



NOKIA

5G Enables Enterprise

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Marketing & Corporate Affairs

Megatrends are changing the world, and the ways we connect with it



Network,
compute
& storage

Broadband every-
where, distributed
cloud, near infinite
storage



Internet
of Things

Connectivity for
a trillion things



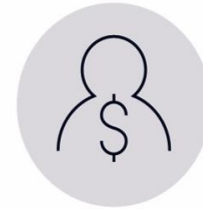
Augmented
intelligence

Human assistance
and task
automation at
machine scale



Human
& machine
interaction

Virtual and
augmented reality,
reshaping how we
interact with
machines



Social & trust
economics

Sharing economy
and digital
currencies making
trust and security
essential



Digitalization
& ecosystems

Digitalization of
services,
operations,
network and
supply chain

First
Industrial
Revolution



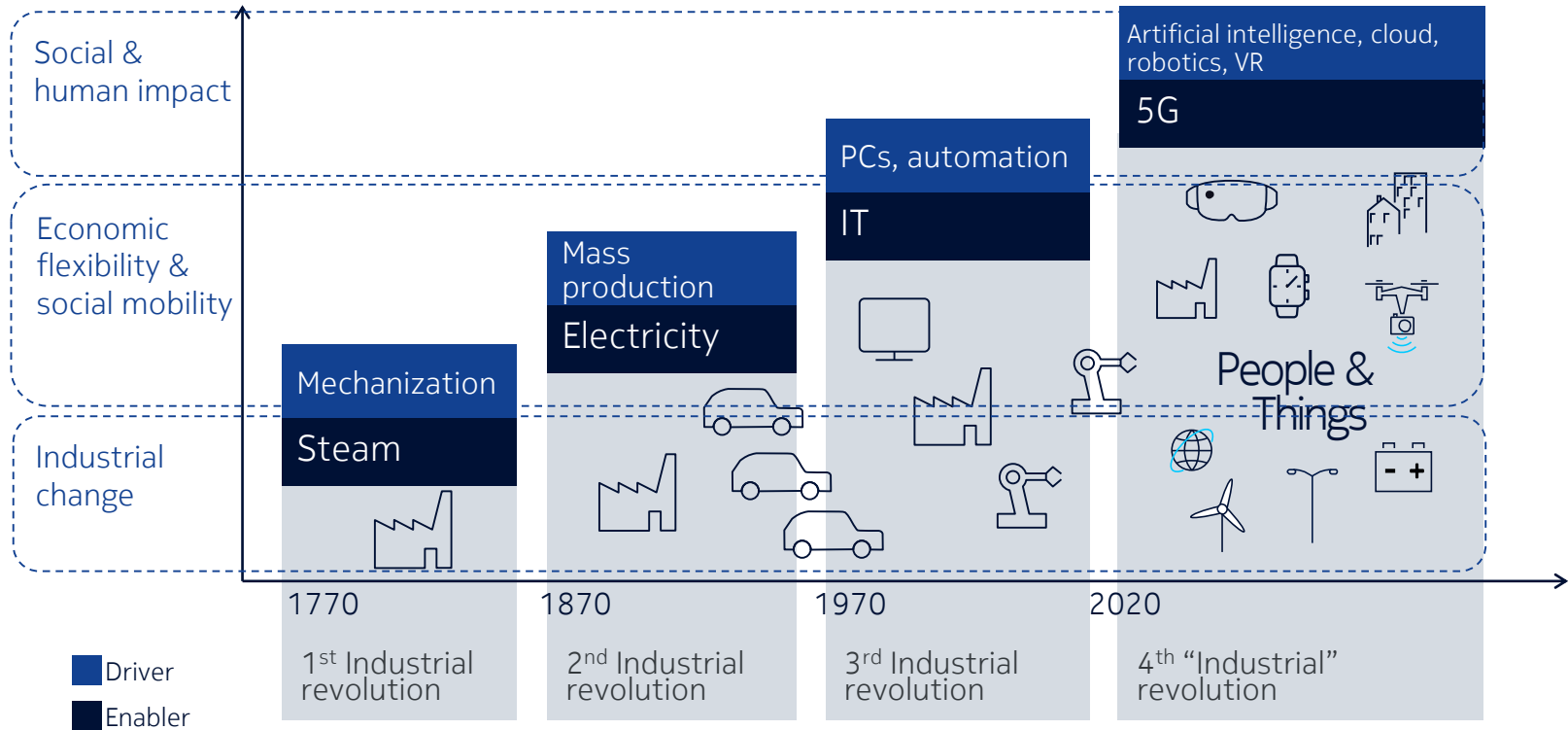
Second
Industrial
Revolution



Third
Industrial
Revolution



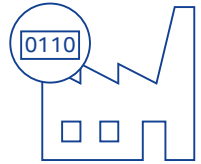
4th “industrial” revolution powered by 5G



Megatrends, challenges and market opportunities

Digital transformation = Cornerstone of the 4th Industrial revolution

Mobile wireless technologies & IoT are 2 key enablers that will help verticals & public sector operations evolve as much it changed people's life in the last decade



Will help embrace today's megatrends...

Managing natural resources



Urbanization impact on infrastructure



Enterprises & public sector efficiency



Globalization of supply and demand



Some industry verticals have massive transformation & gain potential

Energy



Transportation



Industry



Sports and entertainment



Retail

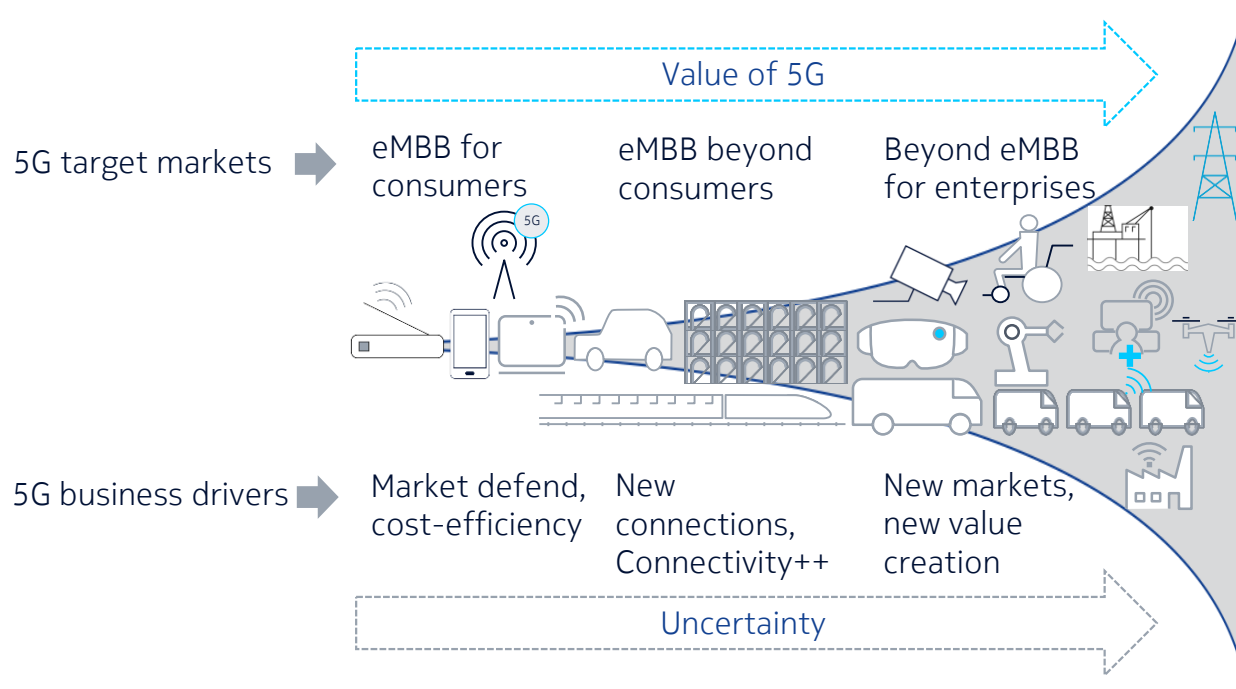


Cities



Promise of 5G

Enabler for CSPs to capture new industrial, infrastructure and enterprise value



Market defense and cost efficiency in short term but new markets and value creation in long term

Business case for 5G

Not driven by single use case but a journey of value creation & capture

5G
Access

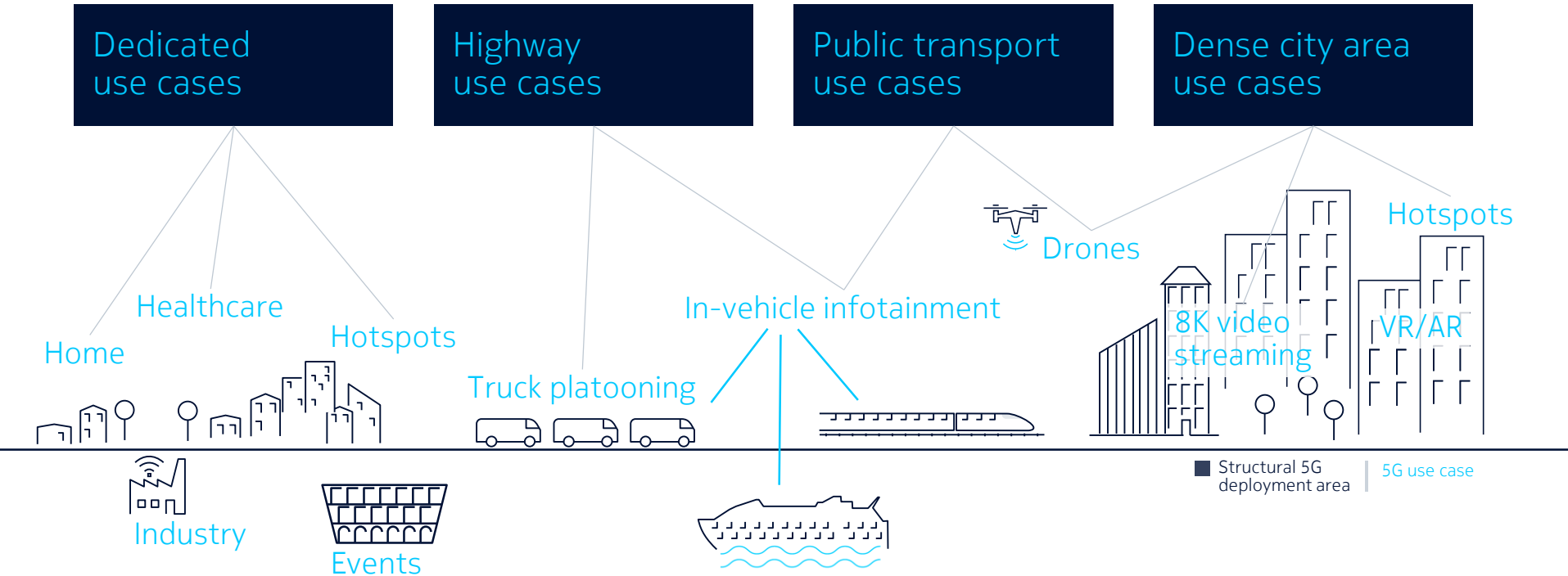
5G
Application

Use Cases



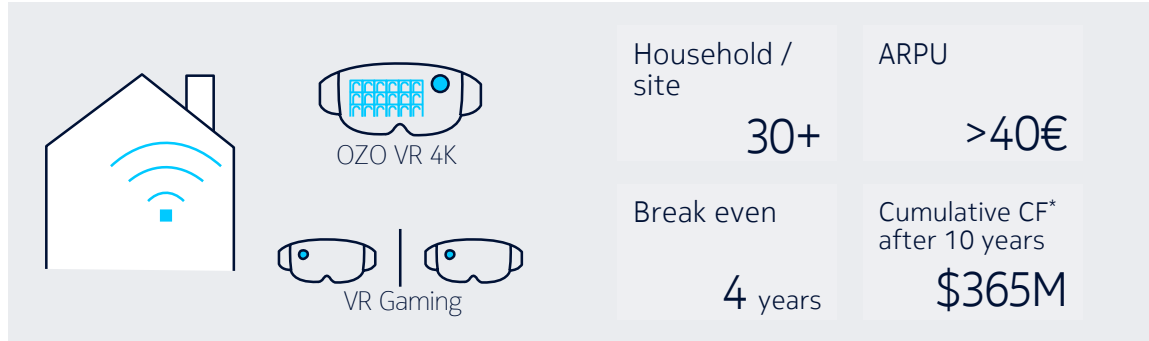
5G early market use cases

Nokia study unveils high value use cases and their business models



5G home experience – immersive video and virtual reality services

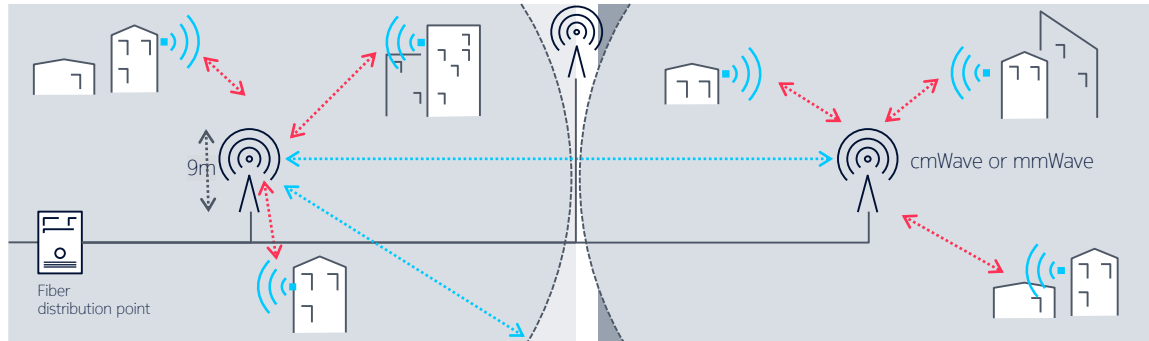
Fiber speeds without cables



Fiber like speeds
to multiple 10s of houses from single BTS

<5ms latency
to avoid motion sickness for VR services

5G
Advantage



Accelerate Gbps roll out
compared to FTTP/GPON

Overcome uncertainty
of FTTH adoption impact

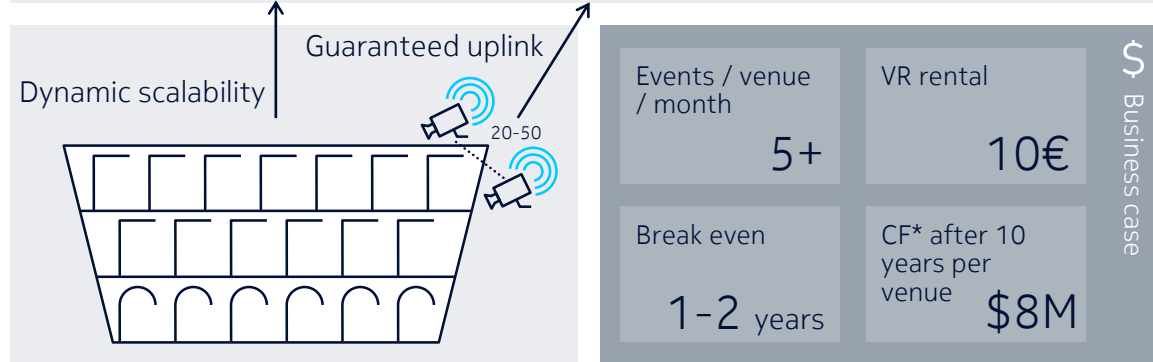
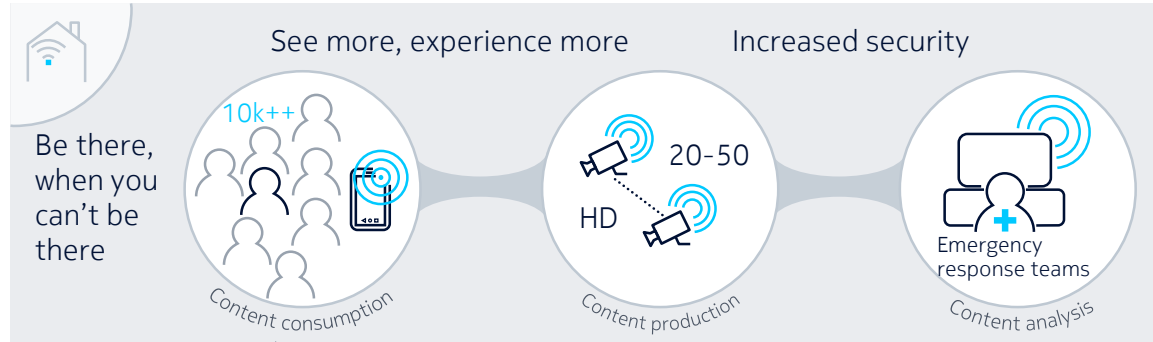
Infrastructure build up
to mobile 5G is minimized

Benefits

*1) Cash flow, Example US operator

5G event experience – get close to the action

Multiple camera views and virtual reality to thousands of spectators



*) Cumulative Cash Flow, Example UK operator

20 x lower delivery cost of HD multi-feed video

40 x more capacity in a stadium

30% take-rate compared to 2% by 4.5G

5G

Advantage

Ticket upsell with video and VR services

Strategic positioning amongst sport enthusiasts

VR/AR devices channel

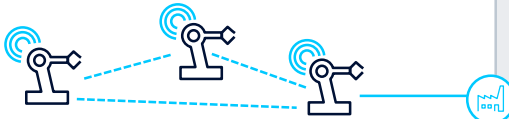
Focused advertisement




Benefits

5G industry experience – enabling industry 4.0


Resilient, secure low-latency communication




Manufacturing and process automation
Resilient, secure low-latency comms



Intrusion detection
Critical comms



AR-enhanced maintenance
Public MNO slice



Wireline connections today
>90%

Ultra-low latency at scale **5G**
<1ms; 99.999% reliability

Inherent security
by dedicated network slices

Single company network
for all kinds of industrial applications

Advantage

Overall costs for greenfield 2-5 times lower	# of sensors ↑ = Payback period ↓
Break even for wireline replacement 1 year	Reconfiguration cycle ↓ = Payback period ↓

Business case

Removing cost of cabling installation and maintenance

Less reconfiguration time

Less production capacity overprovisioning

Benefits

5G truck platooning – automatically controlled convoys

Cutting costs of transportation, increasing safety



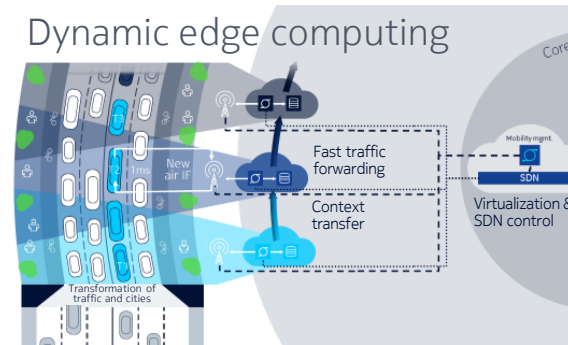
Ultra-low latency
 <1ms to avoid oscillation at tightly-knit convoy

Enabling platoons >4
 not feasible with truck-to-truck

Inherent system security
 by dedicated network slices

5G

Advantage



Fuel savings lead truck

4%

Driver-truck-ratio

1 to 4

Fuel savings following trucks

10%

Operator break even*

6 years

Business case

Revenue* in transportation
 E2e fleet management service

Society benefits
 Efficient infrastructure use

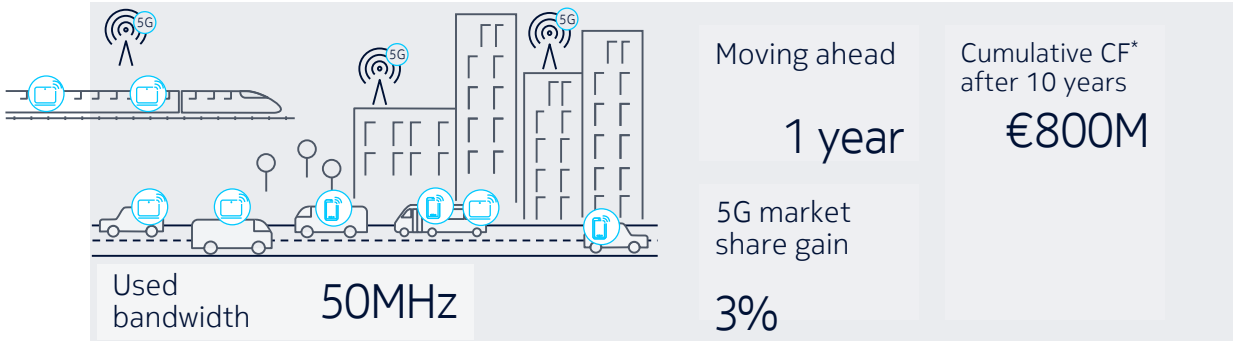
*) CSP revenue calculated with 12.5% of cost savings for positive biz case



Benefits

5G in-vehicle infotainment – additional business with urban 5G deployments

HD, UHD and 3D content to multiple users in the same moving vehicle



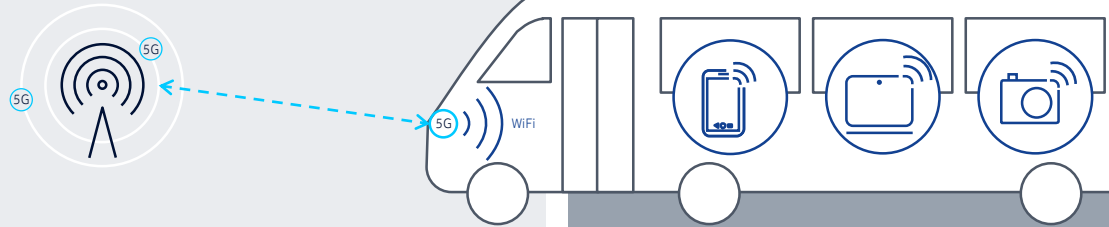
Consistent service
across complete journey at high
speed

Precisely directed beams
to multitude of passengers

Increased cell capacity
up to 10 Gbps DL / 3 Gbps UL peak
and more users/cell

5G
Advantage

Experience also for non-
5G-enabled WiFi devices



Leverage 5G infrastructure
in early dense urban deployments

Early 5G revenues
ahead of 5G device mass market

Strategic move
into public transportation and
automotive segments

5G
Benefits

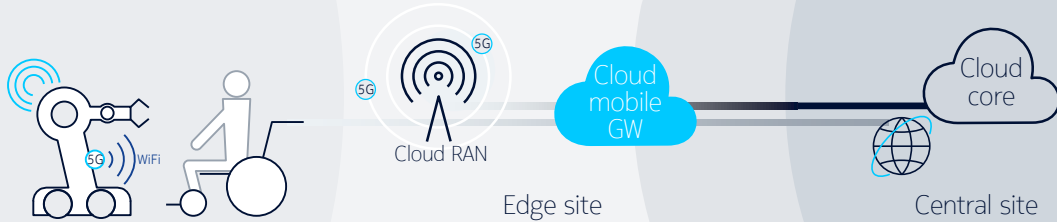
*) Discounted cumulative Cash Flow, Example UK operator

5G for connected healthcare

Immediate network response for critical interaction with humans

Remote care

Immediate situational robot control



Direct haptic feedback
<5ms;

Haptics & vision in sync
99.999% reliability

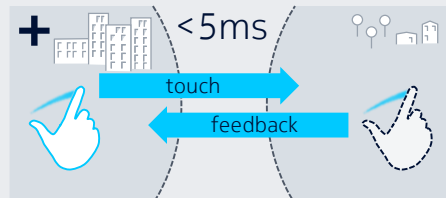
Situational robot control
AI* at edge computing centers for self-moving care robots

5G

Advantage

Remote examination and surgery

Immediate sensory feedback



Same sense of touch



Haptics & vision in sync

Break even operator

<1 year

Break even care provider

<6 years

Business case

Reduced care costs
while improving quality of life

Remote surgery, a niche but
high margin business

Remote care meets aging
population trend



Benefits

*) Artificial intelligence

Turn 5G visions into real business

Use case approach

- Bell Labs modelling
- Holistic approach to transformation

Automation & analytics

- Investments in AI, analytics & automation

End-to-end expertise

- 1st live 5G network in Korea
- Hamburg port (live network slicing trials)



Creating the technology to
connect the world

NOKIA