

# Capital Markets Day 2021



Tommi Uitto  
President of Mobile Networks

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# Agenda

- 1 Mobile Networks at a glance
- 2 Significant turnaround progress 2019-2020
- 3 Future dynamics in our addressable market
- 4 Our vision for technology leadership and value creation
- 5 Path to improved Operating Margin in 2023
- 6 Selected success factors – we are set to win
- 7 Timeline to technology leadership and improved value creation

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# Mobile Networks at a glance

29 of top 30\* mobile operator groups run Nokia base stations

Annual revenue  
in 2020

€10bn

R&D engineers

~18k

In 4G and 5G  
Radio Access  
Networks (RAN),  
excluding China

#2

Commercial 5G  
agreements

196

Live 5G  
networks


55

\*) Source: GSMA Intelligence

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# We made significant progress in product development and product platform turnaround in 2019 - 2020

1	2	3	4	5
<ul style="list-style-type: none"> <li>• Renewed leadership</li> <li>• Consolidated R&amp;D</li> <li>• Grew 5G R&amp;D significantly</li> </ul>	<ul style="list-style-type: none"> <li>• Increased wireless research</li> <li>• Connected research and product Management</li> </ul>	<ul style="list-style-type: none"> <li>• Improved product development processes, methods and tools</li> </ul>	<ul style="list-style-type: none"> <li>• Renewed processor base and software architecture</li> </ul>	<ul style="list-style-type: none"> <li>• Strengthened high-performance culture</li> <li>• Nurtured learning organization</li> </ul>
R&D headcount increase in 5G/NR	Position in granted 5G Standard Essential Patents (SEP)*	5G/NR Feature Output	5G Powered by ReefShark SoC	Share of employees enabled to perform above external benchmark **
+40%	#1	+58%	Q4'19  10 Q4'20 43	75%

\*) Sources: PA Consulting Group, IPLytics GmbH    \*\*) Source: Accenture Transformation GPS

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# 5G and Enterprise are driving growth in Mobile Networks

We are still in early stages of the 5G cycle, which has an extended peak

1 5G growing in flattish CSP market

2 Trust and security increasing in importance

3 Enterprise use cases driving growth beyond mobile broadband

4 Gradual adoption of Open RAN and Virtualized RAN

4G/5G market\* share in 2021

25%-27%

Overall Mobile Networks market\* growth 2020-23

1% CAGR

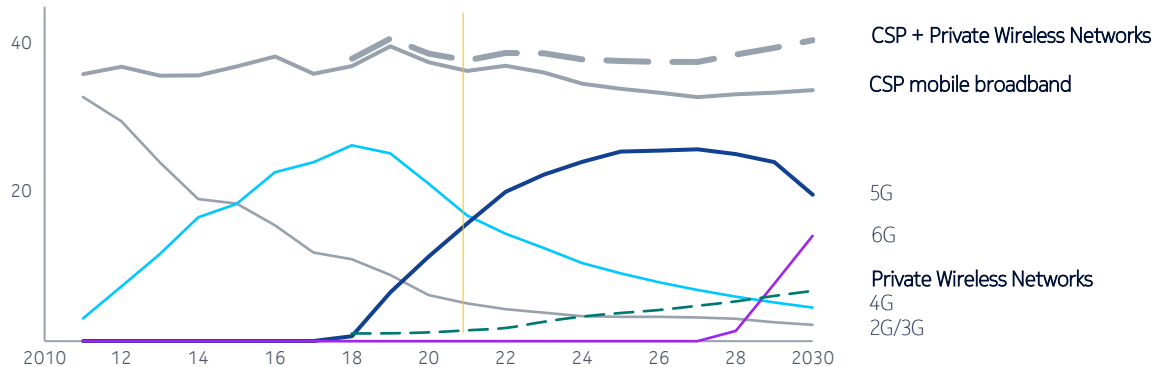
2020: €44bn

2023: €45bn

Private Wireless Networks market\* growth

35% CAGR

Radio technology product and services market\* in €bn



\*) excluding mainland China

Source: Nokia market intelligence

# We have won several new CSP customers in RAN since 2019...

... helping to offset headwinds in China and North America

22 new RAN customers

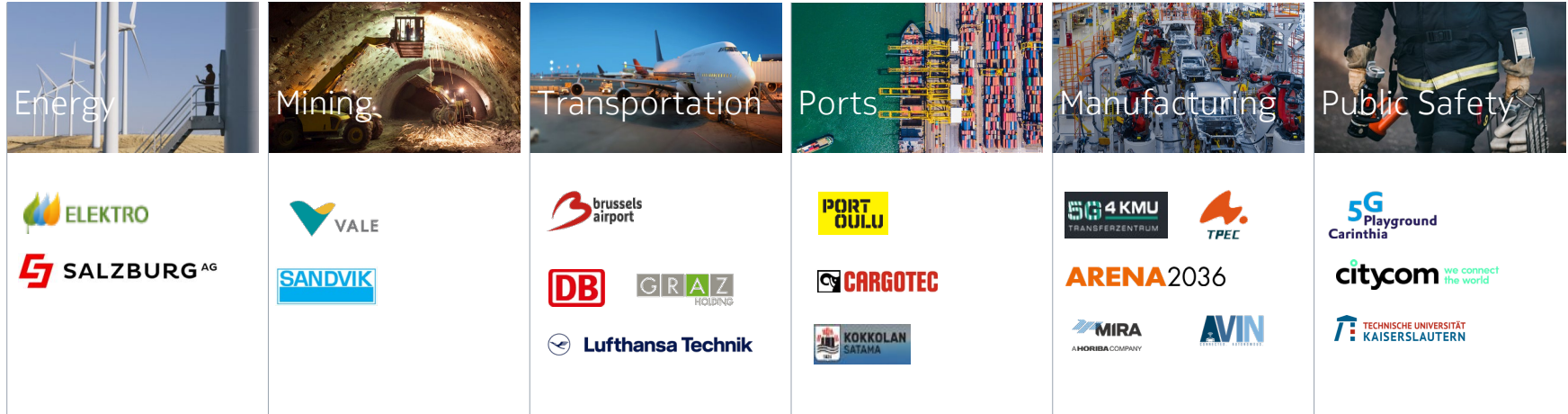
Increased RAN share with 20 customers



+4 non-public

# Private wireless and IoT expand critical networks market into Enterprise

We are leading the market in private wireless networks, a segment that grows by 35% annually



verizon✓

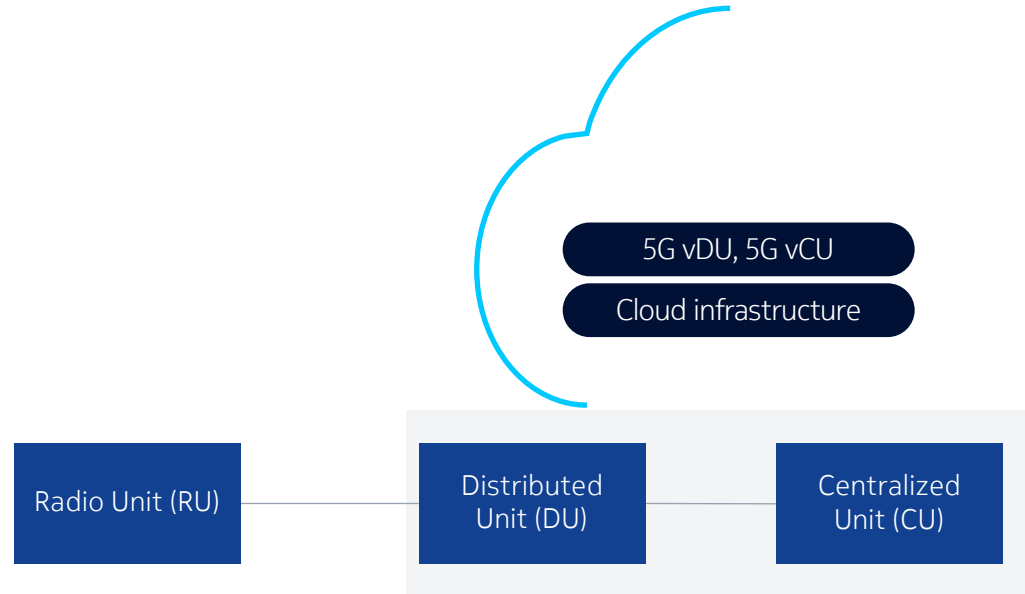
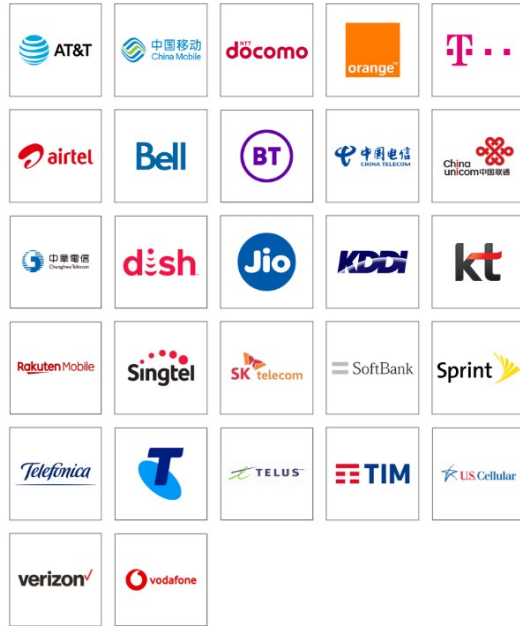


A1

Private Wireless Networks sold to 260+ customers via CSP or direct, of which 30+ are 5G

# We are shaping the future of wireless with Open RAN and vRAN

## Bringing the benefits of cloud computing to mobile networks for CSP and Enterprise



# Deutsche Telekom has chosen Nokia in O-RAN Town in Germany

We are the leader in making O-RAN and vRAN commercial reality



Claudia Nemat  
Chief Technology Officer  
Deutsche Telekom

DTAG NetzTag (Network Day) on Dec 8, 2020

“I am particularly pleased that with Nokia we have also been able to win a strong European partner for our cooperation in O-RAN”

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# Our vision for technology leadership and value creation

The leading and trusted partner for 5G wireless networks for CSPs and Enterprise

## Strategic focus

## Success factors

Comparable Operating Margin in 2023...

### Scale

- Convert Nokia 4G CSP customers to 5G
- Continue winning new CSP customers
- Continue winning in Enterprise segment

### Product competitiveness

- Build on product platform and R&D turn-around
- Increase 5G R&D capacity further
- Continue reducing product and service cost

5%-8%

### Shaping the market

- Leading solutions for e2e slicing and private wireless networks
- Make O-RAN commercial reality to gain share
- Bring cloud computing benefits to mobile networks

... and in longer term

### Resetting fixed cost base

- Reap the benefits of the new operating model
- Significantly lower fixed cost base to fund R&D increase
- Continue improving R&D productivity

10+%

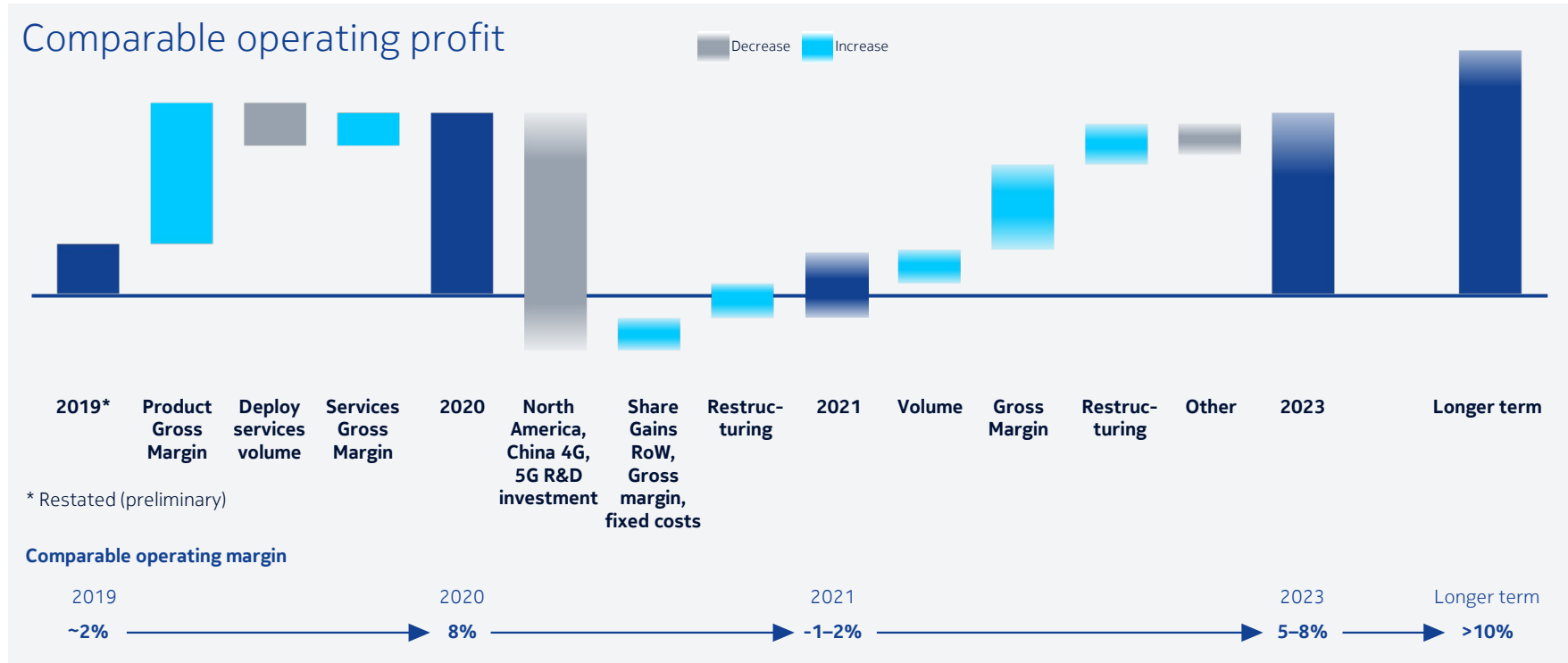
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# We have a focused strategy to regain profitability

Concrete action plans to drive technology leadership and value creation



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# Expanding ReefShark System-on-Chip (SoC) family drives competitiveness in capacity, cost and power consumption

Partnerships with leading SoC houses to complement Nokia IP for ReefShark

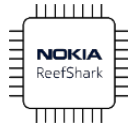
**NOKIA**



Partner IP blocks  
3<sup>rd</sup> party IP blocks

Nokia IP blocks

ReefSharks power both Baseband and RF portfolio

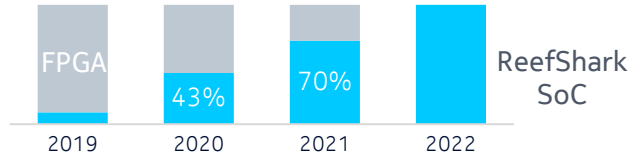


Baseband



Radio Unit

Fully ReefShark based portfolio from 2022



# We are digitalizing service delivery for cost, speed and quality

## Integrated operating model

- Increased focus on Design for Services (DfS) in product development
- Optimizing total cost of ownership for products and attached services

## Digitalization and automation

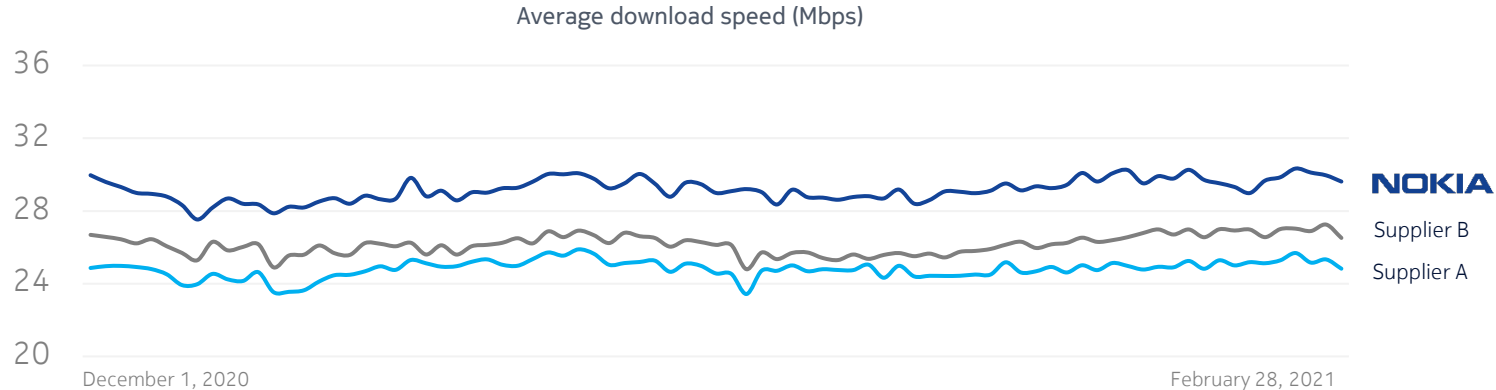
- 100% digitalized 5G deployments worldwide
- Industry-first AI based intuitive chatbot embedded into case handling process
- Industry-first "zero-touch" site and cluster acceptance

## Efficiency and execution excellence

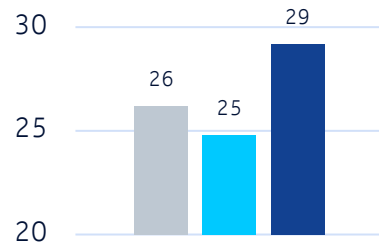
- 35% improvement in end-to-end deployment lead time
- Up to 30% reduction in case handling time

# Crowdsourced data shows Nokia 4G leads the market in performance

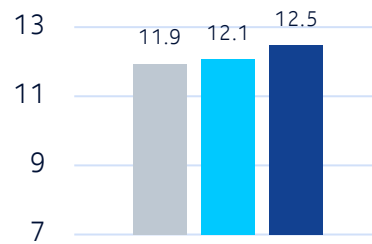
We deliver the highest data speeds across 36 representative countries and 226 cities



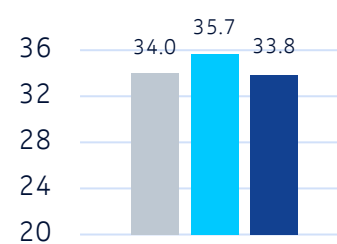
Average 4G downlink speed (Mbps)



Average 4G uplink speed (Mbps)



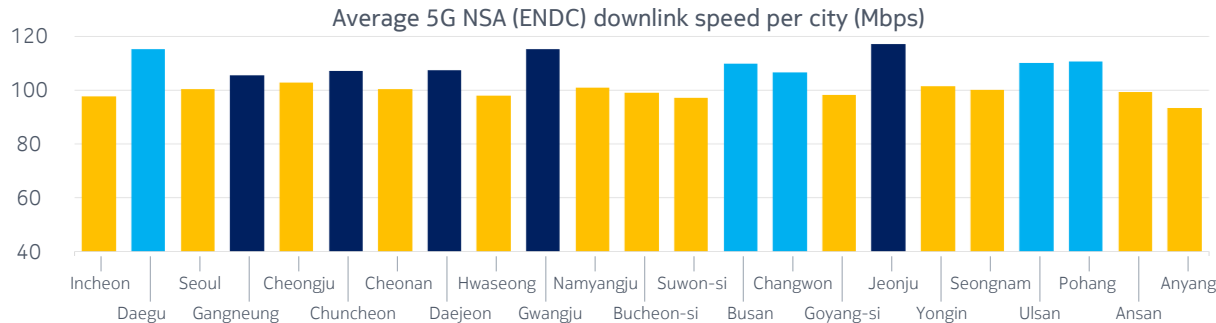
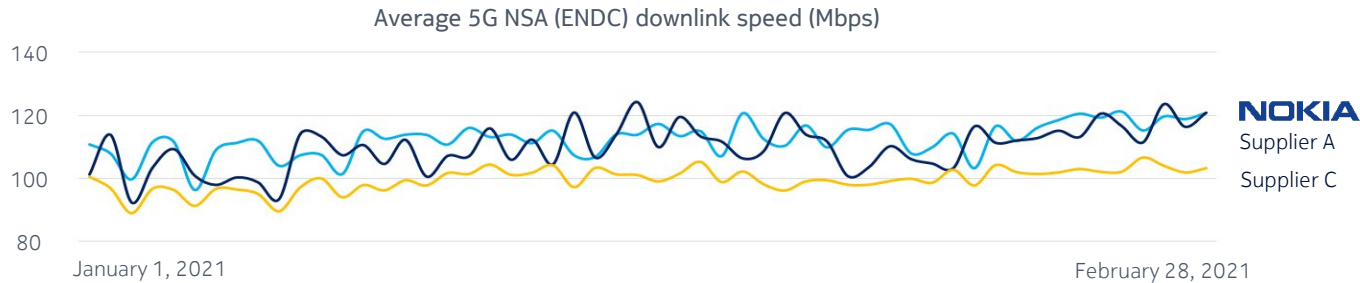
Average 4G latency (ms)



Nokia analysis based on crowdsourced data from Tutela Technologies, Ltd.

# Crowdsourced data shows positive Nokia 5G NSA performance

A case of large South Korean dual-connectivity network with three suppliers



Nokia analysis based on crowdsourced data from Tutela Technologies, Ltd.

# We are resetting fixed cost base with new operating model...

...while sharpening focus on customers and our culture

## New operating model

One P&L

Fully P&L  
accountable  
Business Group

Managing product and  
attached services  
business as one

End-to-end  
Regional Business  
Centers

Strong  
performance  
management

## Learning

Continuous  
learning



Trust



## High performance

Total business  
ownership



Commitment  
culture



Cross-functional  
collaboration



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# Timeline to technology leadership and improved value creation

2021

## Reset

- ✓ Secure full portfolio competitiveness
- ✓ Continue 5G momentum with CSPs and for private wireless customers
- ✓ Launch vRAN2.0 and O-RAN solutions
- ✓ Reset fixed costs

**-1%...2% Operating Margin in 2021**

2022-2023

## Accelerate

- ✓ Lead in 5G network performance
- ✓ Convert portfolio competitiveness into further revenue and margin with CSPs and for private wireless customers
- ✓ Capitalize on early O-RAN/vRAN market-making
- ✓ Reap full benefits of fixed cost reset

**5%...8% Operating Margin in 2023**

Longer term

## Scale

- ✓ Finalize and densify CSP 5G build-outs
- ✓ Drive 5G growth with new use cases for private wireless networks
- ✓ Transition most CSP spectrum to 5G
- ✓ Profit from O-RAN and vRAN leadership
- ✓ Prepare for 6G

**10+% Operating Margin in longer term**

**NOKIA**