


WRC-19 | 4 November

# CEPT

GSMA

# Introduction



**Moderator**

**Glyn Carter**
Senior Spectrum Advisor
GSMA

**Brett Tarnutzer**
Head of Spectrum
GSMA

**GSMA**





**MNO**

**Mats Ohman**
Telia

**Sverker Magnusson**
Ericsson

**GSA**



# SPECTRUM

THE FUNDAMENTAL ELEMENT OF MOBILE



Welcome

## Brett Tarnutzer

GSMA

2G

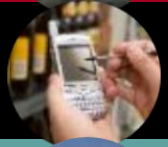
3G

4G

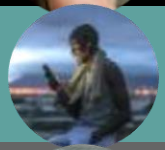
5G



All about calls and texts



The start of mobile data



The arrival of mobile broadband services and applications




The network adapts to the application

Ultra high speed
Ultra low latency
New applications

# 5G Ramps Up



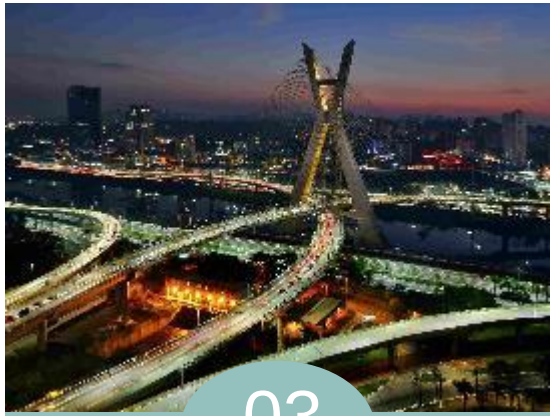

01

O2 commercial 5G gives music fans intimate access to gigs and musicians through cutting edge Virtual Reality

Early 5G data usage has tripled, according to SK Telecom, in comparison with 4G

02

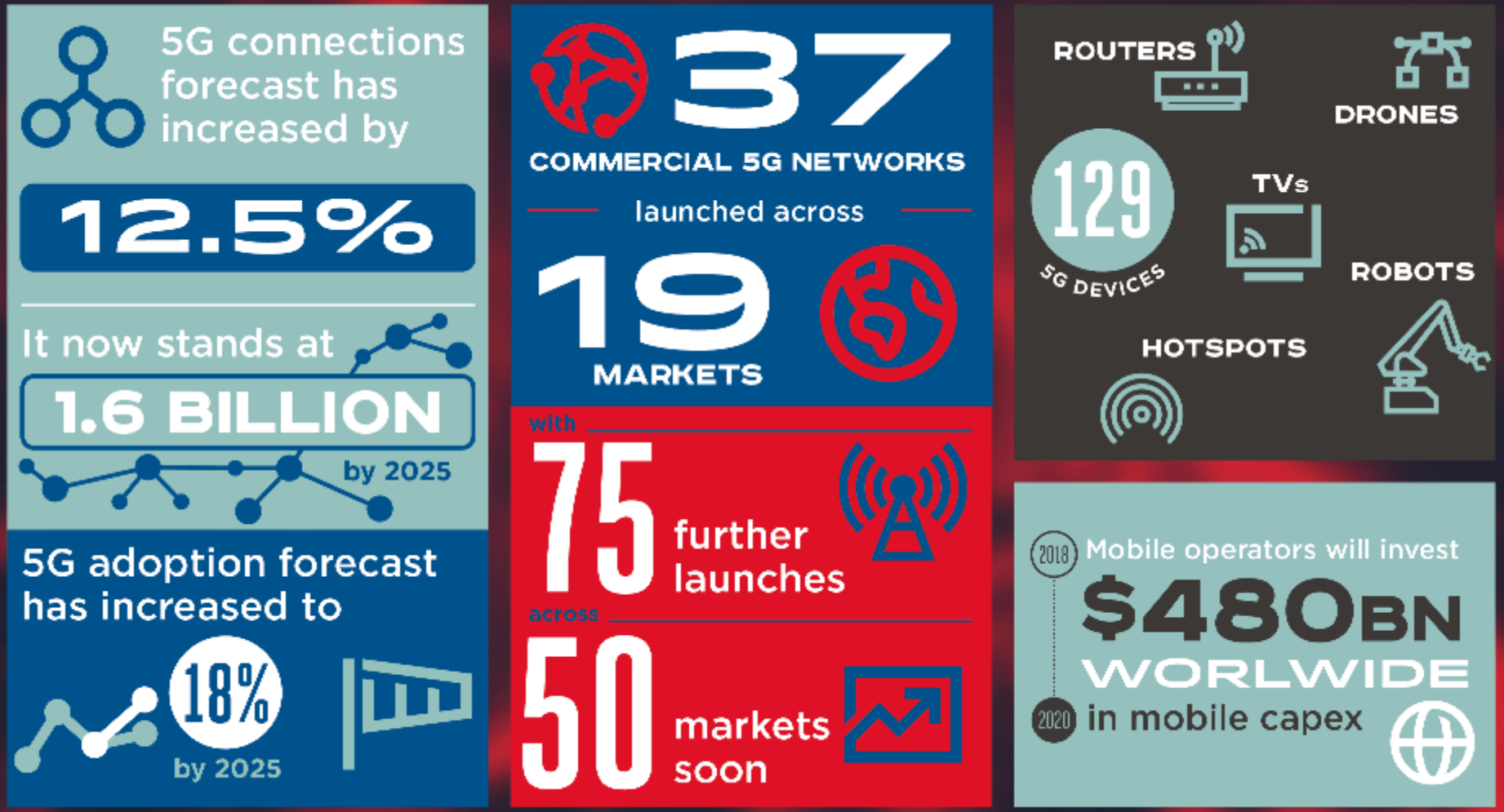


03

**5G IN EUROPE**
17 live networks
43 trials

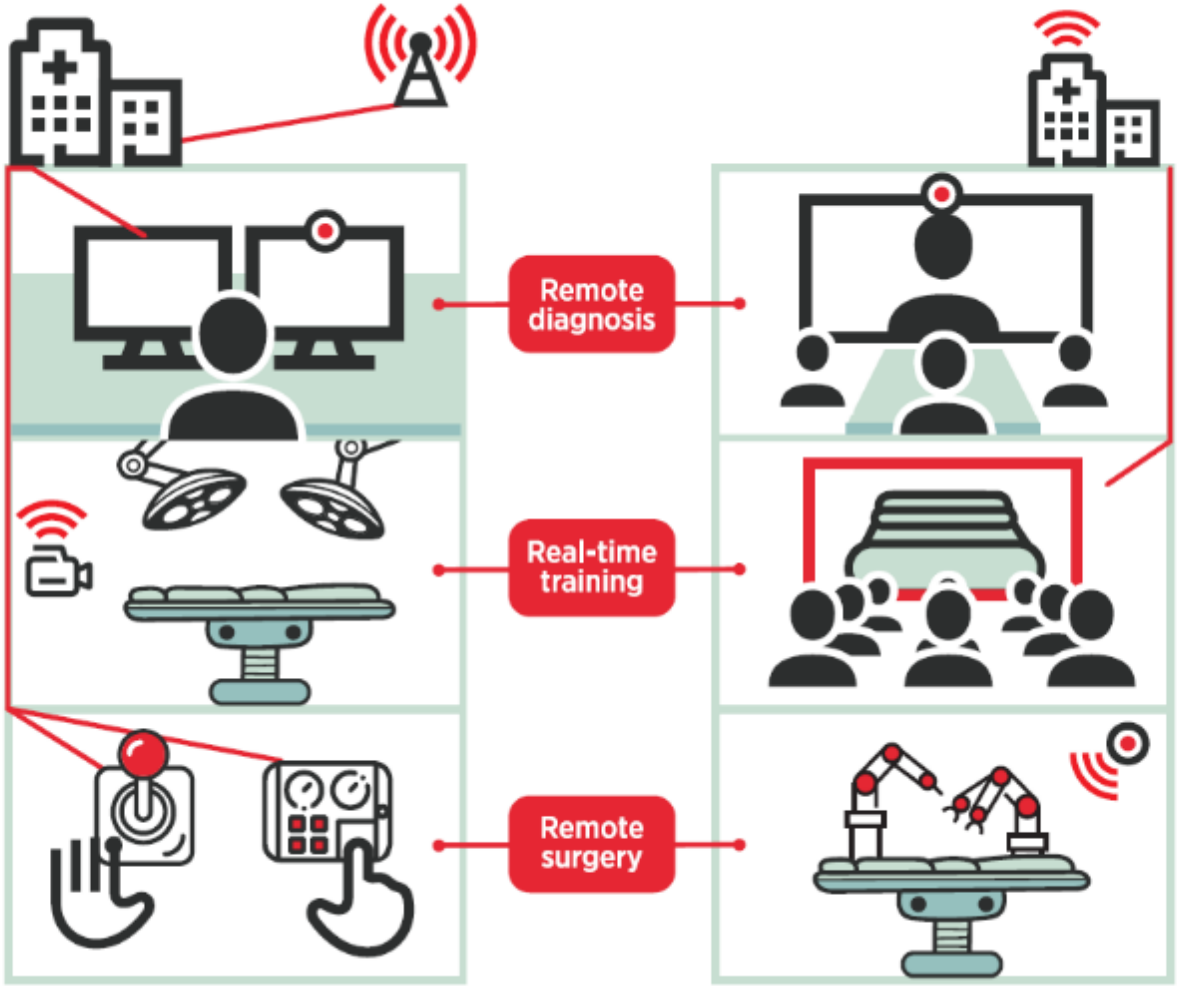
26 GHz auctions planned for 2020/21


5G connections forecast has increased by
12.5%
It now stands at
1.6 BILLION
by 2025
5G adoption forecast has increased to
18%
by 2025
37
COMMERCIAL 5G NETWORKS
launched across
19
MARKETS
with
75
further launches
across
50
markets soon
ROUTERS
DRONES
129
5G DEVICES
TVs
ROBOTS
HOTSPOTS
2018
Mobile operators will invest
$480BN
WORLWIDE
2020
in mobile capex

## Use Case

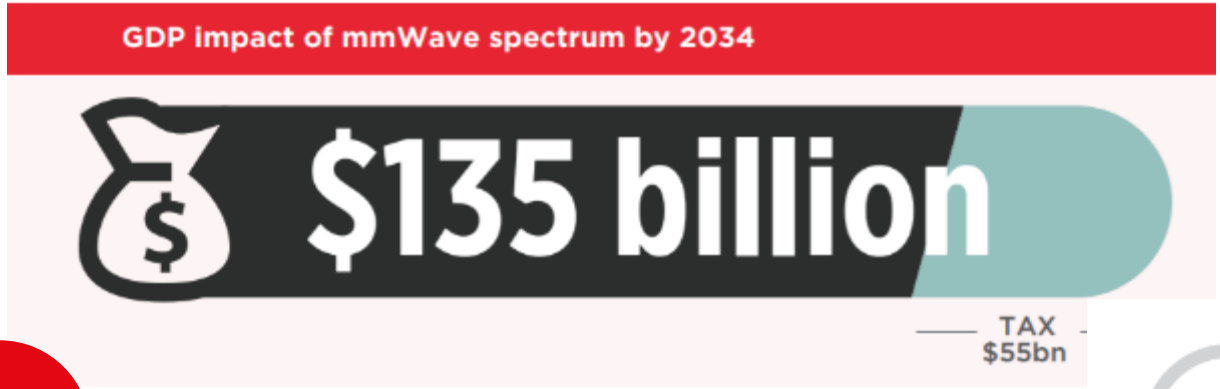
**5G** CAN MAKE IT HAPPEN

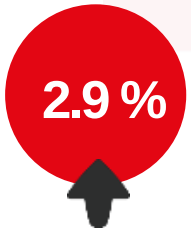
# Healthcare



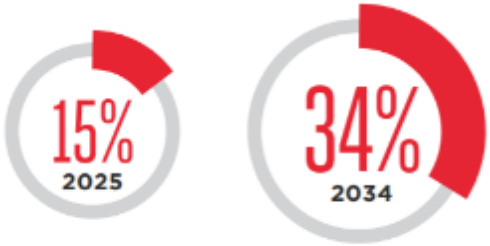
# The socio-economic benefits of mmWave 5G (2020-2034)

## Europe Edition




GDP growth




The share of 5G services using mmWaves

SPECTRUM

THE FUNDAMENTAL ELEMENT OF MOBILE



5G Trials and Launches

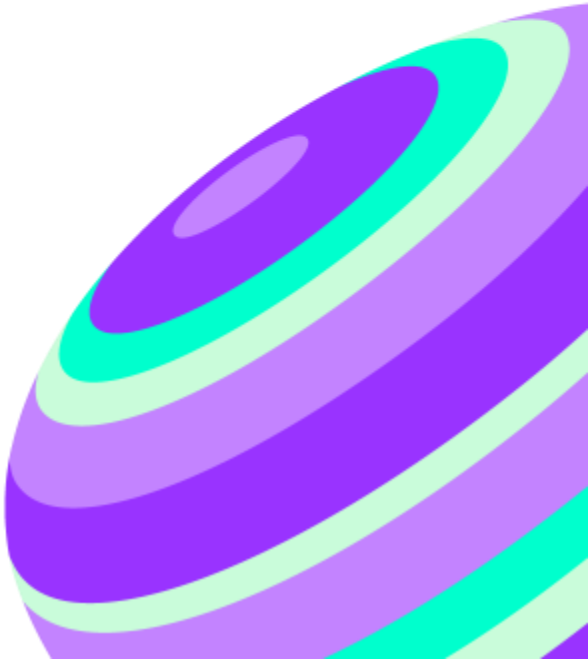
# Mats Ohman

GSMA

# 5G AND SPECTRUM NEEDS

Mats Öhman, TeliaCompany
GSMA Seminar for CEPT
WRC-19 Sharm el-Sheik

November 4, 2019



# BACKBONE STRUCTURE OF 5G




5G Success is not only about spectrum
but it plays a key role

# ROLES OF DIFFERENT SPECTRUM RANGES

**Unlicensed +**
**5G licensed High & Mid-bands**

~60% traffic

**Ultra Experience Layer**

**5G licensed Mid-bands**

~30% traffic

**Capacity/Coverage Layer**

**5G licensed Low & Mid-bands**

~10% traffic

**Basic Coverage Layer**



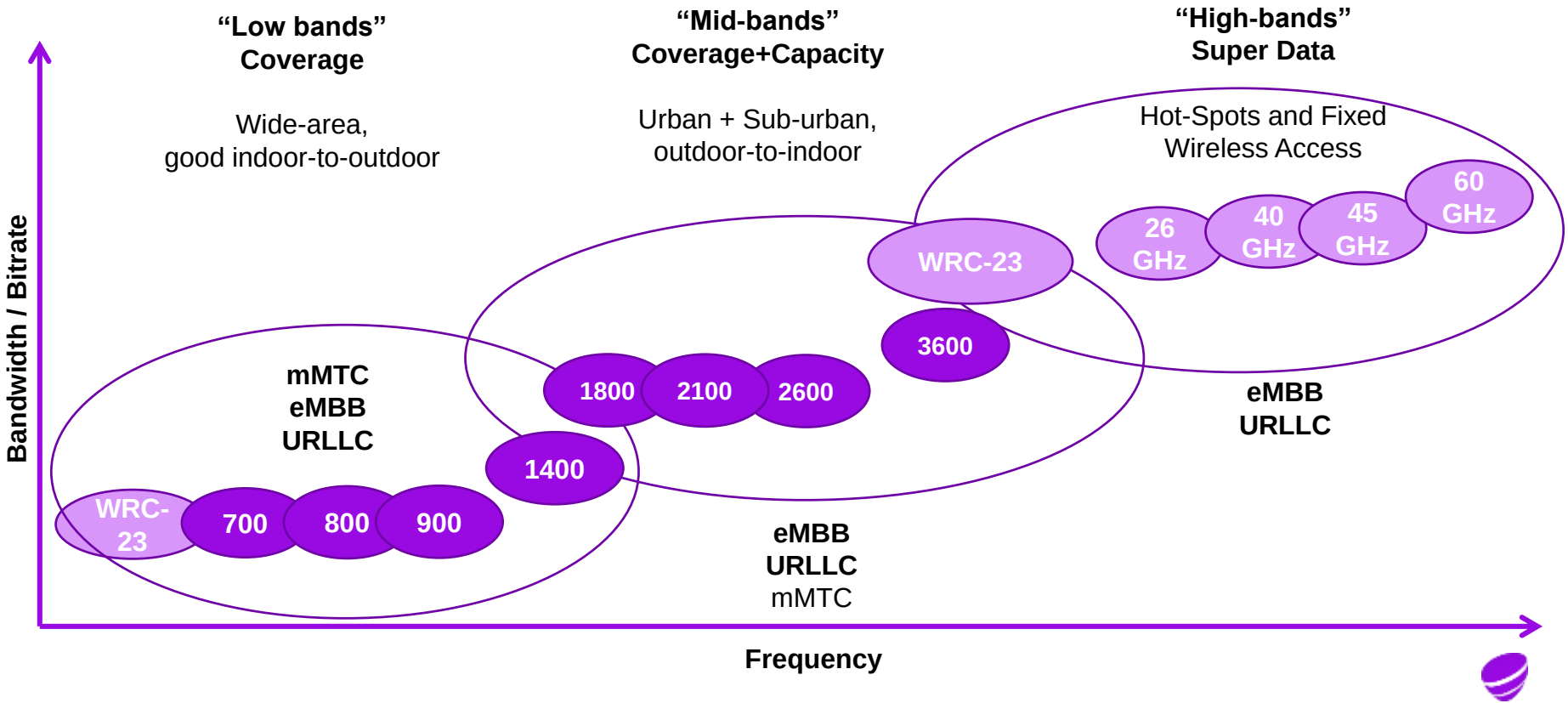

Frequency

**High-bands >24GHz**
**Mid-Bands** *2-8GHz*

**Mid-bands** *2-8 GHz*

**Mid-bands** *2-8 GHz*
**Low-bands** *sub 2GHz*

# SUFFICIENT SPECTRUM NEEDED IN ALL RANGES



- # WHAT HAS TELIA DONE WITH 5G?

SEVERAL TRIALS IN MMWAVES AND MID-BANDS WITH VARIOUS PARTNERS

TELIA COMPANY PARTNERSHIP PROGRAM

COMMERCIAL LAUNCH IN FINLAND AND PLANS IN OTHER COUNTRIES PENDING ON SPECTRUM AVAILABILITY

Public

# ABB ASSEMBLY LINE: 5G + AI + CLOUD




**Real time quality assurance, low latency 5G connection, machine vision analytics running in datacenter**

# VOLVO CONSTRUCTION EQUIPMENT FACILITY

## REMOTE-CONTROLLED MACHINES AND AUTONOMOUS SOLUTIONS



Public

# BOLIDEN MINE - 5G UNDERGROUND NETWORK



Sustainable mining -
better safety and productivity
with less CO2




Public

# FACIAL PAYMENT OVER 5G

Fancy a top-quality ice-cream
just showing your face for payment ?






# AND MANY MORE ...



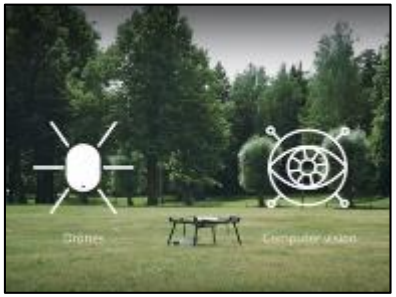

Airport robot




eSports



Forrest industry mill



Drone+video analytics



Movie theater



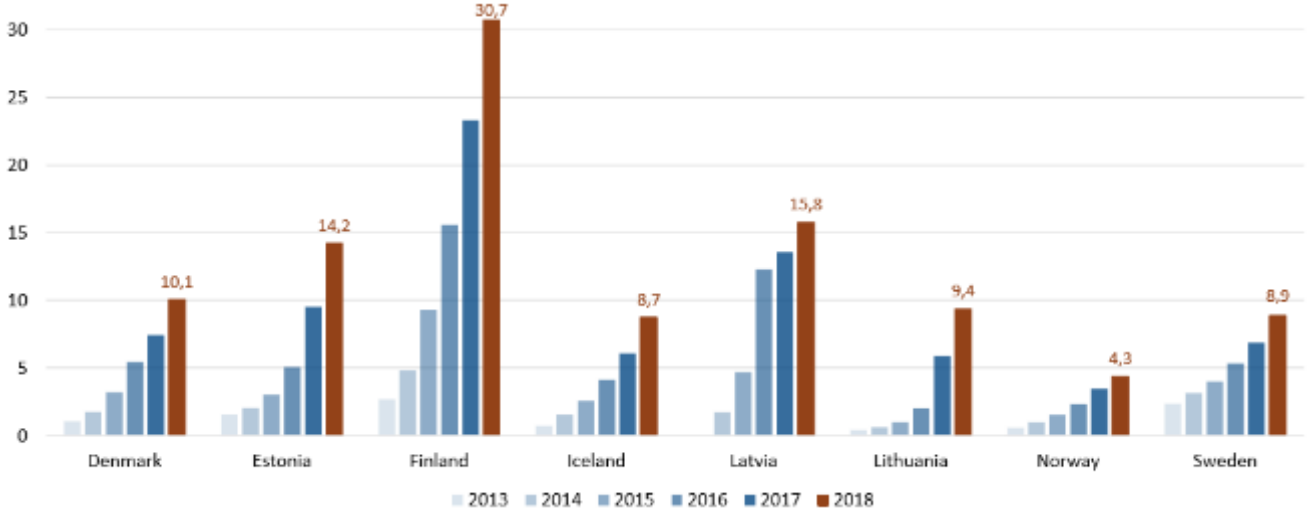
Virtual reality collaboration



Cruise ship

# DATA USAGE IN TELIA-COUNTRIES?

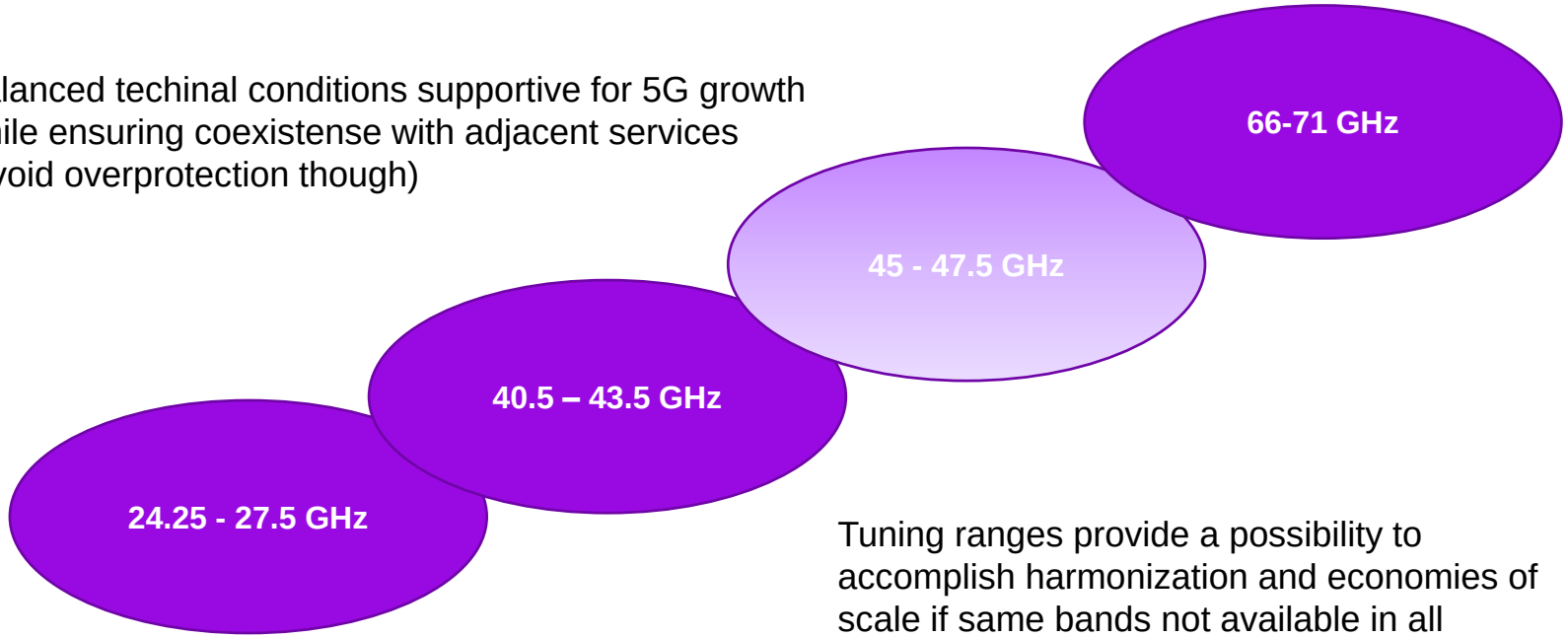
- Development of data transferred over mobile networks per capita in a month (Gbytes) in Nordic and Baltic countries in 2013-2018. - Up to 160% annual increase.
- 5G services expected to drive high demand, e.g.
  - HD video 90min/day => 84 GB monthly
  - VR/AR 10 min/day => 110 GB monthly
  - Very fast increase experienced already in Asian countries with early 5G-launch




Ref. Telecommunications Markets in the Nordic and Baltic Countries 2018, statistics from NRAs

# TELIA WISHLIST FOR WRC-19 MM-WAVES

Balanced techinal conditions supportive for 5G growth while ensuring coexistense with adjacent services (avoid overprotection though)



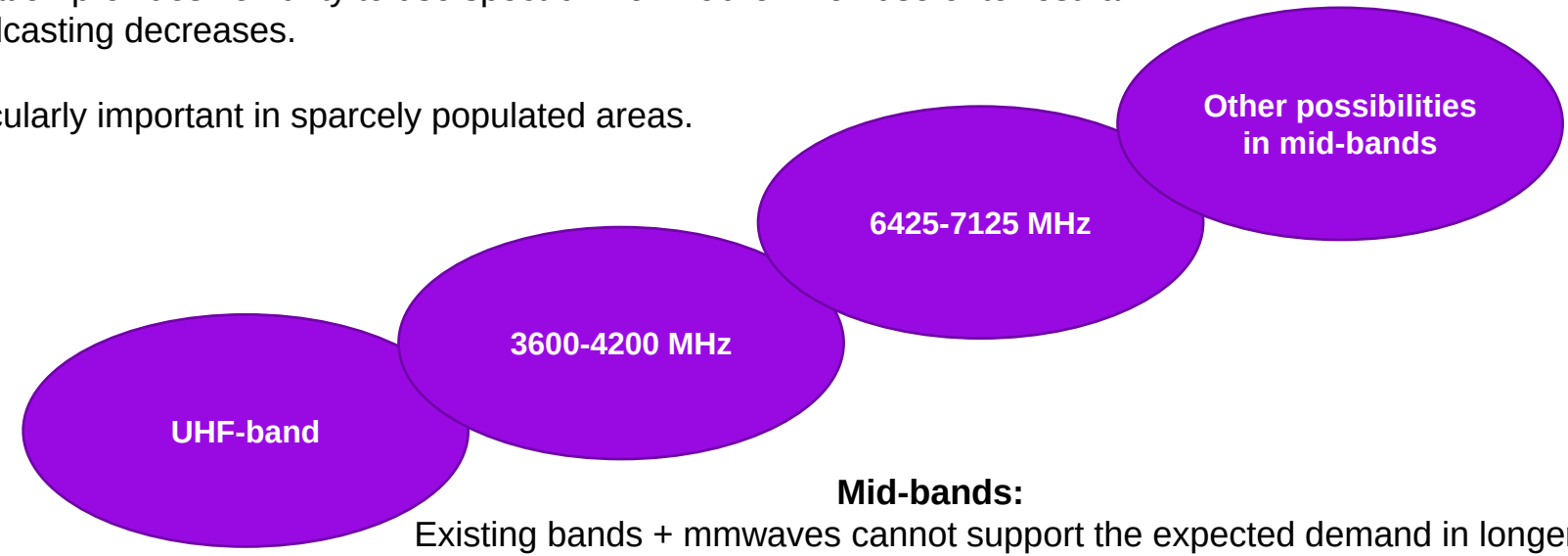

Tuning ranges provide a possibility to accomplish harmonization and economies of scale if same bands not available in all regions

# TELIA WISHLIST FOR WRC-23 AGENDA

**UHF-band review:**

Mobile data increase is driven by media consumption. Co-primary mobile allocation provides flexibility to use spectrum for mobile when use of terrestrial broadcasting decreases.

Particularly important in sparcely populated areas.



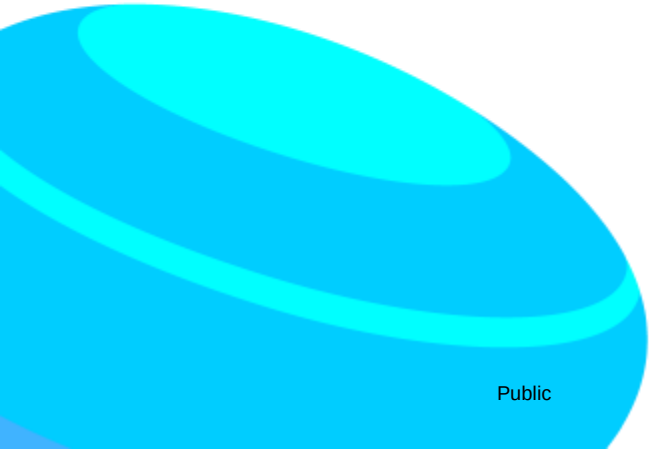

**Mid-bands:**

Existing bands + mmwaves cannot support the expected demand in longer term.

Spectrum enabling high capacity and sufficient propagation (incl. outdoor-indoor) is needed especially in urban and suburban areas in mid-long term.

Public

# THANK YOU!







Public

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5G Ecosystem

## Sverker Magnusson

GSMA

# 5G ECOSYSTEM UPDATE

Sverker Magnusson
GSA CEPT

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# VISION



## VISION

wirelessly connect almost all 7 billion people globally to new and exciting services through 100 billion devices and things, by 2030




## HOW

spectrum from the low-band, mid-band and high-band frequency ranges helps realise the Vision



## WRC-19 GOAL

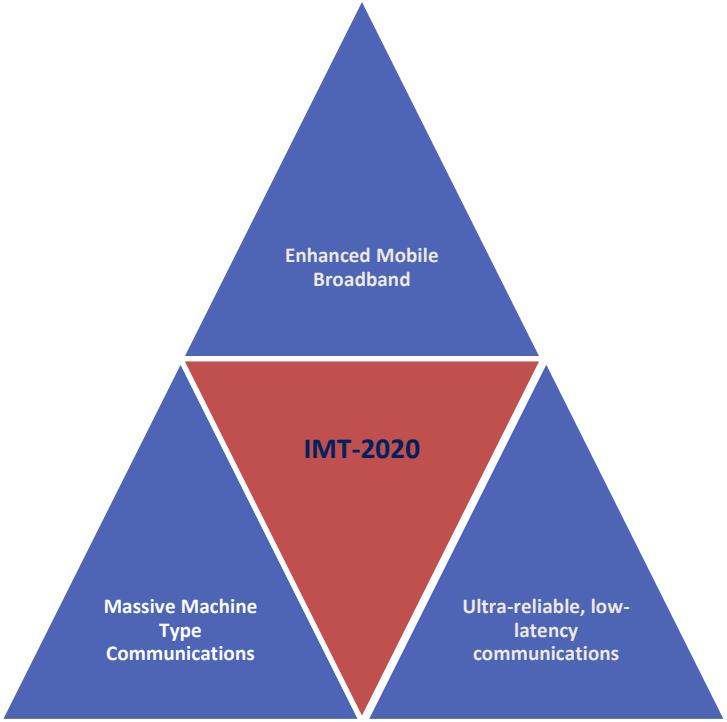
large contiguous amounts of high band (mmWave) harmonised spectrum, with suitable regulatory conditions, helps enable extreme capacity and ultra fast local area services.
planning for the future with WRC-23 mid & low band agenda item

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# USE CASES










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# STANDARDS




Release 15 complete (2017-2019)

Release 16 development (2018-2020)

Enhancements, Unlicensed, URLLC+ & IoT+, V2X, etc

Release 17 planning (2019-2021)

Enhancements to support verticals, coverage improvements, NTN, etc

**3GPP 5G specs complete – work underway on enhancements**

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# PRODUCTS




BASE STATIONS

DEVICES

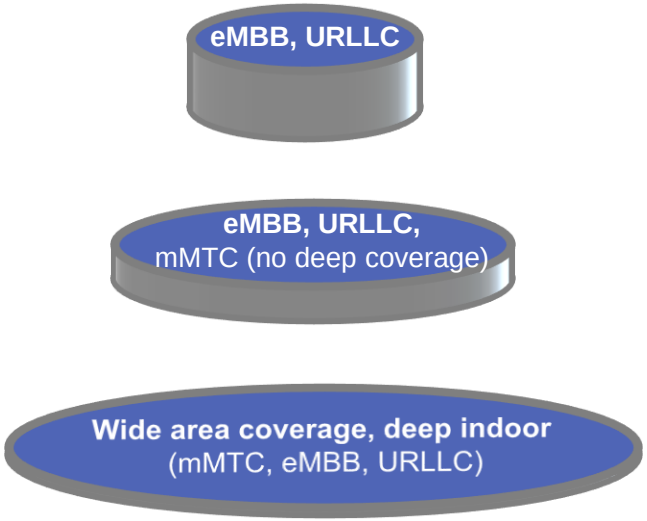
CHIPSETS






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# SPECTRUM




**High band**
Extreme capacity

e.g. 24.25-29.5, 37-43.5 GHz etc
800-1000 MHz MNO/Network contiguous 2020 onwards

**Mid band**
Both coverage & capacity

e.g. 2.3, 2.6, 3.3–4.2, 4.4-5 GHz etc
80-100 MHz MNO contiguous 2020 onwards

**Low band**
Extended coverage

e.g. 600, 700 MHz etc
Upto 20 MHz channel bandwidth 2020 onwards

**Various applications and services require access to spectrum from low, mid and high bands**

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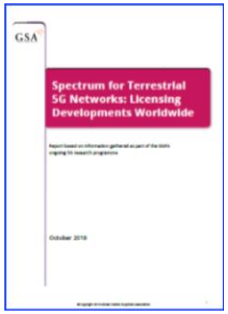

# THANK YOU

Check out www.gsacom.com for regular report updates

5G ecosystem update




5G licensing update




ERICSSON Qualcomm HUAWEI NOKIA intel SAMSUNG

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Conclusion

# Glyn Carter

GSMA

# Our Asks

## 26 GHz
(24.25-27.5 GHz)

- Limits to protect EESS (passive) -28 to -32 dB(W/200MHz)
- No conditions necessary for FSS/ISS since sharing studies show significant protection margin

## 40 GHz
(37-43.5 GHz)

- Identification of whole range provides harmonisation with other Regions
- FSS downlink: ES sharing is a national issue
- FSS uplink: sharing studies show a significant protection margin

## 50 GHz
(45.5-52.6 GHz)

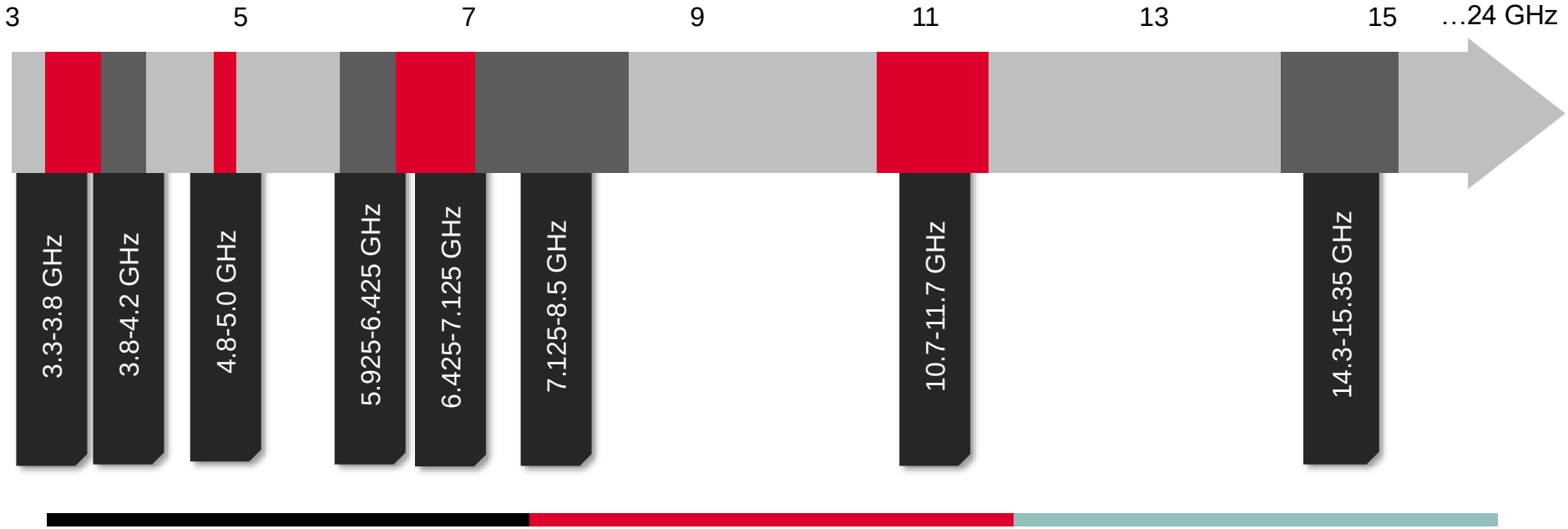
- Good options to support future 5G growth
- Studies have been performed and show sharing is possible

## 66 GHz
(66-71 GHz)

- Flexible use for unlicensed 5G systems - both IMT and non-IMT technologies
- Shared with WiGig
- Supported by APT, ATU, ASMG, CEPT

# WRC-23 supported bands

GSMA supports WRC-23 AIs for IMT in 470-960 MHz, and consideration of the bands below



# Experiences at the GSMA stand

Live 5G demos



City of the Future VR experience







Interactive library – all reports straight to your inbox