

# 5G the new normal



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## ITUWebinars

**Colloquium: 5G  
and Internet access**  
ICT Applications and Internet 2021  
(ITEC 2021)

5 to 9 July 2021  
Online

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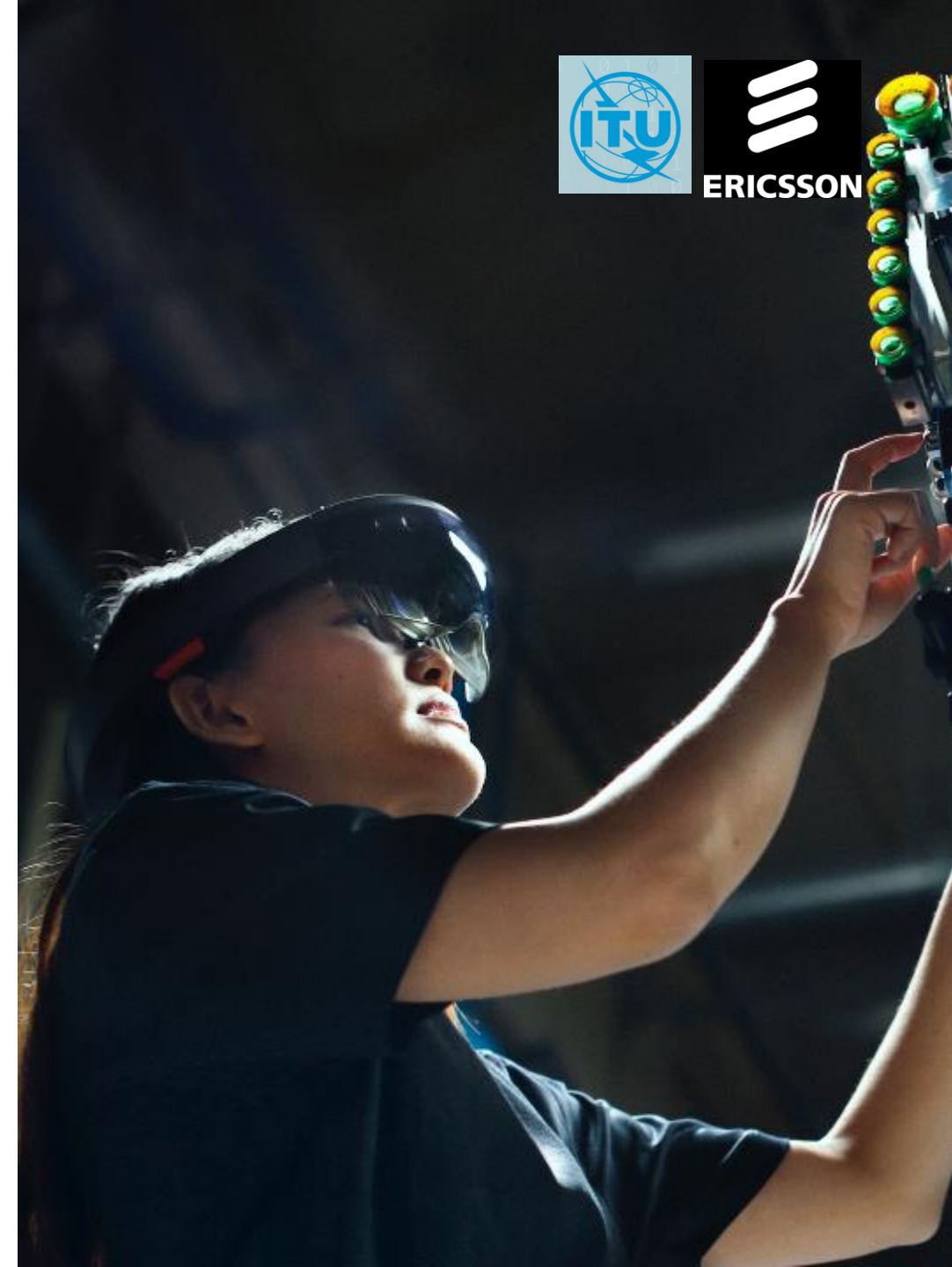
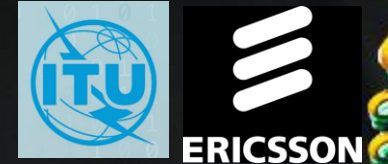
WITH THE EVENT EMERGING TECHNOLOGY  
FOR CONNECTIVITY  
**ONLINE 2021**  
GLOBAL AND REGIONAL DIALOGUES AND TRAININGS



# 5G the new normal

- 5G breaking news of 2021 – Q2 and trends
- 5G towards a smarter society with AI
- 5G enabler the Industry 4.0
- 5G disrupting User
- Conclusion & Wrap-Up

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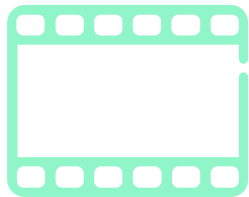
# Ericsson in the Quest for Easy towards 5G



YouTube

# Drivers for a new Telecommunication Generation

MORE  
USAGE



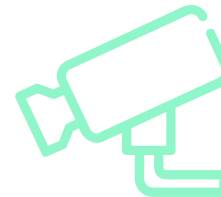
8x mobile data  
traffic by 2023

MORE  
PEOPLE



8.9 billion subscribers  
by 2023

MORE  
THINGS



31 billion IoT devices  
by 2023

MORE  
BUSINESS

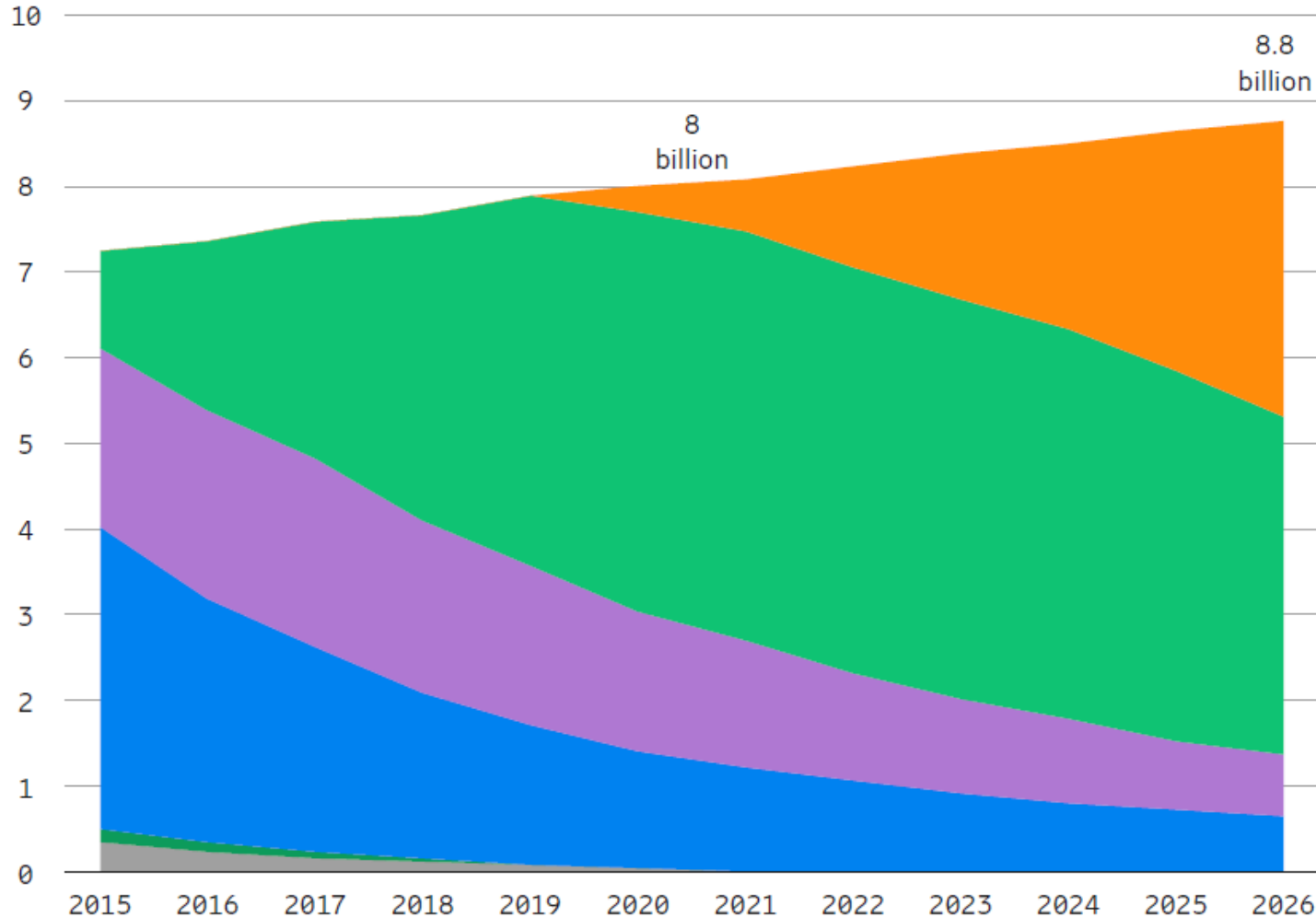


Fixed Wireless Access,  
Smart Cities, IoT, Edge  
...more to discover

# 160 Operators launched 5G services despite COVID



Mobile subscriptions by technology (billion)



**3.5bn**  
In 2026, 3.5 billion 5G subscriptions are forecast.

- 5G
- LTE (4G)
- WCDMA/HSPA (3G)
- GSM/EDGE-only (2G)
- TD-SCDMA (3G)
- CDMA-only (2G/3G)

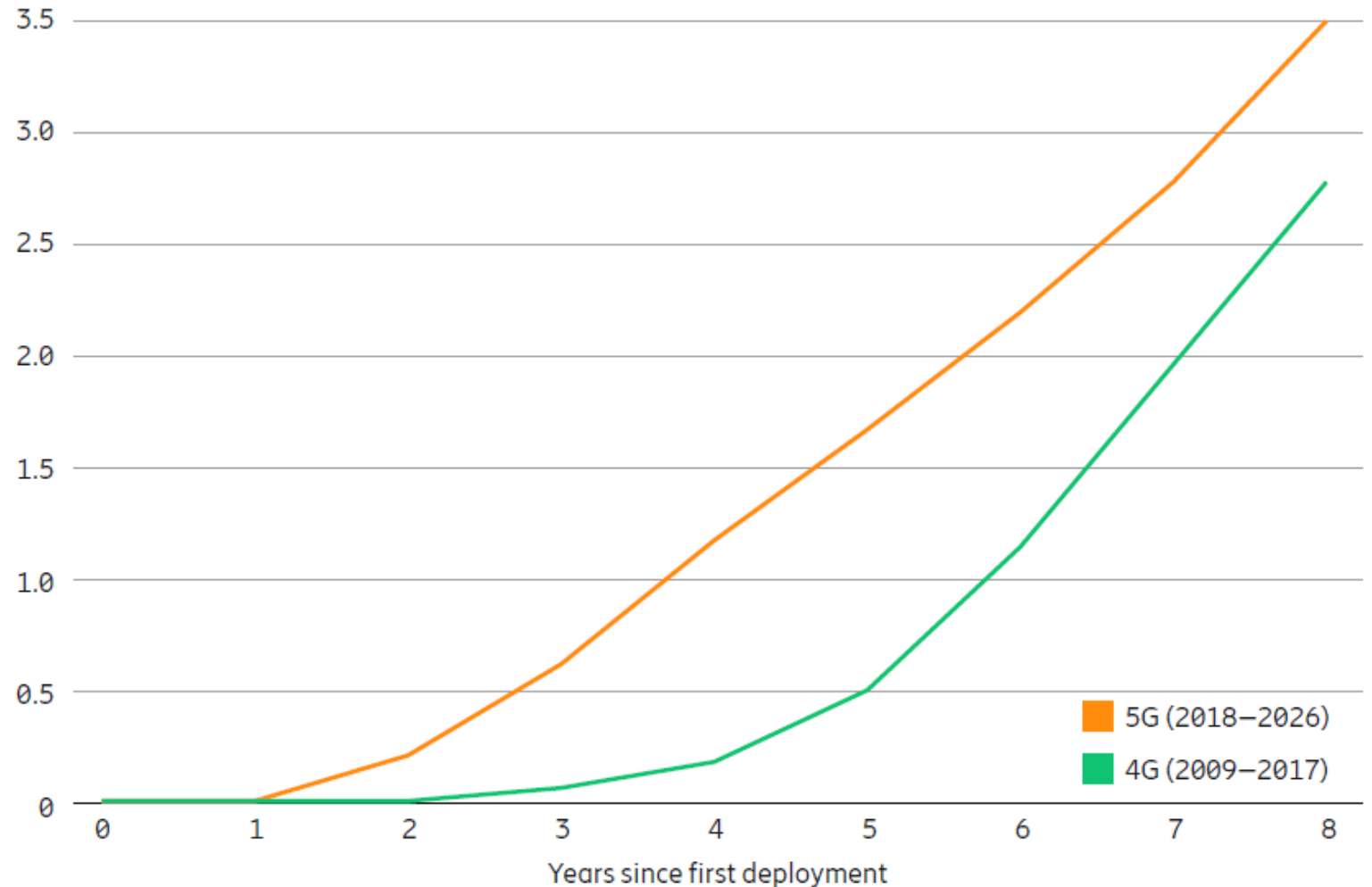
Note: IoT connections are not included in this graph. Fixed wireless access (FWA) connections are included.

<sup>1</sup>GSA (April 2021).

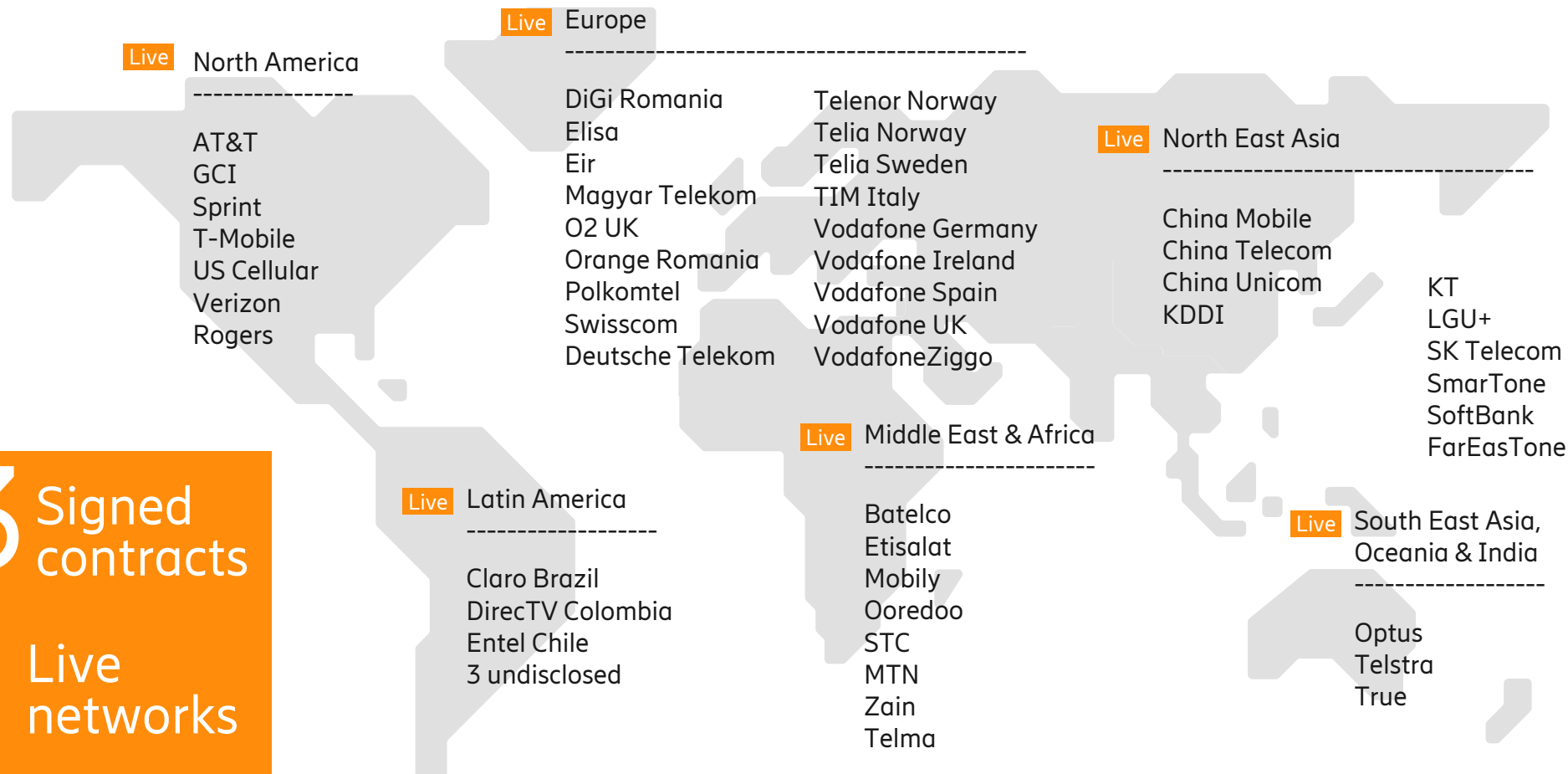
<sup>2</sup>A 5G subscription is counted as such when associated with a device that supports New Radio (NR), as specified in 3GPP Release 15, and is connected to a 5G-enabled network.

# 5G uptake is expected to be faster than 4G

Comparison of 5G and 4G subscription uptake in the first years of deployment (billion)



# 90% of Operators has adopted Ericsson 5G RADIO and/or CORE



143 Signed contracts

92 Live networks

44 Countries

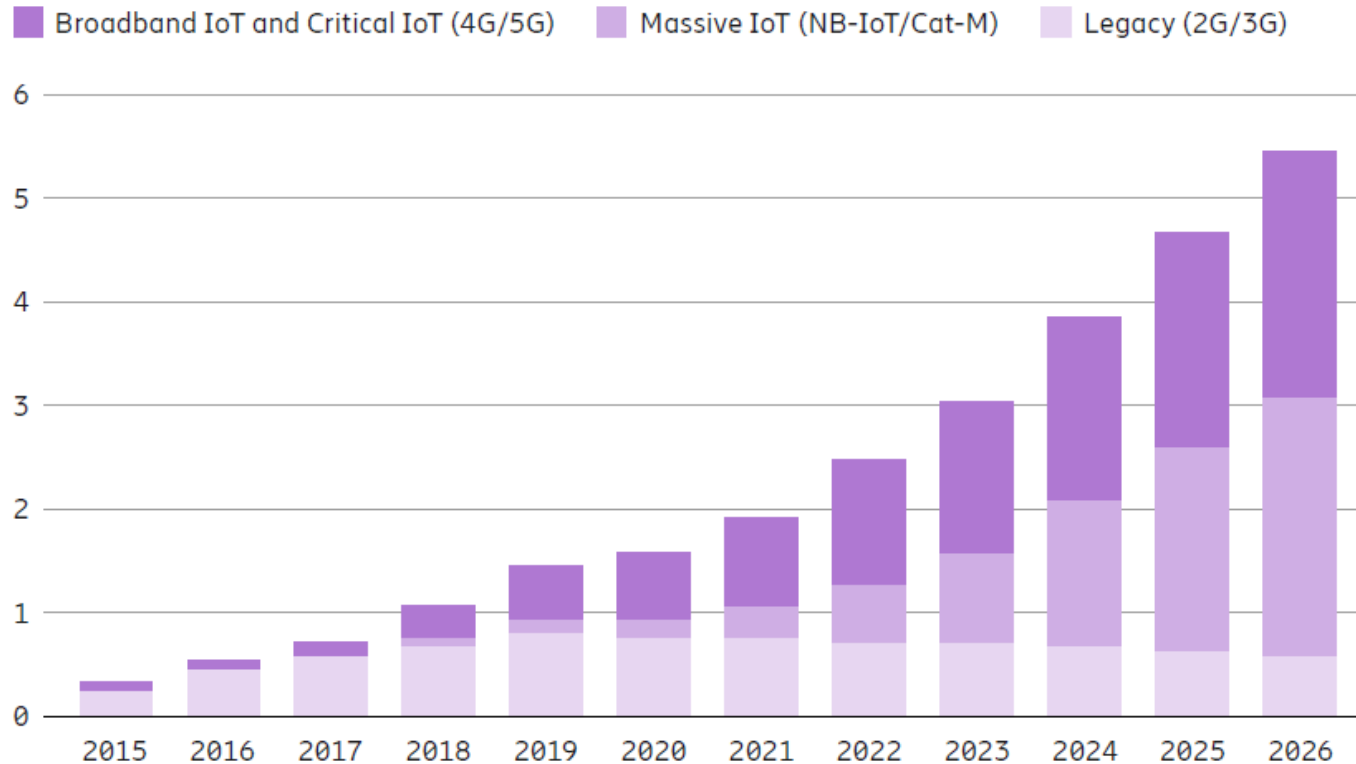
\*As of July 2021

Source: <https://www.ericsson.com/en/5g>

# During 2021, broadband IoT (4G/5G) will overtake 2G/3G as the segment that enables the biggest share of IoT applications



Cellular IoT connections by segment and technology (billion)



<sup>1</sup> Cat-M includes both Cat-M1 and Cat-M2. Only Cat-M1 is being supported today.

<sup>2</sup> These figures are also included in the figures for wide-area IoT.

IoT connections (billion)

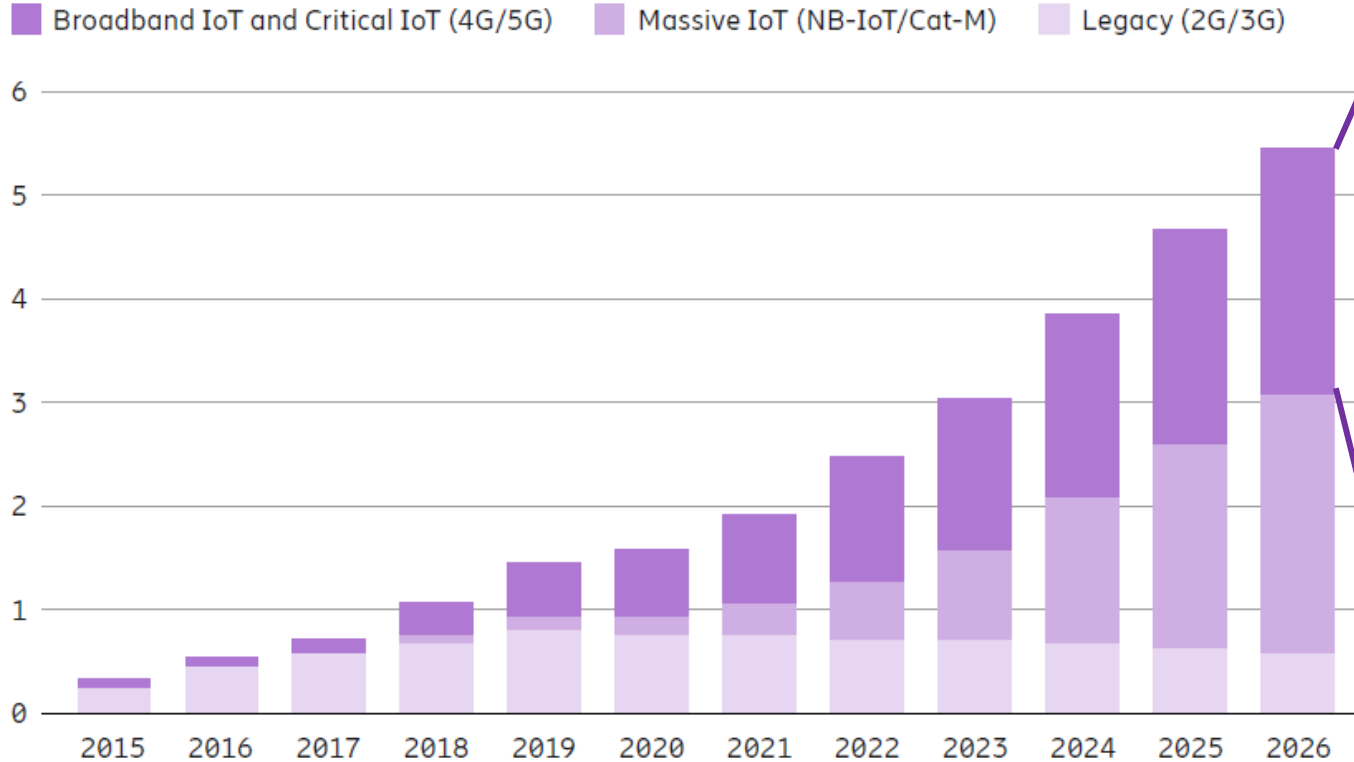
IoT	2020	2026	CAGR
Wide-area IoT	1.7	5.8	23%
Cellular IoT <sup>2</sup>	1.6	5.4	23%
Short-range IoT	10.7	20.6	12%
<b>Total</b>	<b>12.4</b>	<b>26.4</b>	<b>13%</b>



# Broadband IoT triggered by Entertainment, 8K, One Number in multidevice, Multiline in one device

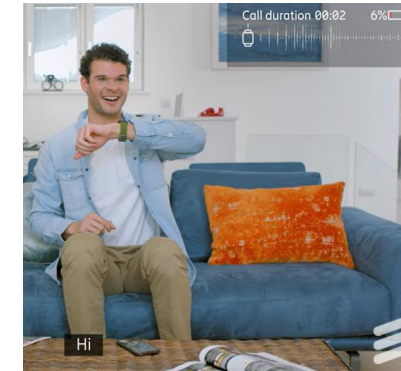


Cellular IoT connections by segment and technology (billion)

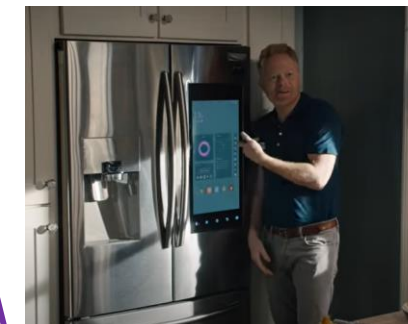


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YouTube One Number / Multi Device



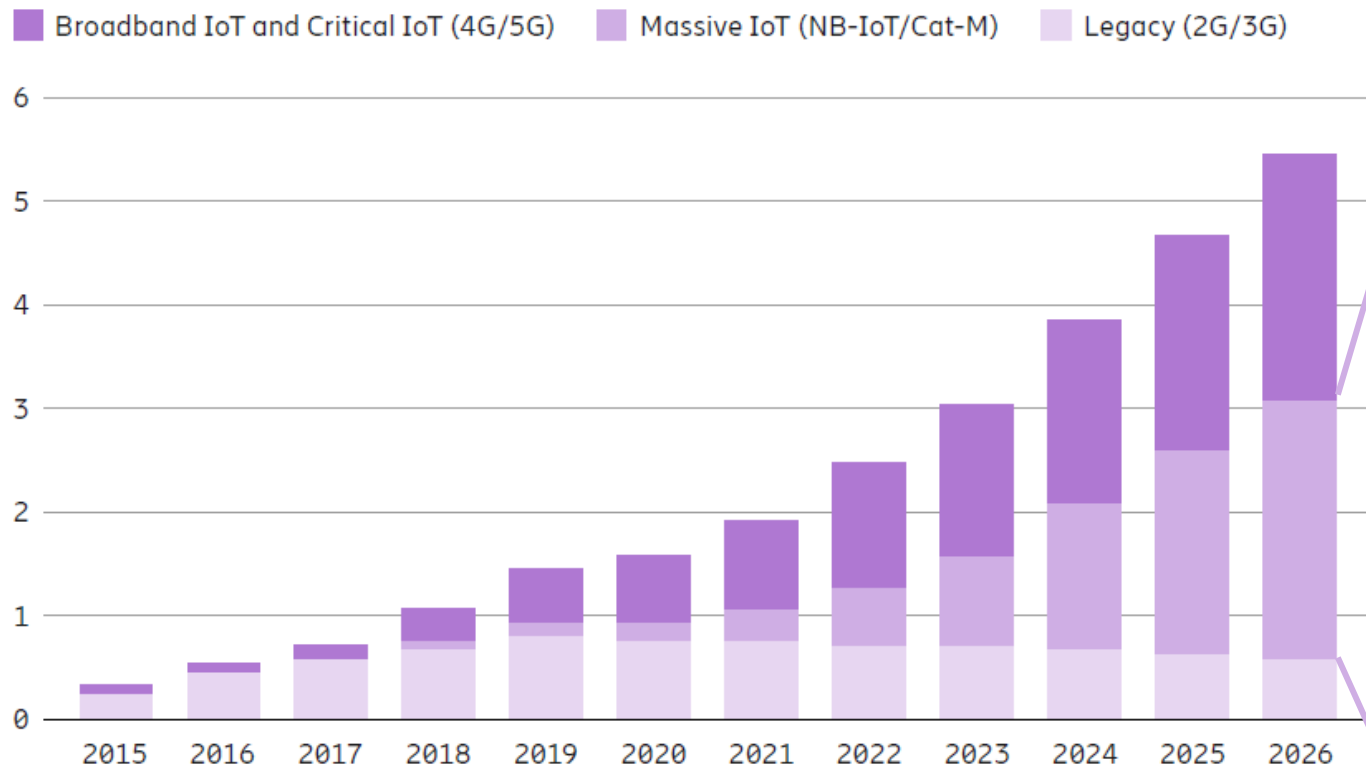
YouTube Smart Fridge eSIM



Fixed Wireless Access

# Massive IoT enabled by long battery duration with reliable connectivity even in non optimal conditions

Cellular IoT connections by segment and technology (billion)

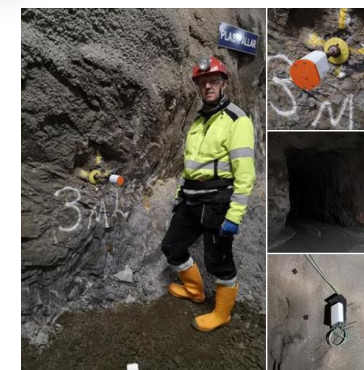


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Trackers Anti Jammer

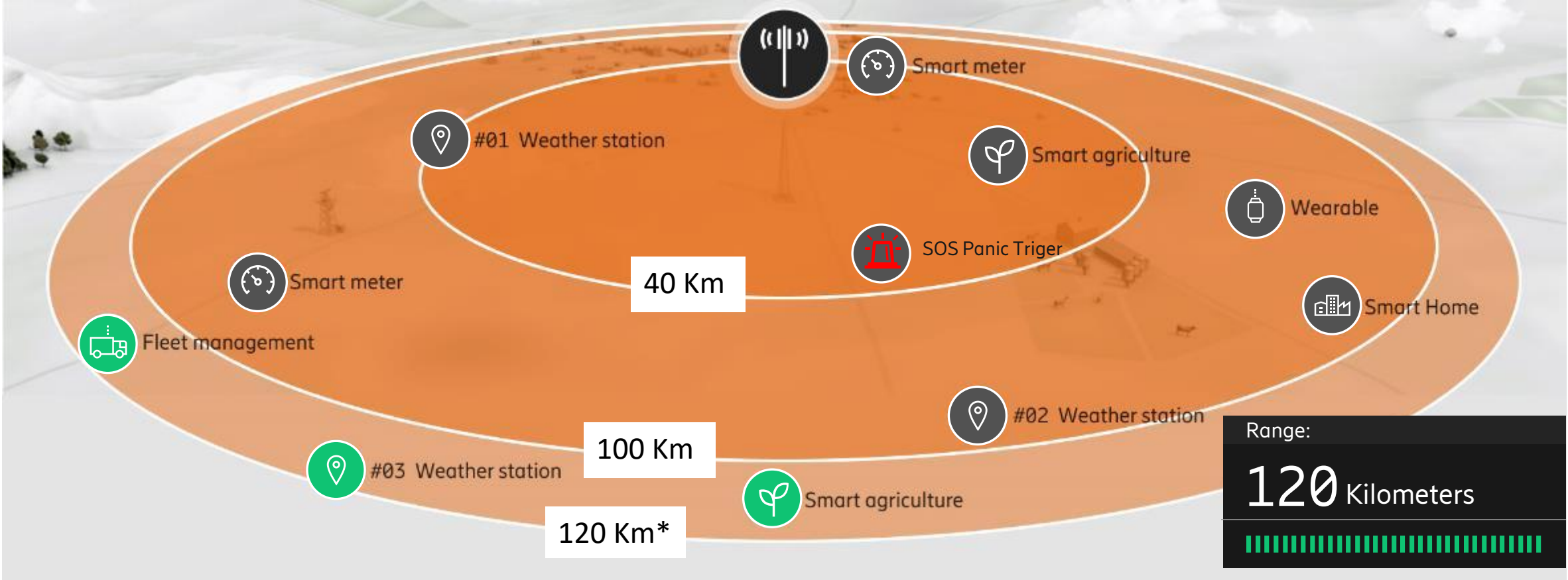


Rock bolt Nb-IoT (10 years battery duration)

# Software upgrade to existing LTE+ enabling extended coverage with Cat-M1 y Nb-IoT



Reliable repetition protocols to use guard band and buffering increasing cell capacity with long battery duration of IoT devices.










\*Coverage extensión depends on constrains, signal attenuation, and other specific constrains

# ✓ Challenge: Capacity to fulfill massive IoT in 4,5G



Meeting diversity of use case requirements enabled by LTE Advanced

	 Bandwidth Spectrum Carrier	 Coverage	 Battery life	 Capacity	 Peak Throughput	 Mobility	 Voice
<b>Cat-M1</b> Wide range of applications	1.4 MHz	160dB (+15dB)	10+ Year	1M+/cell	0.8/1 Mbps (300/375 kbps)	Connected & idle mode mobility	<b>Supported</b>
<b>NB-IoT</b> Ultra low-bitrate applications	200 kHz	164dB (+20dB)	10+ Year	200K/cell	227/250 kbps (21/63 kbps)	Idle mode mobility	Not Supported

**Ericsson supports all IoT technologies based on the 3GPP interoperability standards**

# Coverage test with sensor Nb-IoT / Cat-M1 in underground parking level-5 of Ericsson Chile building (antenna at 2nd floor)



Santiago, Chile, November 11th 2019 – Ericsson Chile Head Quarter & Lab , Las Condes



Search in Youtube: "1er Red IoT Experimental de Calidad de Aire con Tecnología 5G / LTE "Advanced

# ✓ Challenge: Coverage Everywhere with 4G +4,5G+5G



ERICSSON

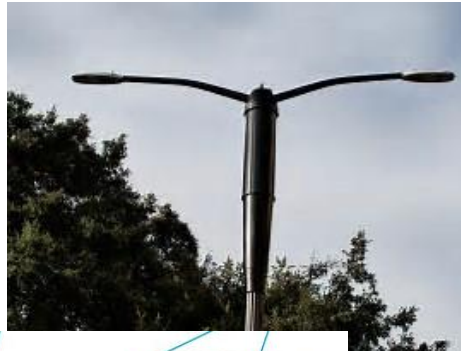
NON-EXHAUSTIVE

## Micro Cells with Ruggedized Enclosure



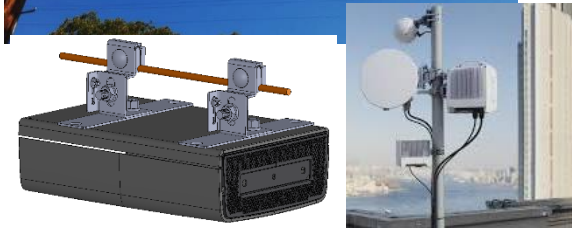
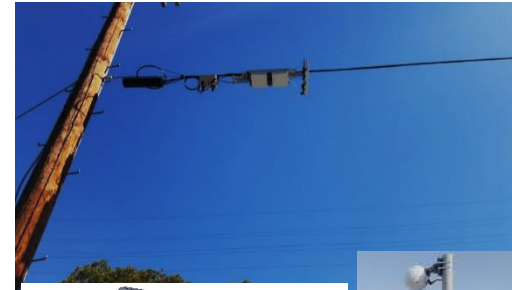
Underground Mining  
Indoor IoT for Office  
Industrial IoT  
Smart Parking  
Smart Building

## Invisible Site



Smart Transport  
Smart Lighting  
Smart Parking  
Fleet Management  
Connected Cars  
Connected Fleet Mgmt.  
Wearables

## Small Cells Hanged



Open Pit Mining  
Connected Ports  
Smart Farming  
Smart Parking

## Micro Sites



## Macro Sites



Industrial IoT  
Connected Building  
Connected Hospitals  
E-Health wearables  
Connected Ports  
Smart Cities  
Fleet Management  
Smart Metering  
Smart Farming  
Connected Cars

# ✓ Challenge: Low latency with Cloud/Edge processing



On Premise

\$\$\$\$  
<1ms  
Core



\$\$\$  
10ms  
Core



\$\$  
50ms  
Core



\$

100ms  
Core



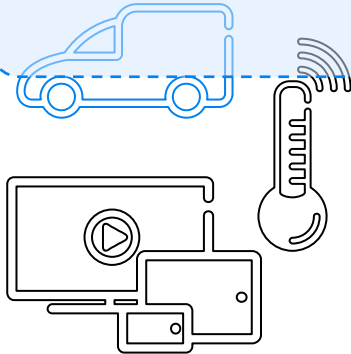
Scale across  
with Orchestration

Scale out

Scale up

Public  
Cloud

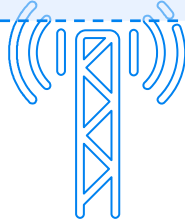
Application / VNFs



Terminal or  
Mine Local Processing



Access Point  
Small Sizing of Core



Regional DC  
Central Office  
Core Medium sizing



Data Center,  
Private Cloud  
Hyperscale Data Center



## Less distributed

- IoT Massive Metering
- Applications with global visibility
- Heavy data processing / machine learning
- Large & cold storage

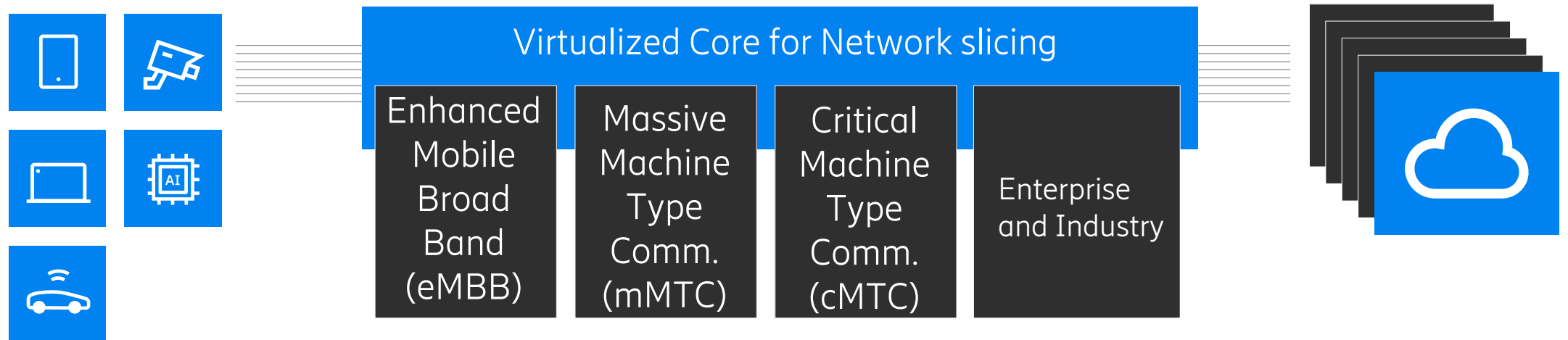


# ✓ 5G Interoperability in one network for multiple Use Case & Industries

RADIO

10-100x End-user data rates	1000x Mobile data volumes	50x Lower latency	100x More devices
Low cost Device cost reduction	5x NW energy efficiency	3x Spectral efficiency	

CORE

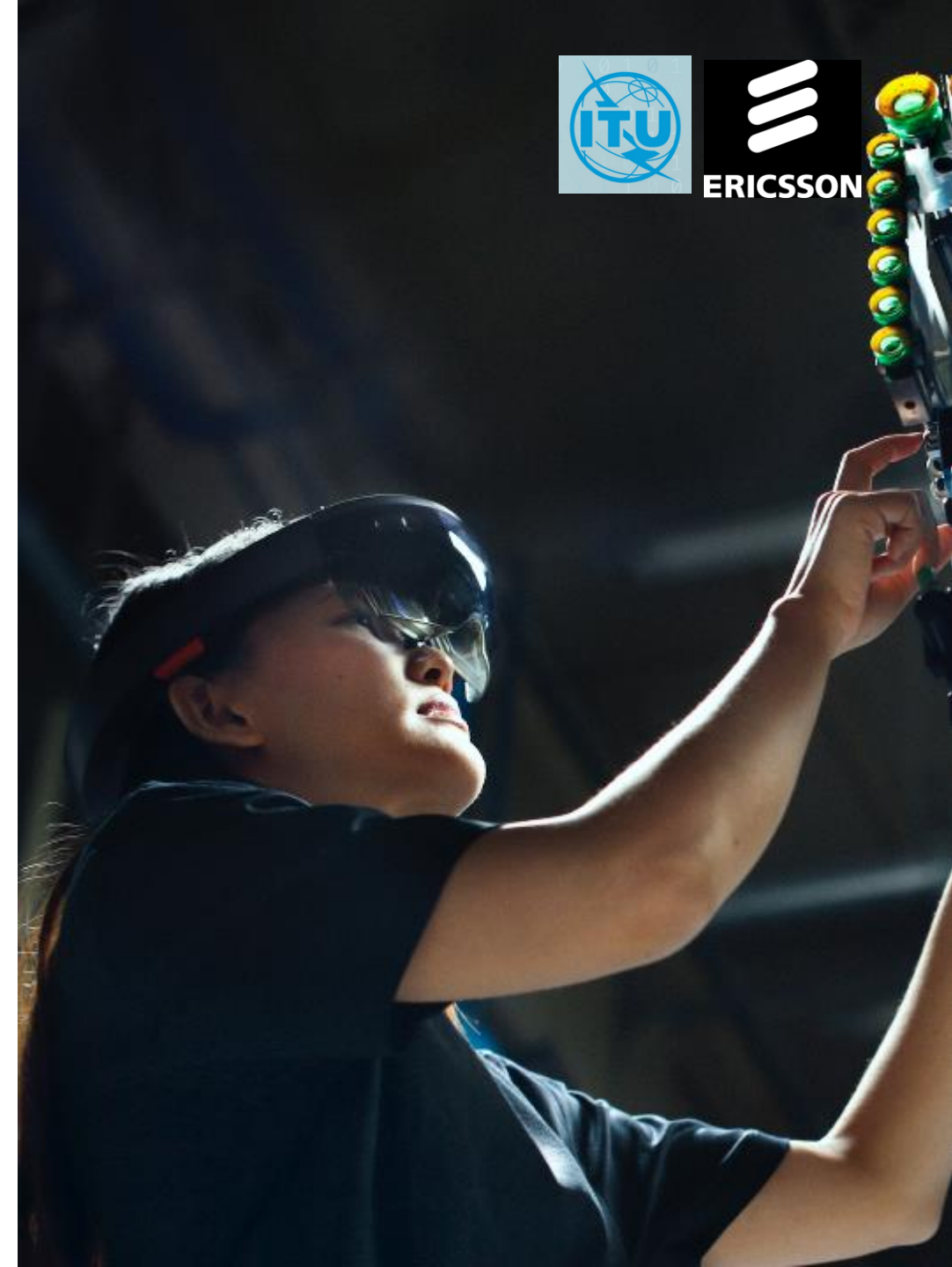




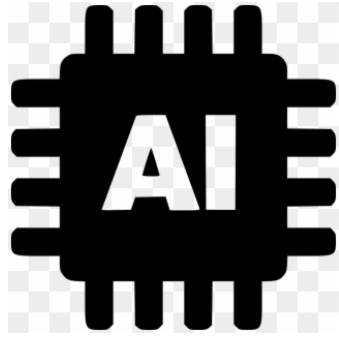
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# Close relationship between 5G and Artificial Intelligence



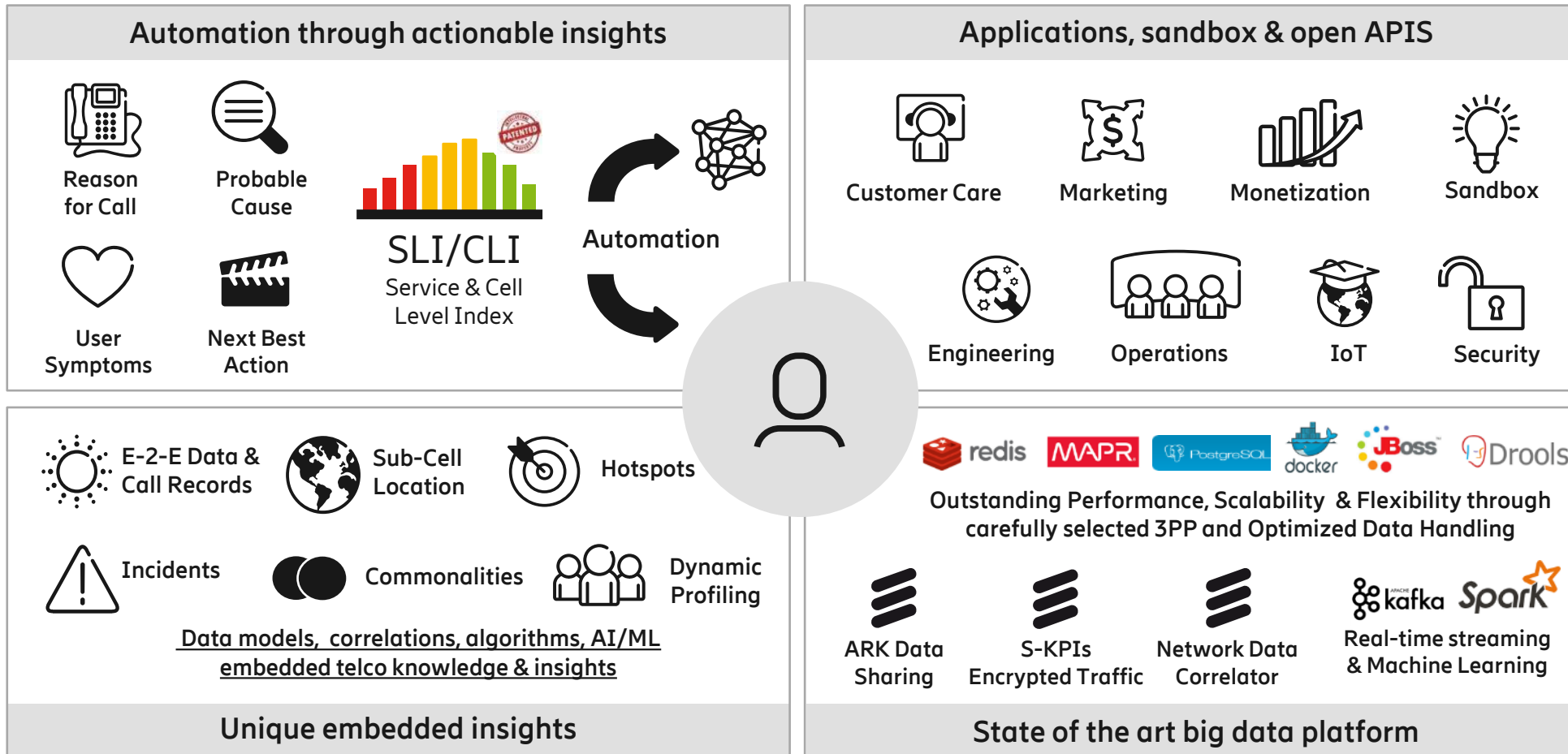
Ability  
for Computers to  
See  
Learn  
Communicate  
like Humans



Enabler  
for Subscribers to  
Sense and Control  
Simplify, be safer, more productive, enhanced  
Everywhere with High throughput and low latency  
to assist Human as an extension of their skills

# Ericsson Expert Analytics to simplify Telco management

Largest Processor



Telecom Customer with Ericsson Expert Analytics

90.000

EEA Correlated Data Sessions per second

Google

40.000

Average queries per second (globally)

Twitter

6.000

Average #tweets per second (globally)

Visanet

2.000

Average transactions per second (globally)

We have packaged our telecom experience and knowledge into unique insights

Identified Subscribers

705

ARPU

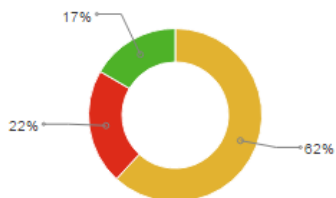
\$ 59.53

Service Level Index

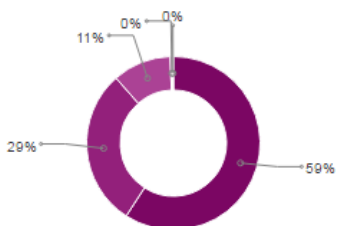
7.5

Usages ★ SLI

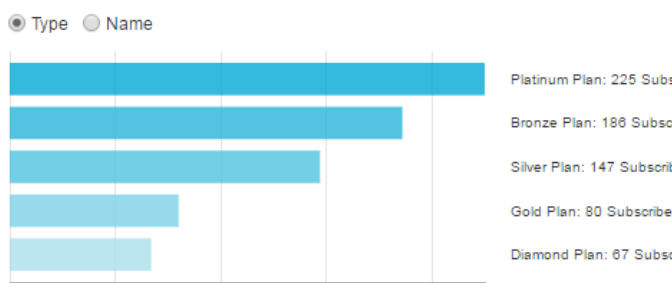
ARPU



Data Usage %

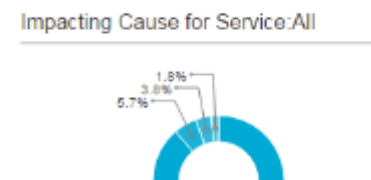
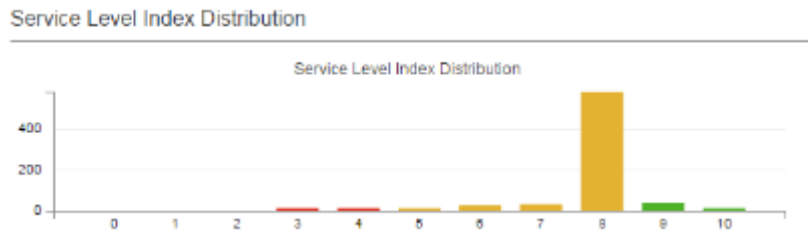
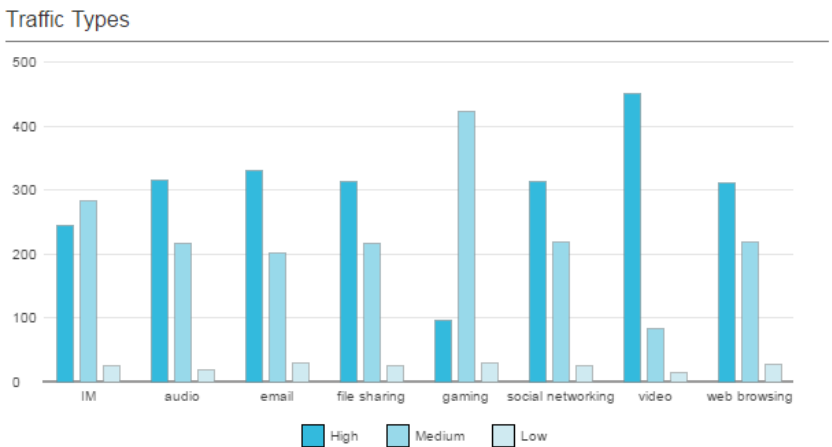


Plans



ARPU	# of Subscribers
Medium	436
Low	152
High	117

Data Usage %	# of Subscribers
50-79	417
80-100	207
Above 100	77
0-49	3



# Expert Analytics Application

## Marketing Analytics

- Service Level Index as active differentiator for targeted campaigns
- Segmentation using real-time network insights correlated with traditional customer profile information
- Behavior specific offer generation

### Highlights

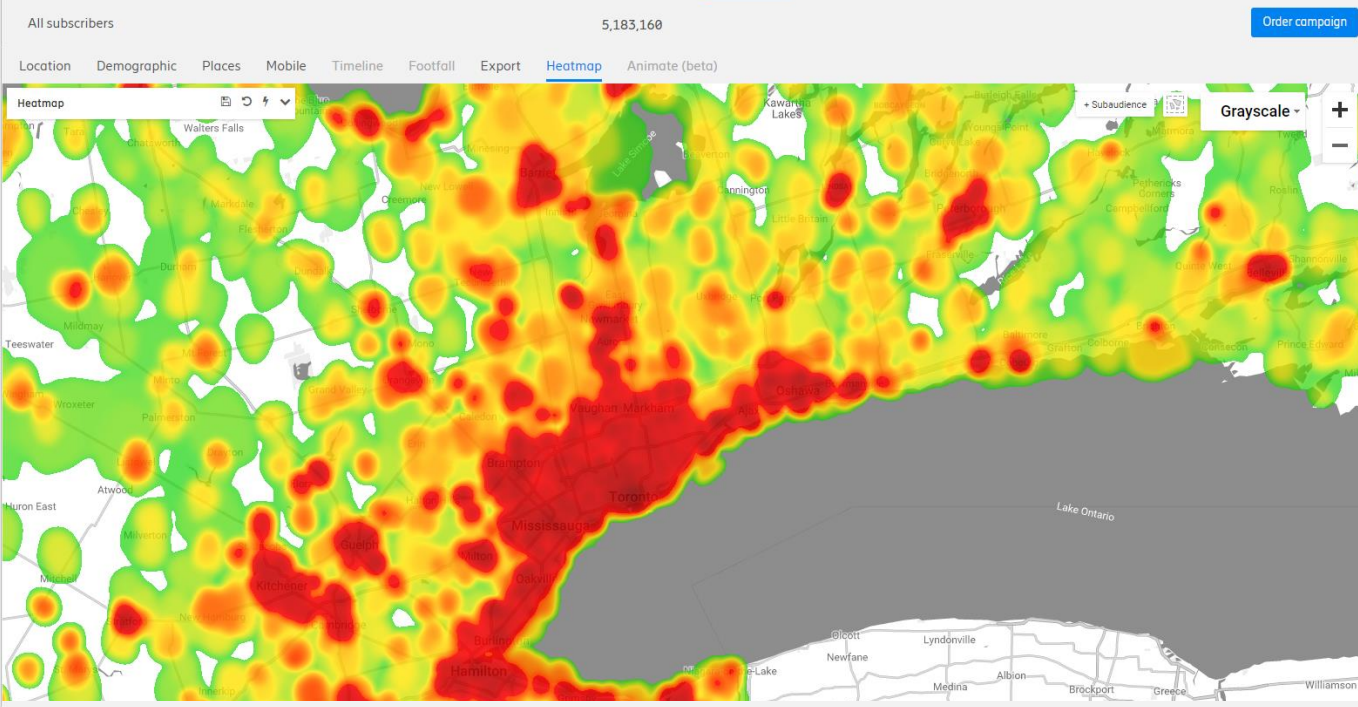
- Correlated SLI with usage and CRM information
- Auto-refreshing based on latest data
- Multi-dimensional filtering possibility
- Export functionality



Audiences Add

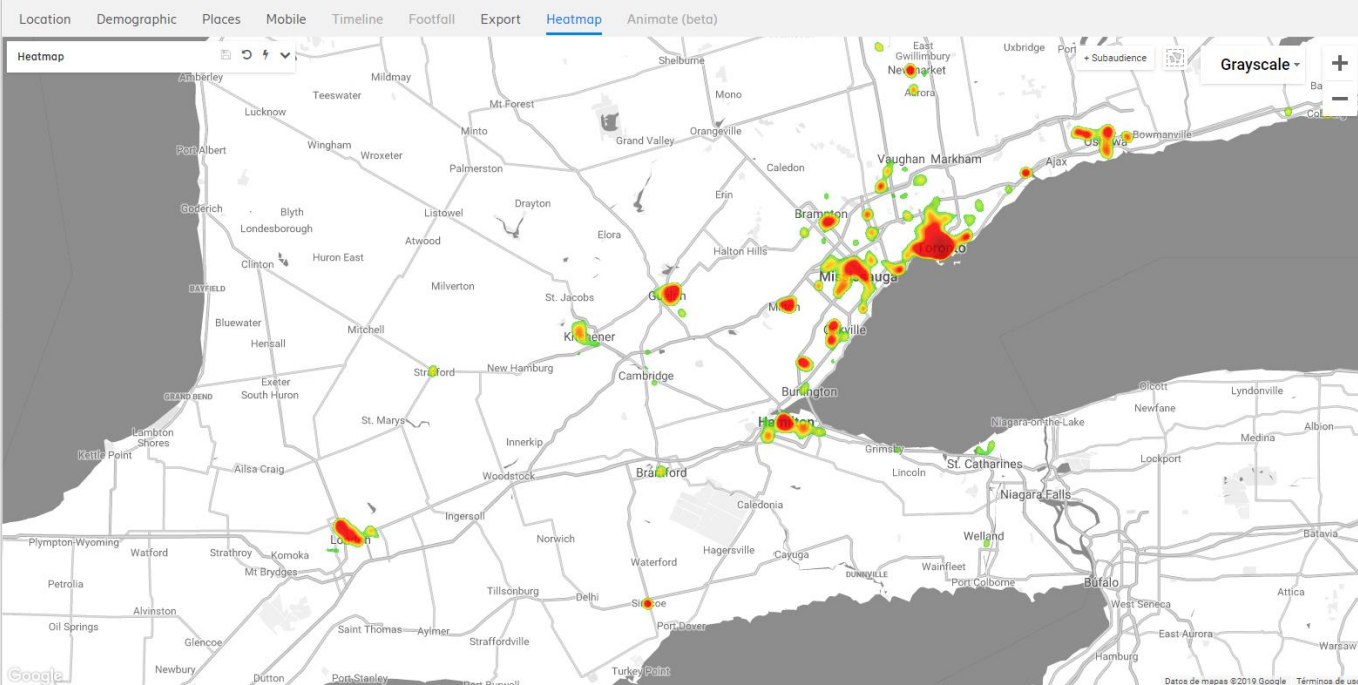
Filter by: All Sort by: Last used

- LOW SLI VIP Coverage churn
- LOW SLI VIP Coverage
- LOW SLI VIP
- LOW SLI
- All subscribers



Filter by: All Sort by: Last used

- LOW SLI VIP Coverage churn
- LOW SLI VIP Coverage
- LOW SLI VIP
- LOW SLI
- All subscribers



# Reduce Network Detractors

- Service Level Index as active differentiator to identify pro-actively Network Detractors
- Identify areas with more Subscribers with low experience
- Get automated insights about the cause of low experience
- Filter analysis for VIP Subscribers
- Coordinate technical and non-technical areas to take preventive actions to reduce churn

## Highlights

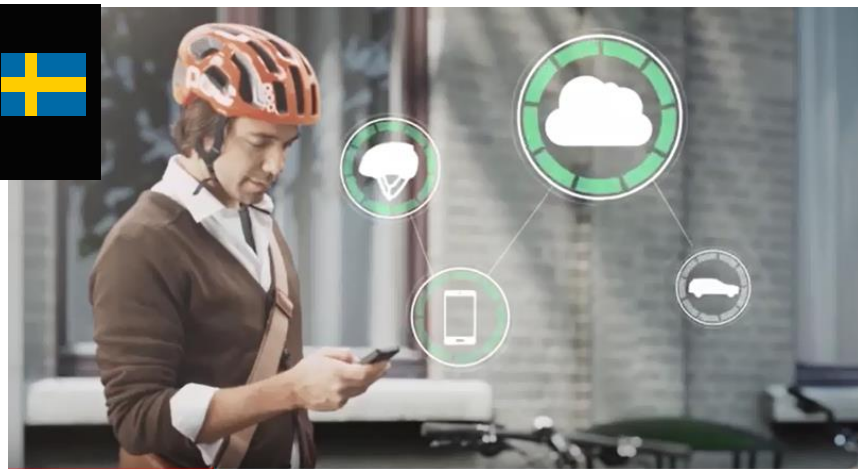
- Correlated SLI with usage and CRM information
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- Export functionality

# Safety: AI + Machine Learning

Data Storage and Analytics



Analytics related to the Mobile Positioning System of the UE, the speed and the Rules for a certain type of Road Intersection.



Machine Learning



# SLIPPERY ROAD ALERT

Part of Connected Safety

*Commercially available in Sweden and Norway*

THE CLOUD



Slippery Road



Slippery Road – How it Works



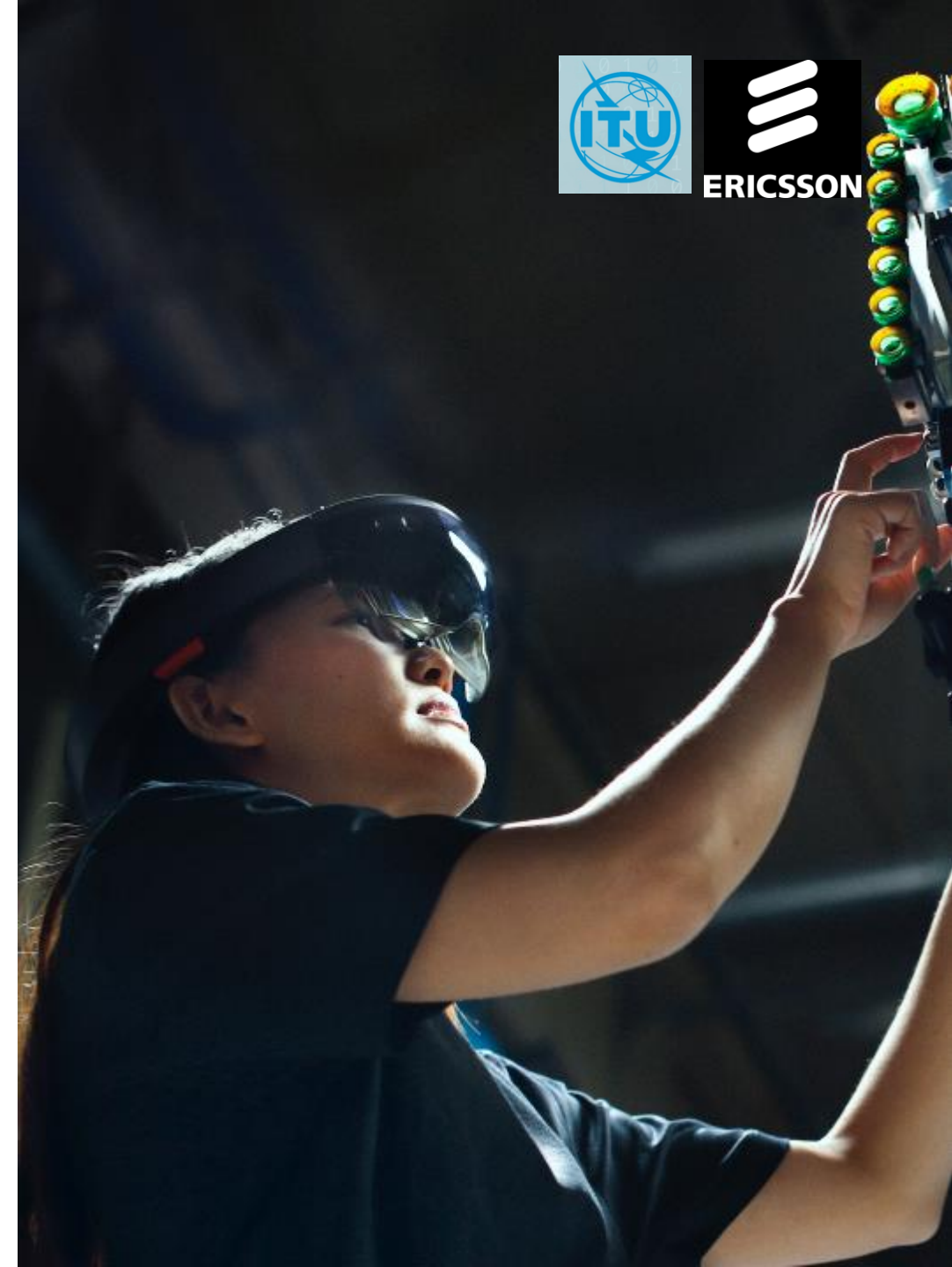
Hazard Alert – How it Works

Ericsson has built Volvo's cloud solution. Live since 2013, available in 160 markets and winner of several industry awards. [Learn more](#)

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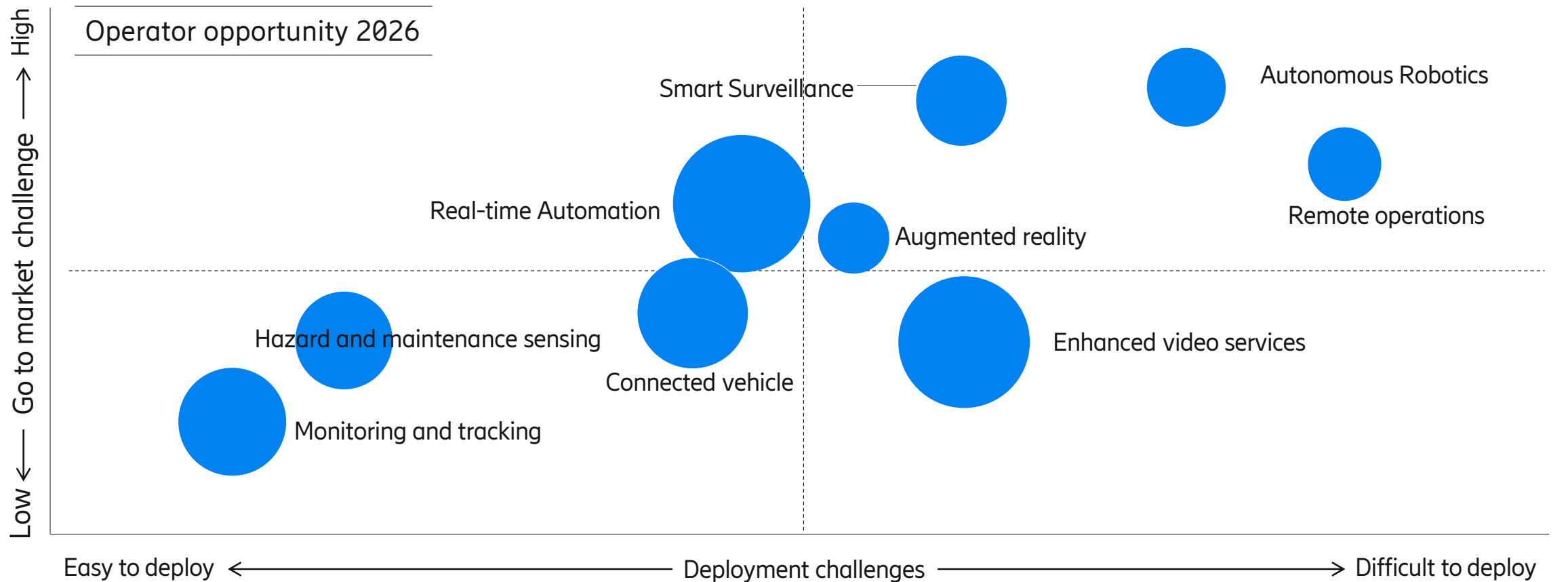
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# Emerging IoT & 5G strategies

## Ambition level steers the ability to capture the value

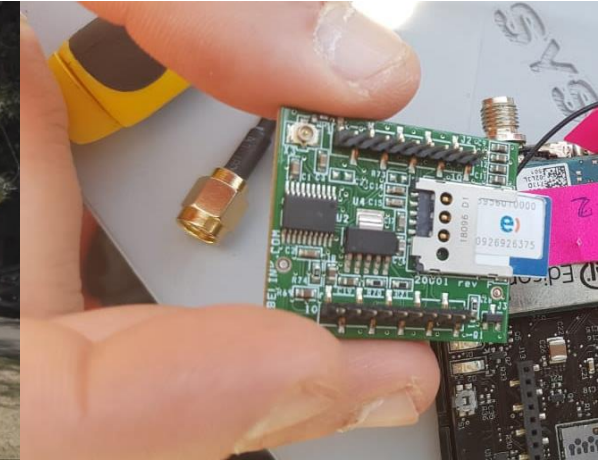


Source: Ericsson and Arthur D Little

# 1er Drone 5G de Latino America Tecnologías Ericsson, en Red 5G ENTEL

5 días de trabajo de agrónomos reducido a 5 horas con 5G

• December 7<sup>th</sup> 2020



- Video Drone 1er Campus 5G Chile: [Link](#)
- Video Drone Vuelo con 5G: [Link](#)
- SUBTEL Press release: [Link](#)
- Pisapapeles press: [Link](#)
- Diario La Tercera – [Link](#)
- Universidad de Chile: Press [Link](#)
- Universidad de Chile Ing.: [Link](#)
- Tele 13 -17/12/20(Minute 32:40s) [Link](#)
- Mega Noticias - 20<sup>th</sup> Dec 2020–[Link](#)
- Litoral Press [Link](#)
- Diario Financiero [Link](#)

DRONE OPERÓ UTILIZANDO NUEVA TECNOLOGÍA

INICIA OPERACIÓN PRIMER CAMPUS UNIVERSITARIO 5G

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T13 21 32 SANTIAGO 12° 23°

# 1st deployment 5G in mining



Sweden - Currently deploying since July 2019

European Sustainable Intelligent Mining Systems for the Global Mining Industry



5G New Radio in 3,5Ghz  
4G/5G Core

- Official Website & Videos: <https://www.simsmining.eu/project/communication-positioning/>
- English: <https://www.miningmagazine.com/communications/news/1366784/5g-radio-network-deployed-at-kankbe>
- Spanish: <https://www.thenewnow.es/tecnologia/red-5g-subterranea-en-una-mina/>

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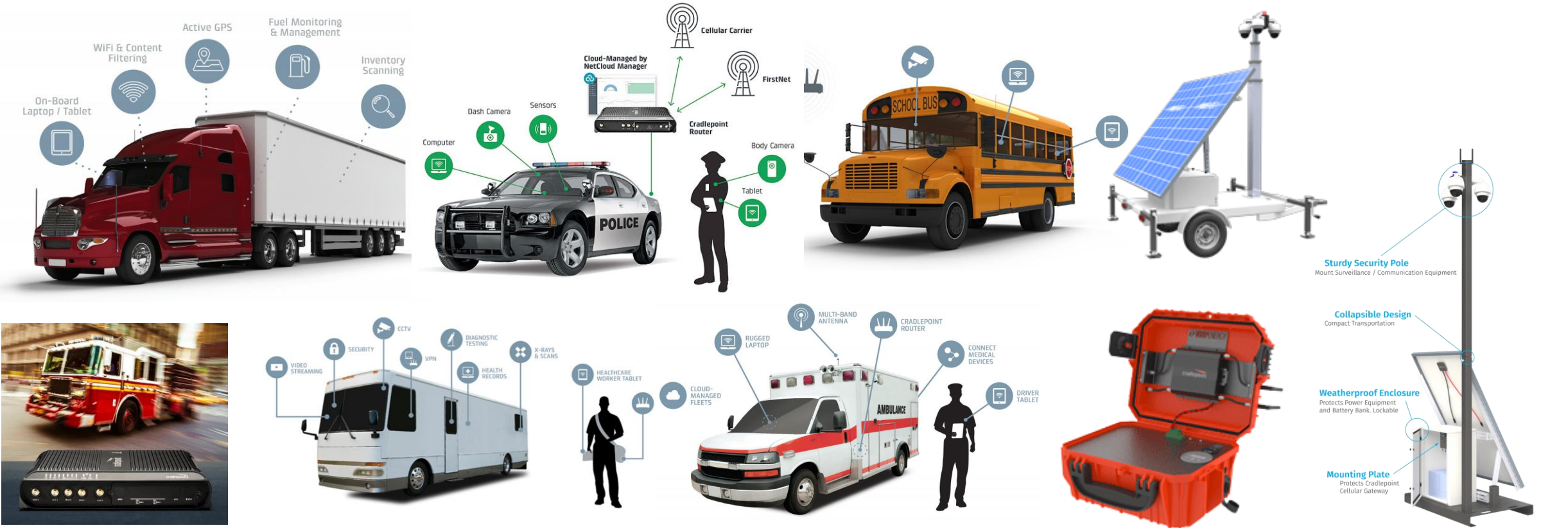


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- Spanish: <https://www.thenewnow.es/tecnologia/red-5g-subterranea-en-una-mina/>

# Fixed Wireless Access as with SD-WAN 4G/5G to grant Security, high traffic in different Network Slicing



Replacement of MPLS by Software defined WAN (SD-WAN) tackle multiple use case on the road, as well as pop-up places



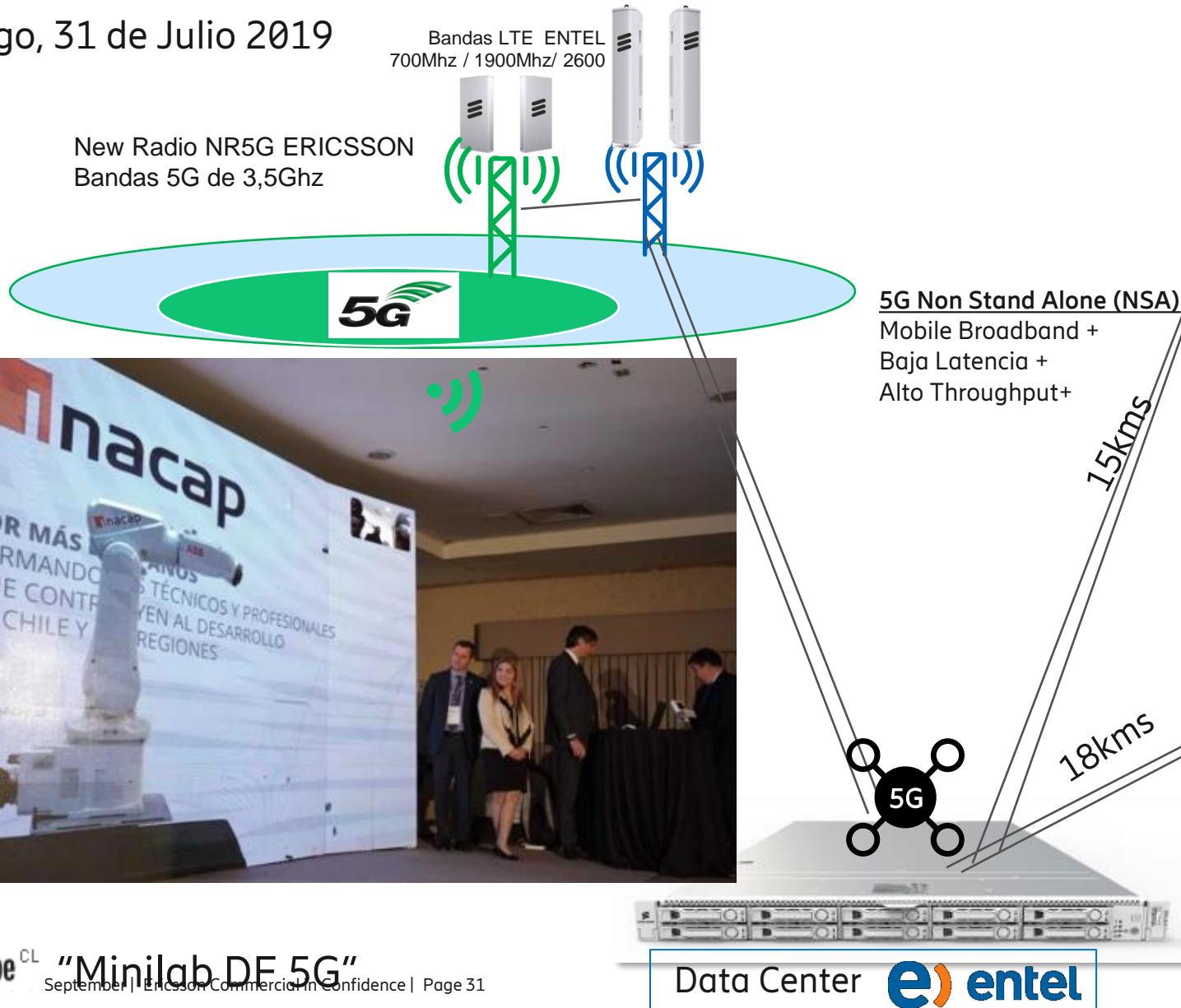
SD-WAN for Mobile: [Link](#)



# 1er demostración 5G Industria 4.0 & Minería con Red Comercial de Chile con tecnologías de ABB, ENTEL, ERICSSON



Santiago, 31 de Julio 2019



Variador de Potencia de Cintas Transportadoras de Minerales

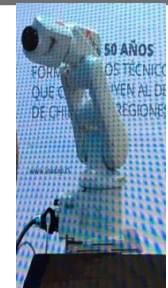
ABB University - calle Vicuña Mackenna 1602- Ñuñoa



YouTube<sup>CL</sup> "Mini Lab DF 5G"

Brazo Robótico

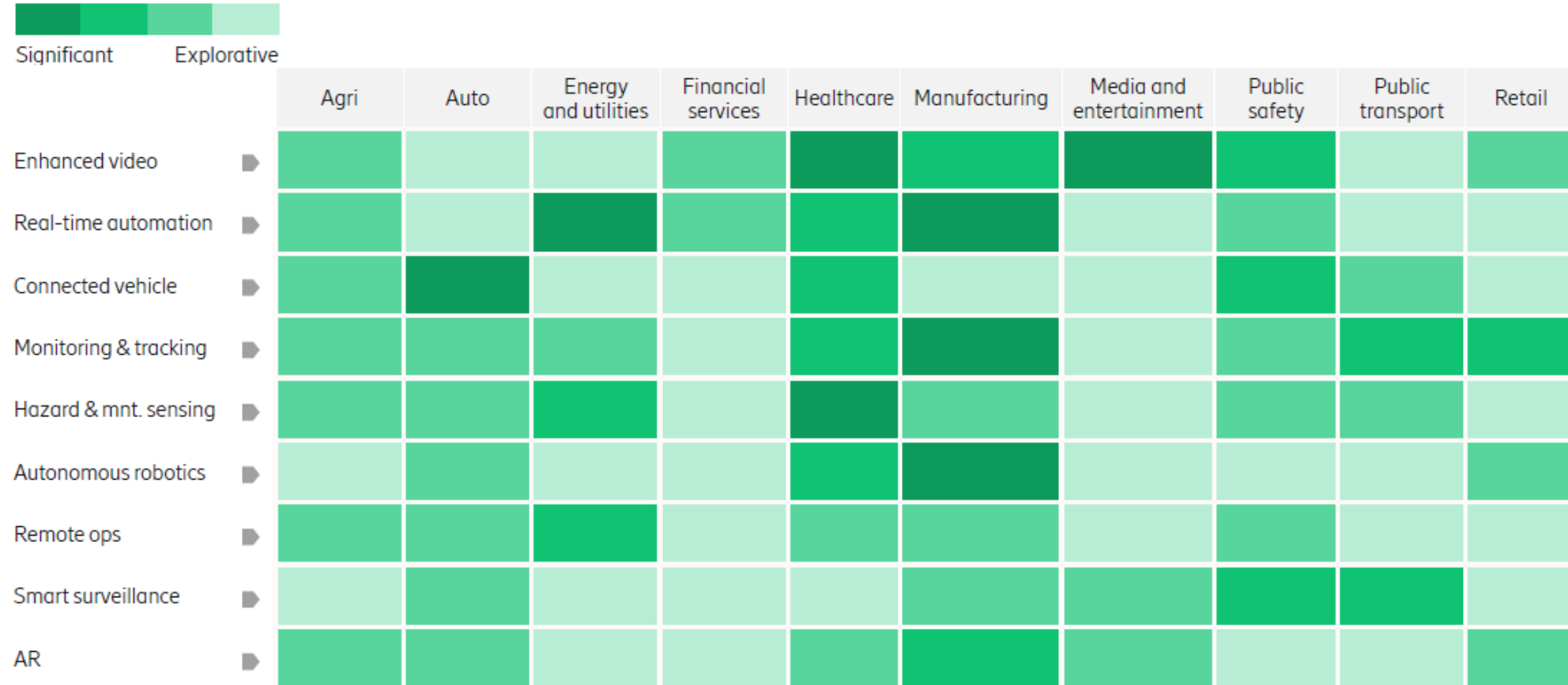
INACAP Universidad - Santiago Sur



# Instead of Industry siloed use case the business reside in Service Enablement across similar 5G patterns



5G-enabled industry digitalization addressable opportunity (telco global service creator role)



Source: Ericsson and Arthur D. Little

Source Ericsson 5G Market Compass 2030: <https://www.ericsson.com/es/5g/5g-for-business/5g-for-business-a-2030-market-compass>



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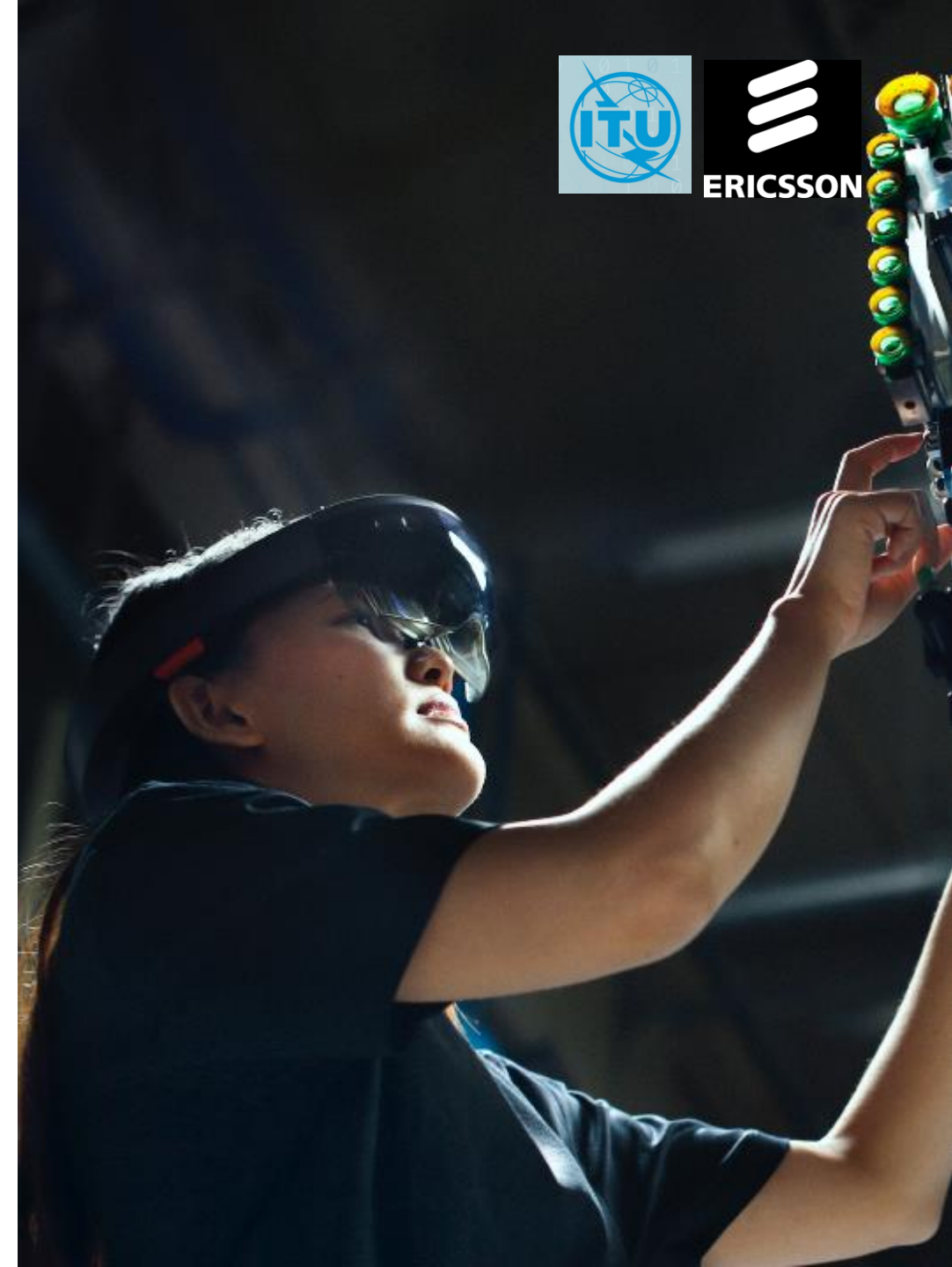
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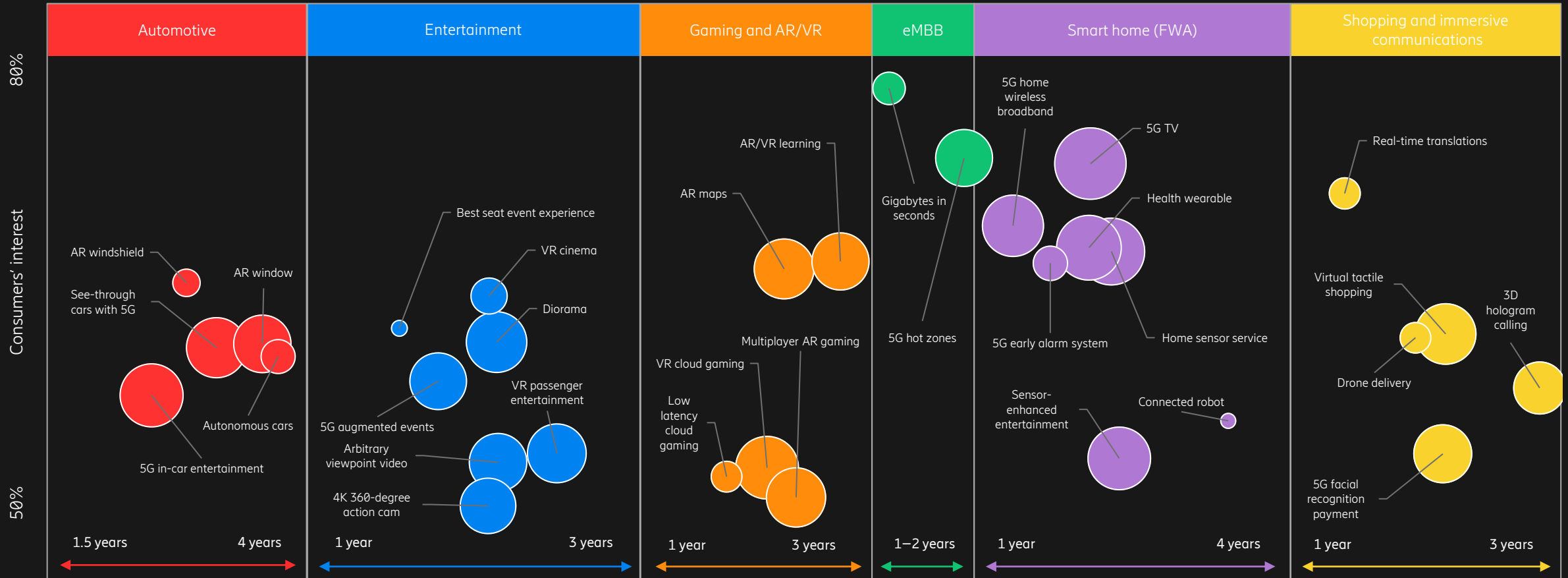
ITUWebinars  
**Colloquium: 5G and Internet access**  
ICT Applications and Internet 2021 (ITEC 2021)  
5 to 9 July 2021  
Online  
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<http://tu.itu.int/itec2021>  
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WITH THE EVENT EMERGING TECHNOLOGY FOR CONNECTIVITY  
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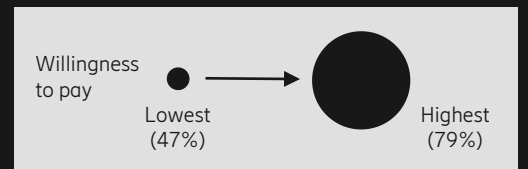


# Consumer 5G use case roadmap



Timeline to go mainstream from 5G launch

Base: Smartphone users aged 15–69 in Australia, Argentina, Brazil, Belgium, China, Canada, Chile, France, Finland, Germany, India, Indonesia, Ireland, Italy, KSA, South Korea, Singapore, Thailand, Uruguay, the UAE, the UK and the US  
 Source: Ericsson Consumer & IndustryLab, 5G consumer potential (May 2019)



# Primer red experimental IoT de medición de Calidad de Aire

Santiago, Chile, September 2019 – ENTEL , Centro Mario Molina, Volvo, Scania, Ericsson



YouTube CL "1er red experimental IoT" September | Ericsson Commercial Confidence | Page 39

facebook Link

# 1<sup>st</sup> Holographic call in 5G of Latin America



- Brasil: 1<sup>st</sup> 5G arena - January 2020
- Radio: mmWave, Ericsson Spectrum Sharing
- 5G Core: Edge Core, Network Slicing Ultra Low Latency – Prioritized Uplink
- Device: FWA using millimetric Wave



[https://youtu.be/1L9ZM\\_aOsFs](https://youtu.be/1L9ZM_aOsFs)

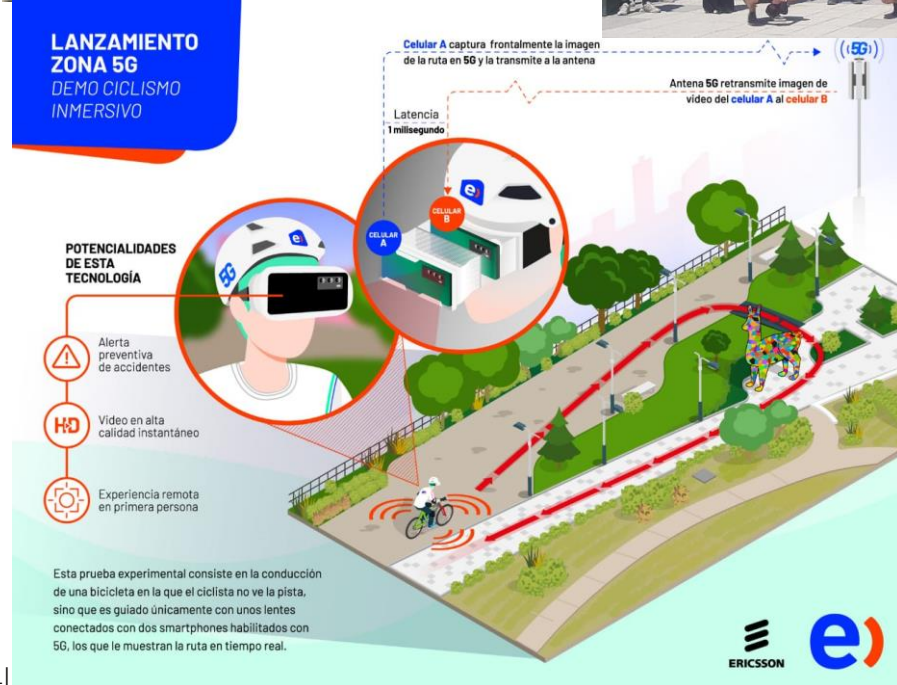
# 1er Red 5G de 3,5Ghz de Latino America Tecnologías Ericsson y ENTEL



Ultra baja latencia entre 2 Smartphones 5G al punto de hacer equilibrio en bicicleta

• December 7<sup>th</sup> 2020

- Video Diario Financiero: [Link](#)
- Tele 13 video: [Link](#) / CNN video: [Link](#)



# In-Car delivery in Sweden with URB-IT and MAT.SE



- ▶ In-Car delivery Urb-It
- ▶ In-Car delivery Sweden
- ▶ In-Car delivery Mat.Se

# 5G is an evolution challenging previous paradigms



ERICSSON

NON-EXHAUSTIVE

## PREVIOUS



## POST

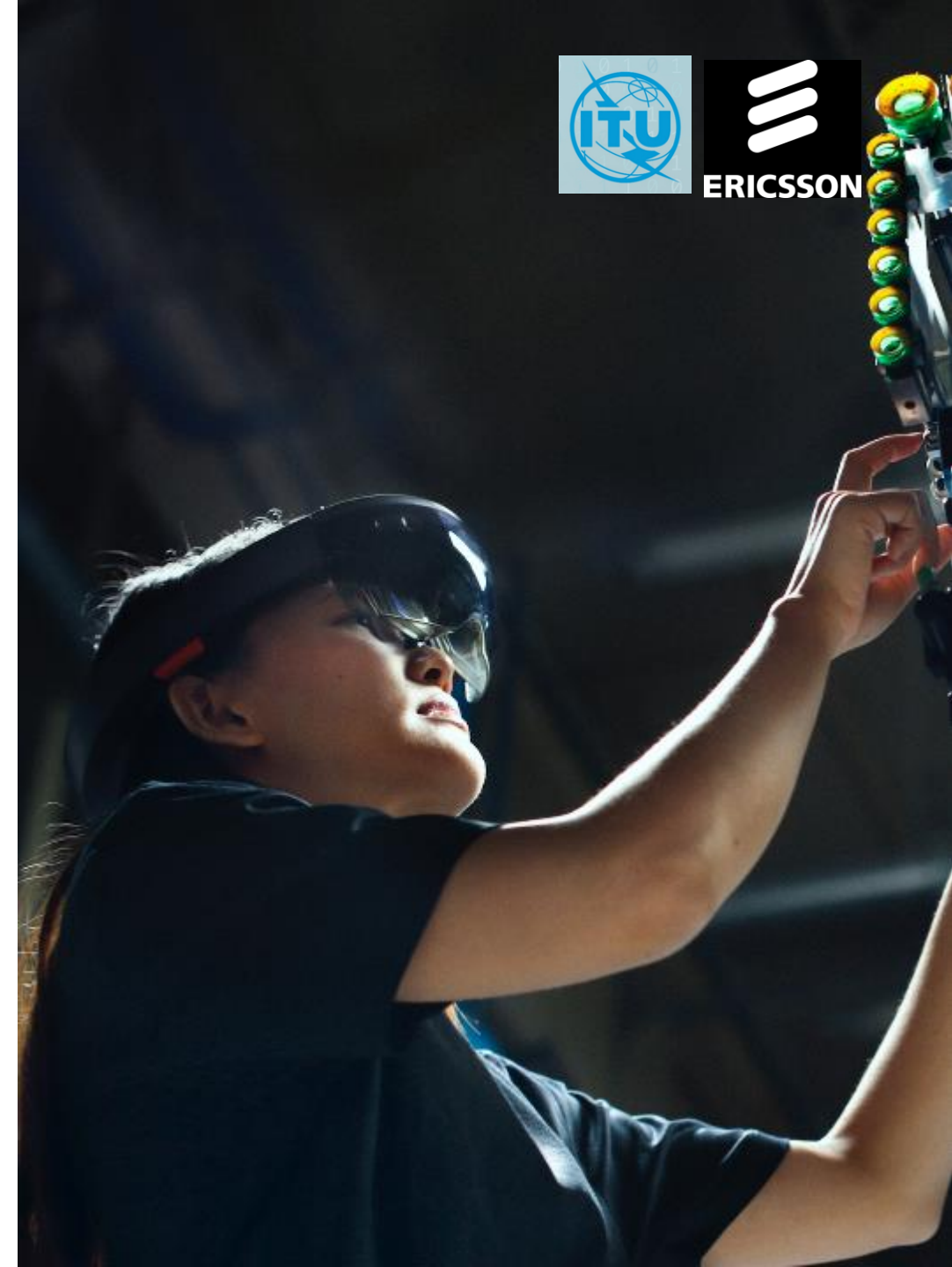
- Subscribers, B2X
- Voice, Data, Mobile, Fixed
- Quality of Service
- Call Center for Quality Assurance
- Integrations
- Virtualized in tech control
- Encrypted Interfaces
- Siloed business
- Standards
- Manual policy based automation

- +IoTs, APIs, B2Dev, OEMs
- Edge, Interactive Services, V2X
- Quality of Experience
- Self healing analytics
- Cloud native DevOps + CI/CD
- Containerized in open boundaries
- Secure End-2-End Microservices
- Collaborative business
- Agnostic interoperability
- Art.Int & Mach.Learning

# 5G the new normal

- 5G breaking news of 2021 – Q2 and trends
- 5G towards a smarter society with AI
- 5G enabler the Industry 4.0
- 5G disrupting User
- Conclusion & Wrap-Up

**Roberto CABANILLAS ACERBI**  
Digital Service Director  
ERICSSON CHILE  
Roberto.Cabanillas@ericsson.com

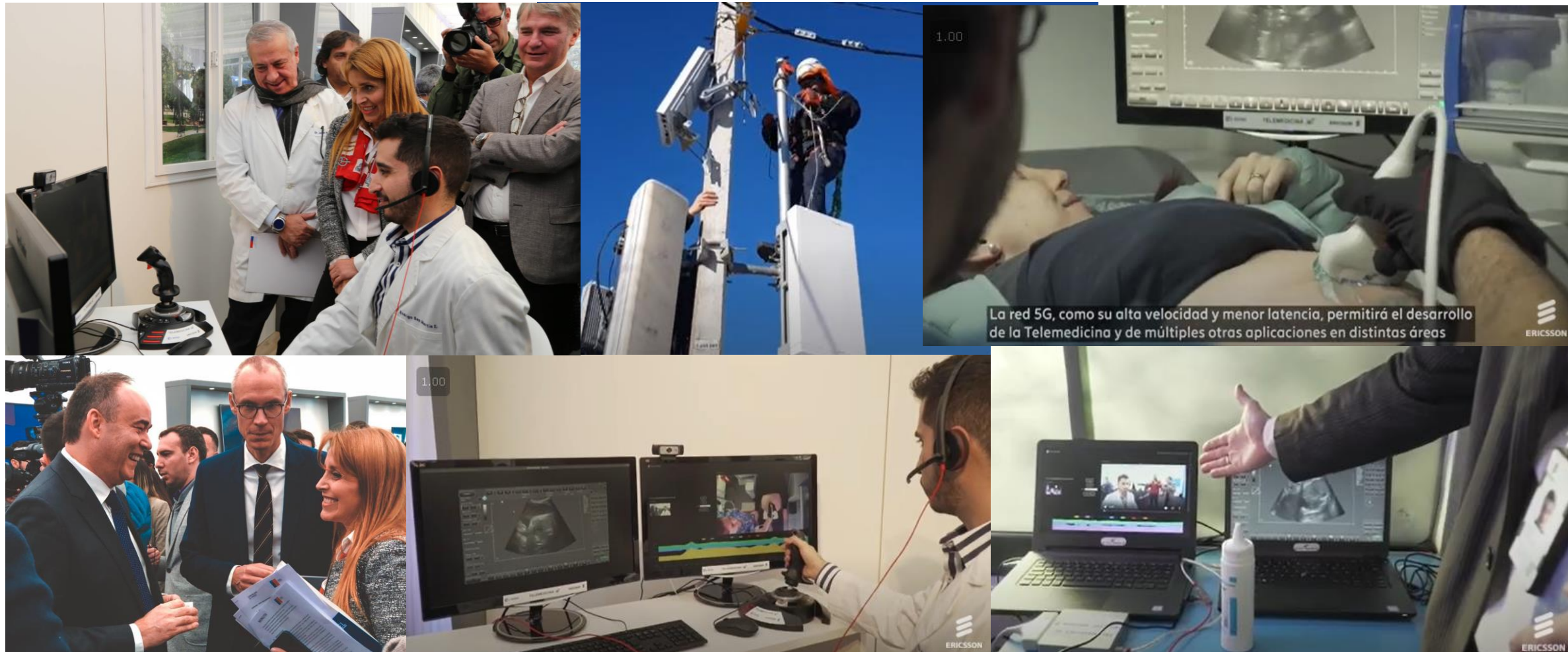




# 1er demostración 5G en Telemedicina de 5G en Red Comercial de Chile con tecnologías de ENTEL, ERICSSON



Junio 2019 – CESFAM La Granja, Santiago, Chile




La red 5G, como su alta velocidad y menor latencia, permitirá el desarrollo de la Telemedicina y de múltiples otras aplicaciones en distintas áreas



YouTube <sup>CL</sup> "1er teste 5g"

# Artificial Intelligence with 5G in UK jointly with King's College

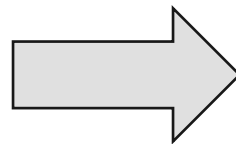


1<sup>ST</sup> 5G DEPLOYED NETWORK TESTBED IN LONDON  
IN JANUARY 2018 – COMMERCIAL IN 2019

 Bringing Ideas to Life

  tech How 5G will transform the way we learn new skills

Master Musician records music movements  
in the Cloud Other Musicians can contribute



A children student can download Music movements  
to accelerate learning

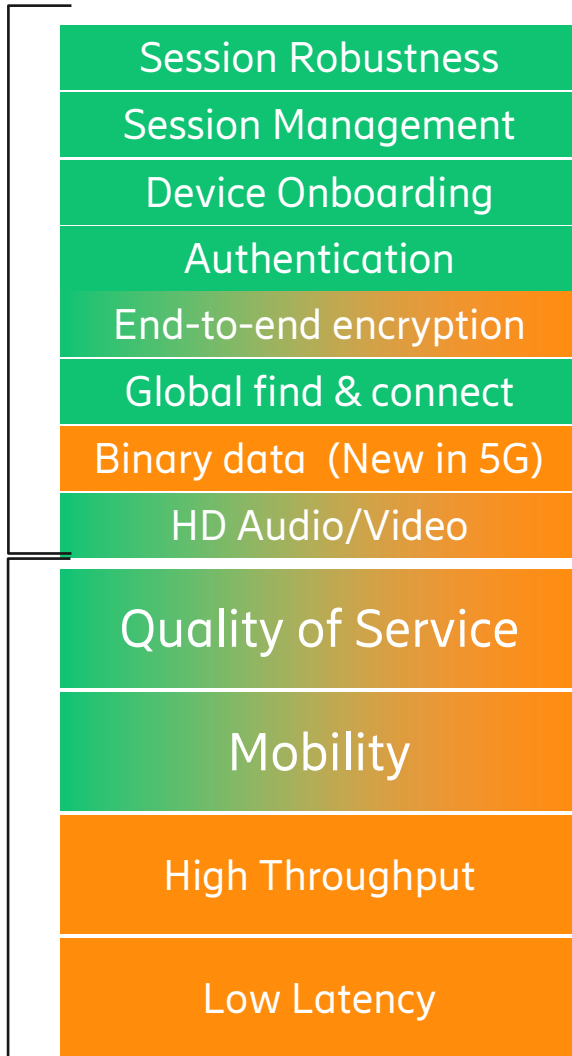


# 5G Edge enabling new Real-time Interactive Services



4G , IMS, VoLTE, ViLTE

5G Core & NR



Remote Health



Machine control



VR with collaboration



Remote haptic control



Remote support



Remote Surgery

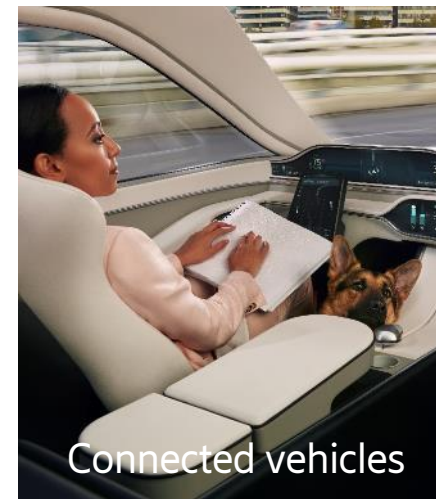
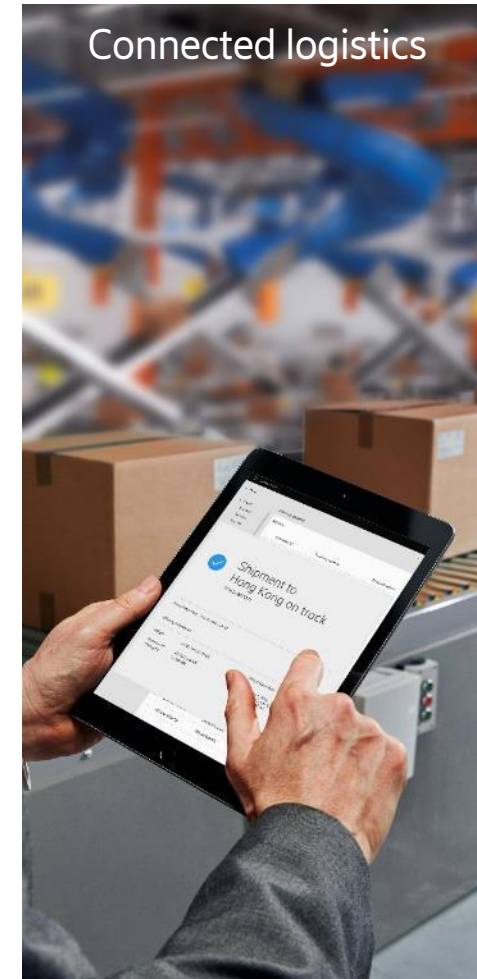
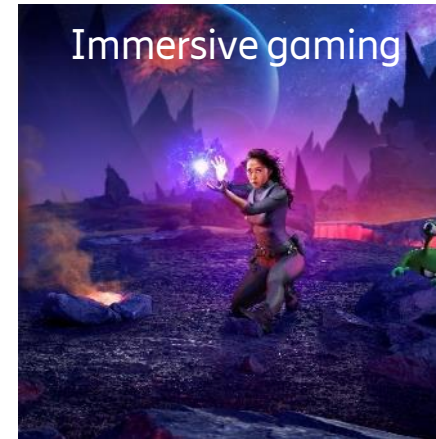
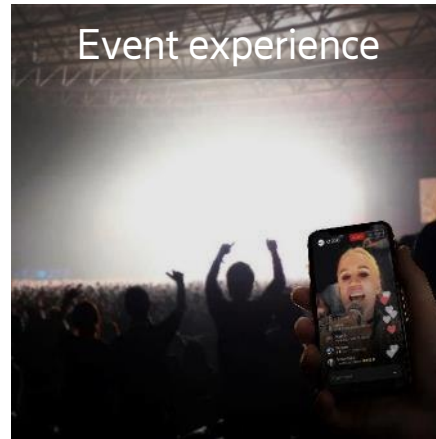


Drone/Vehicle Steering



AR with control

# Unleash the power of easy for 5G



...for a more inclusive, resilient and better society!



# 5G the new normal



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## ITUWebinars

**Colloquium: 5G  
and Internet access**  
ICT Applications and Internet 2021  
(ITEC 2021)

5 to 9 July 2021  
Online

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