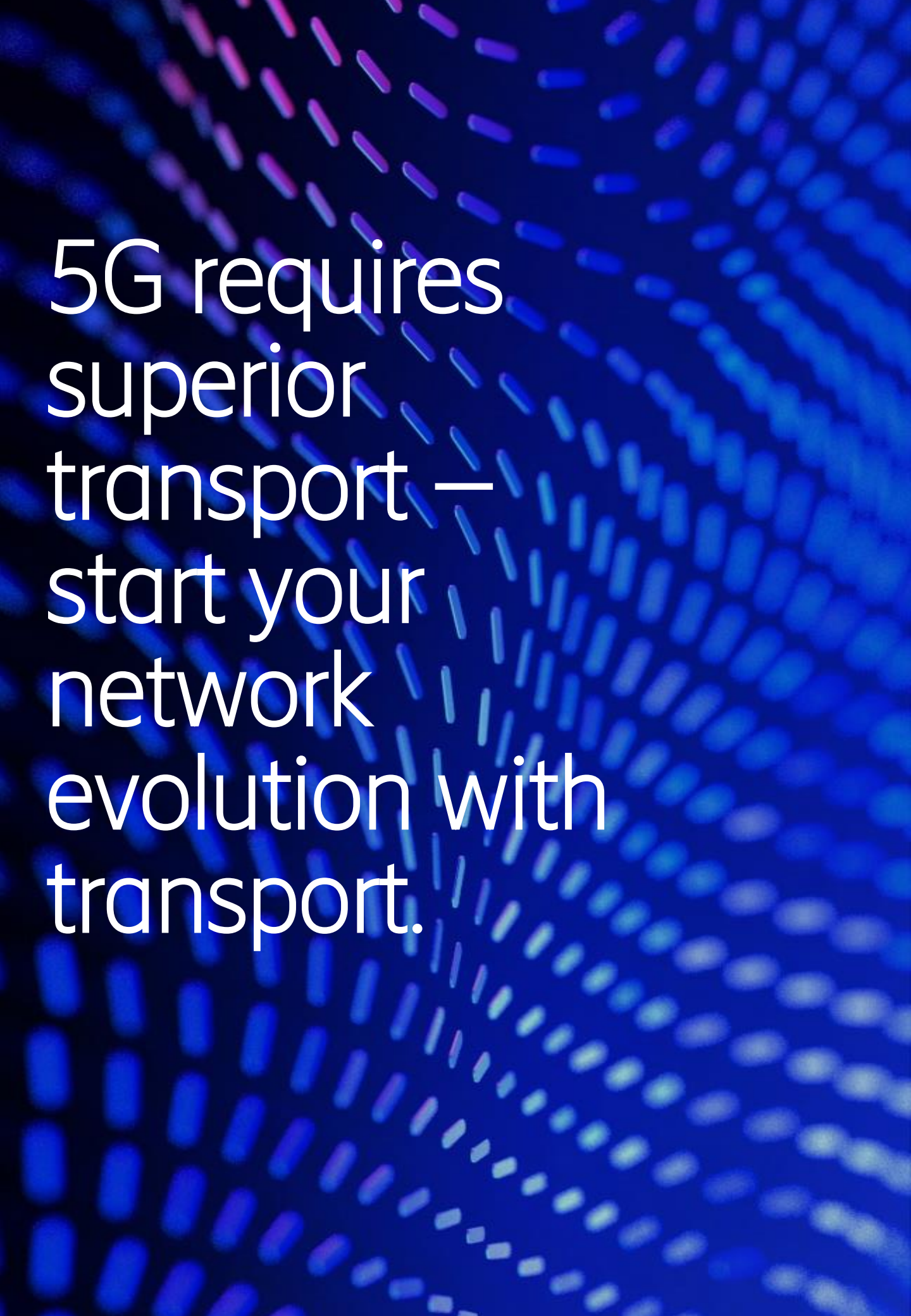
- Optimized solution for metro areas without space on the rooftop
- Transport of Up to 24 x Ethernet from new RBU
- Smooth, fast & cost-effective migration to 5G
- Possible interworking with 3PP Routers

5. Fixed Access connectivity

- Optimized filters for GPON and XG(S)-PON coexistence
- Leverage PON Network (fiber infrastructure)
- Efficient overlay of DWDM and PON bandwidth
- Same fiber or same duct options

6. Router connectivity

- Optimized solution for multiple channels (10GE, 25GE) over one single fiber strand
- Point to Point scenarios with Routers 6000 + Fronthaul 6000
- Filters modularity scales as required
- Interworking with 3PP router (if required)



5G requires
superior
transport —
start your
network
evolution with
transport.

Products and offering

Ericsson’s Fronthaul 6000 is a flexible and cost-efficient fronthaul solution for Ethernet, CPRI and eCPRI transport, separately or together. It offers market-leading fiber density, 25G capacity and negligible latency to achieve leading-edge 5G radio performance, even in the densest deployment areas, where RAN centralization plays an increasingly important role.

Fronthaul 6000 family



Ericsson Fronthaul 6000 passive

The passive fronthaul solutions provide transportation of up to 24 services over a single fiber strand. Each service is transported through two lambdas, one Tx and one Rx, with a maximum of 48, resulting in a throughput of up to 600 Gbps.

The innovative filter modules are available either in C-Band or on O-Band so to grant efficient 10 Gbps and 25 Gbps centralization and be open to coming 50 Gbps applications.

Fronthaul 6000 filters can be tightly integrated with Ericsson remote systems with rail solution, backpacked solution or even inside the same shroud.

Ericsson Fronthaul 6000 active

The active fronthaul solutions implement RAN connectivity when management, demarcation and high availability through protection are important requirements. It is built on the passive solution’s infrastructure and provides high-capacity and low latency transponders and muxponder with innovative and cost-effective design.

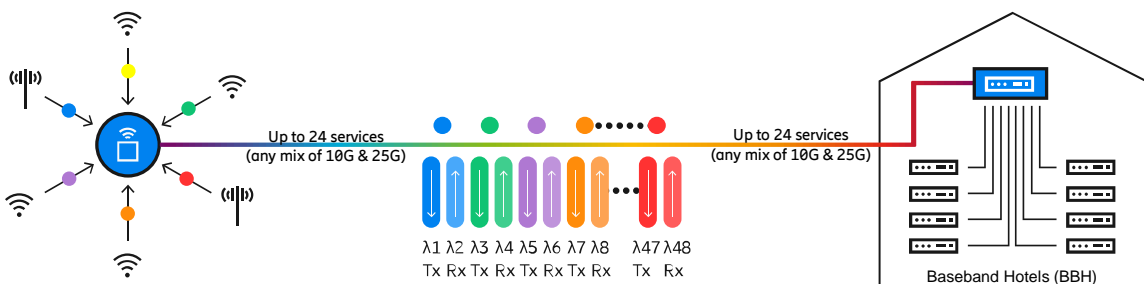
The active units can map signals coming from the RRU without any OTN framing, allowing longer distances thanks to a 30 to 80 times lower latency and meeting the most stringent requirements of 5G networks. It can also interwork with 3PP radios and basebands.

Ericsson Colored optics

Ericsson colored optics are a portfolio of pluggable transceivers tested and granted for the best interworking with Ericsson products. They are a common component of both passive and active Fronthaul 6000 solutions.

Colored optics are optimized in performances, power consumption and operating temperature so to be flexibly pluggable into Ericsson Radios, Basebands, Routers and Fronthaul equipment.

Colored optics are available at different bit rates (10G bps and 25 Gbps) via SFP+ and SFP28 modules with fixed or full self tunable variants. Both C-Band and O-Band are supported.



Fronthaul 6000 products



Fronthaul 6585

- Passive WDM filter enclosure
- Up to 9 services over 1 line
- Street macro or cabinet integrated



Fronthaul 6587

- Passive WDM filter enclosure
- Up to 18 services over 1 line
- Pole, wall, strand, handhole



Fronthaul 6589

- Passive WDM filter enclosure
- Up to 18 services over 1 line
- Pole, wall, strand, handhole



Fronthaul 6387

- Passive WDM filter enclosure
- Up to 18 services
- Rail, pole, wall
- ERS design



Fronthaul 6389

- Passive WDM filter enclosure
- Up to 24 services
- Rail, pole, wall
- ERS design



Fronthaul 6322

- Active transponder enclosure with filter
- 9 grey to color conversion @10Gbps
- Rail, pole, wall
- ERS design



Fronthaul 6681

- Passive WDM filter unit
- Up to 24 services over 1 to 4 lines
- 1+1 protection option



Fronthaul 6683

- Passive WDM filter unit
- Up to 72 services over 1 to 8 lines
- Modular chassis



Fronthaul 6689

- Passive WDM filter unit
- Up to 27 services over 1 to 6 lines
- Modular chassis



Fronthaul 6622

- Active transponder unit
- 18 grey to color conversion @10Gbps
- CPRI, eCPRI, ETH



Fronthaul 6624

- Active transponder unit and WDM filters
- 12 grey to color conversion @10Gbps
- CPRI, eCPRI, ETH



Fronthaul 6626

- Active transponder unit
- 12 grey to color conversion @10Gbps
- 6 grey to color conversion @25Gbps
- CPRI, eCPRI, ETH



Simplified network installation, commissioning and maintenance

The auto tunable colored optics offer a variety of options to reduce spares, simplify installation and inventory stock management, allowing an efficient TCO optimization.

The passive outdoor enclosures are available in multiple variants so to serve Customer needs while allowing a minimal footprint solution. They scale in term of supported services (from 3 to 24) and they can be cascaded when necessary.

Industry-leading performance with Ericsson Radio System

Our portfolio of transport solutions is part of the Ericsson Radio System, ensuring a smooth evolution path with complete site solutions, shared air flow designs and maintenance features that ultimately reduce OPEX. Ericsson Radio System is designed to fit all site types and traffic scenarios, even as networks grow in scale and complexity, from 2G, 3G, 4G, and 5G, delivering industry-leading performance on the smallest site footprint with the lowest energy consumption

Ericsson Network Manager and Ericsson Dynamic Orchestration

With Ericsson Network Manager (ENM), a single management platform handles all network technologies. The cloud orchestration part provides Network Functions Virtualization Orchestration (NFVO) capabilities and generic Virtual Network Function Management (VNFM). The Service Orchestrator provides the glue between the transport and the cloud domains. As parser and orchestrator of service templates, it can decompose and translate each request into provisioning queries for the transport and the cloud orchestration components

Ericsson enables communications service providers to capture the full value of connectivity. The company's portfolio spans Networks, Digital Services, Managed Services, and Emerging Business and is designed to help our customers go digital, increase efficiency, and find new revenue streams. Ericsson's investments in innovation have delivered the benefits of telephony and mobile broadband to billions of people around the world. The Ericsson stock is listed on Nasdaq Stockholm and on Nasdaq New York.