WRC-19 | 5 November

RCC

GSMA

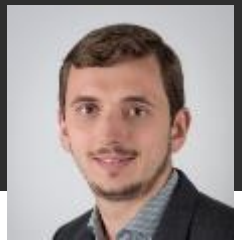
Introduction

GSMA

Konstantin Savin
GSMA

Geraldo Neto
TMG

Analyst Industry



GSA

Alexander Gulyaev
Huawei

SPECTRUM

THE FUNDAMENTAL ELEMENT OF MOBILE

Welcome

Konstantin Savin

GSMA

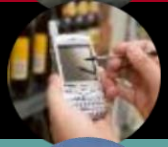
2G

3G

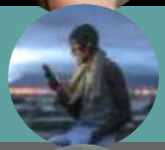
4G

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

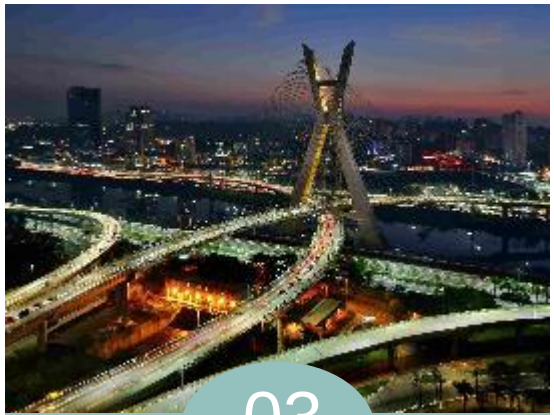
5G Ramps Up

01

5G users in the USA now experience over **1800 Mbps** powered by mmWave spectrum

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

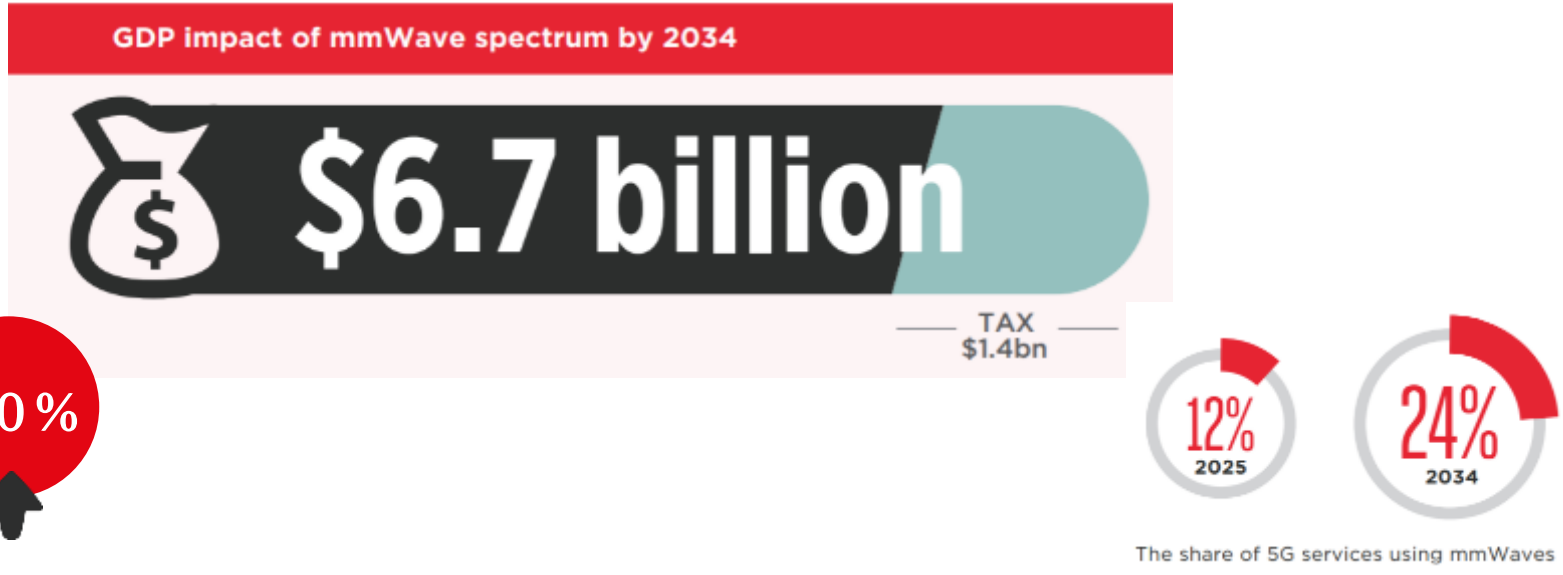
2018 Mobile operators will invest

$480BN WORLDWIDE

2020 in mobile capex

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

RCC Edition



SPECTRUM

THE FUNDAMENTAL ELEMENT OF MOBILE

Industry Perspective

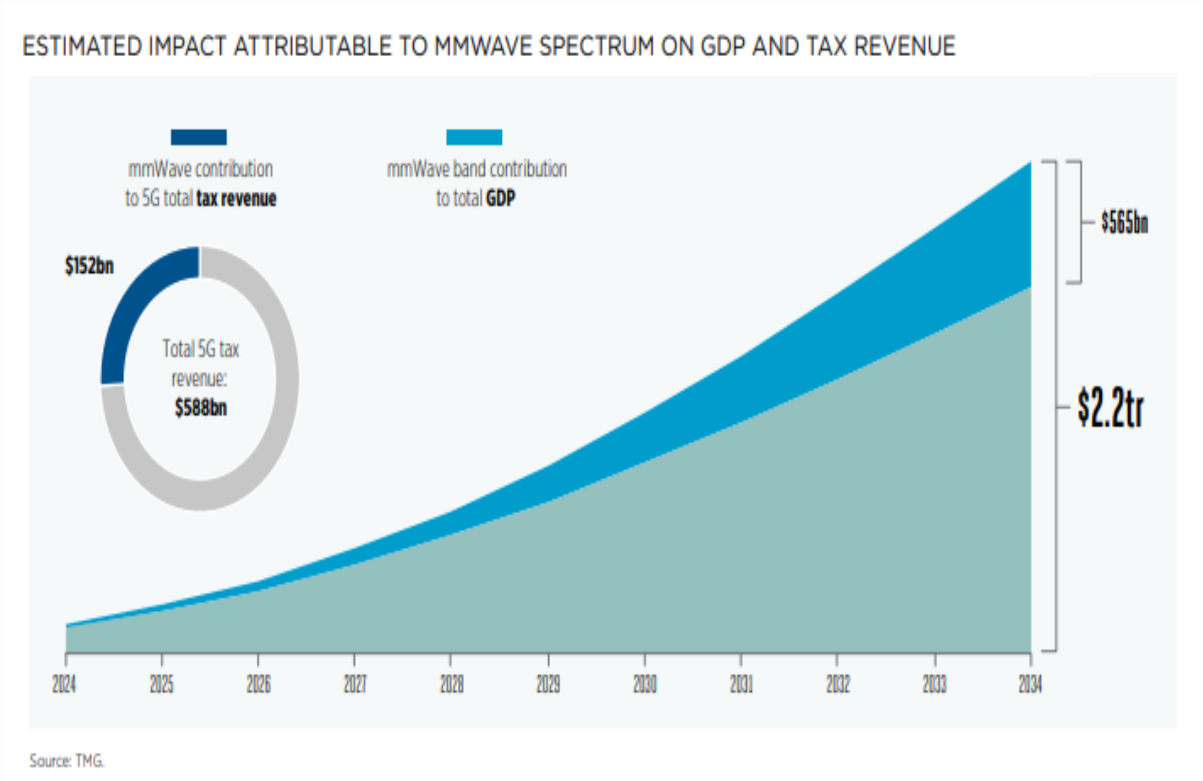
Geraldo Neto

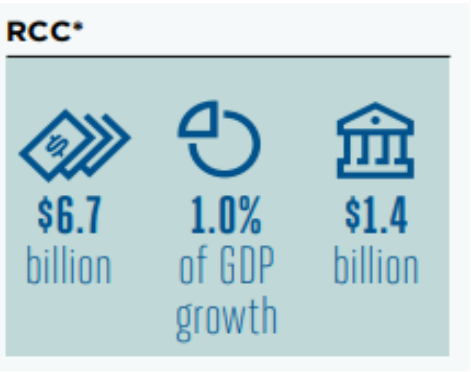
GSMA

WRC lunchtime with RCC

November 2019

5G is expected to contribute $2.2 trillion to global GDP





Regional spotlight report explores the impact of mmWave 5G on four regions

In each of the four regions, the report explores **two key cases studies** where mmWaves can be used to enable new or improved tools or processes to improve economic growth or quality of life.

SUB-SAHARAN AFRICA

- Case Study #1: Smart transportation logistics hubs
- Case Study #2: Extractive industries

REGIONAL COMMONWEALTH IN THE FIELD OF COMMUNICATIONS (RCC)

- Case Study #1: Automation across industry
- Case Study #2: Healthcare

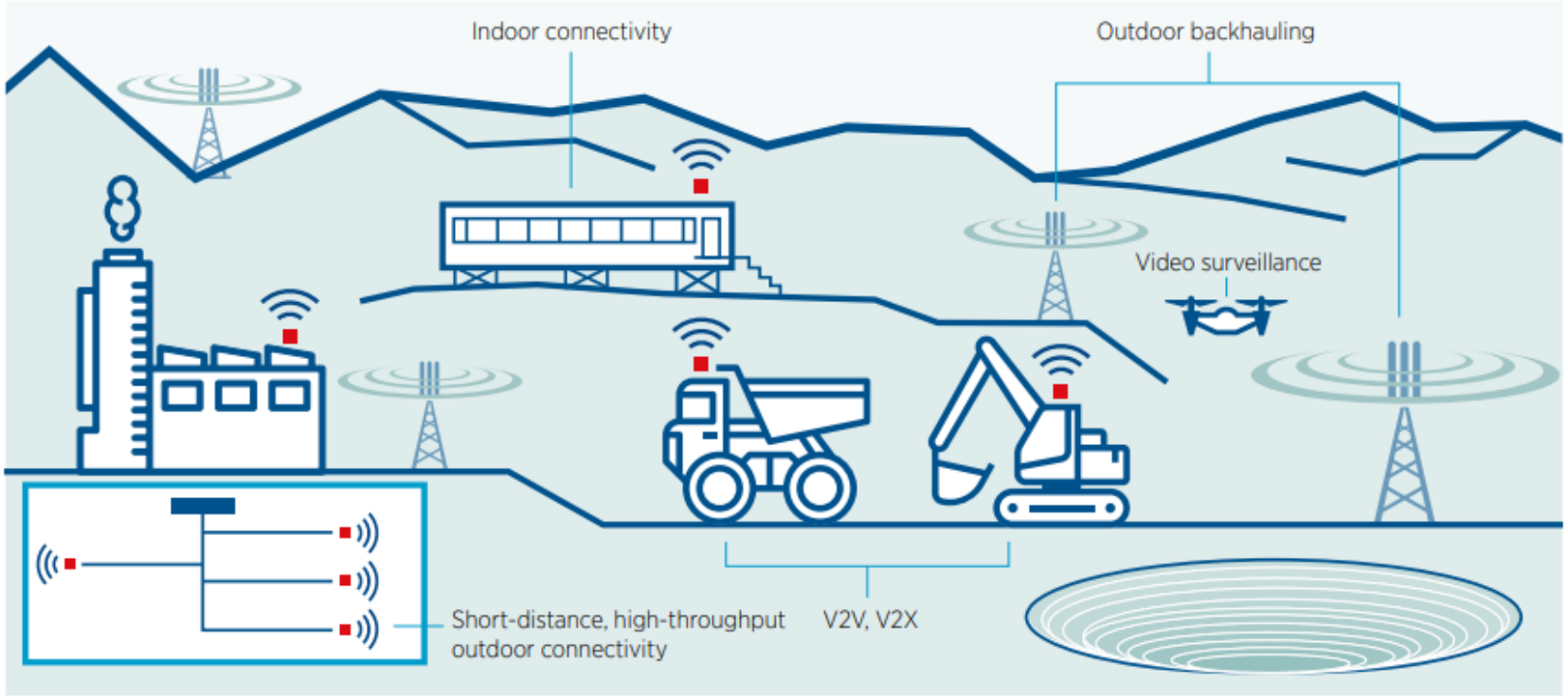
SOUTH AND SOUTH EAST ASIA AND THE PACIFIC ISLANDS

- Case Study #1: Connectivity
- Case Study #2: Disaster Communications

LATIN AMERICA AND THE CARIBBEAN (LAC)

- Case Study #1: Education
- Case Study #2: Transportation

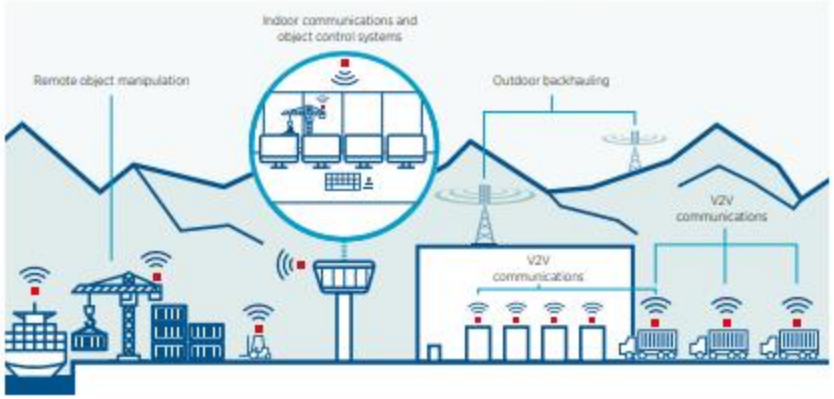
Case Study: Extractive Industries

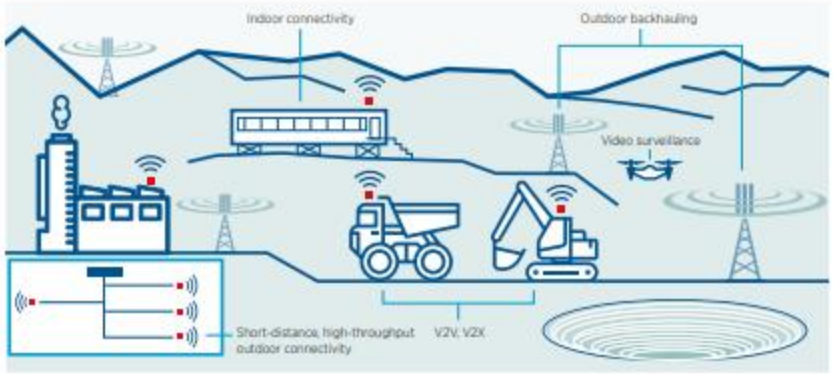


Source: TMG.

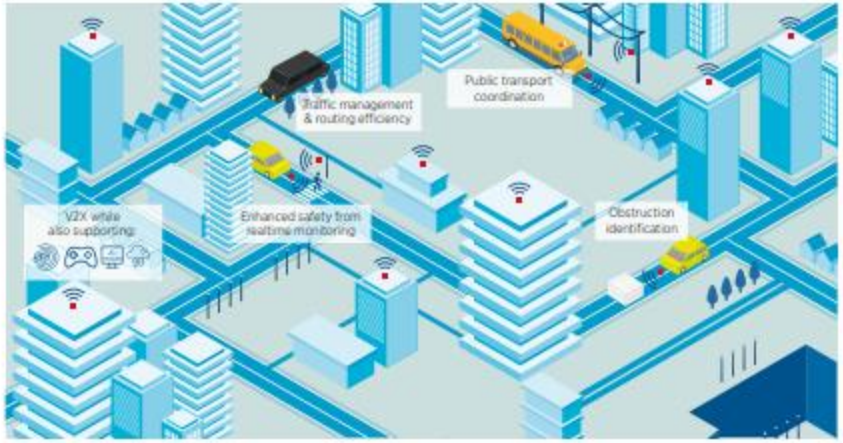
Case Study : Automation across industry

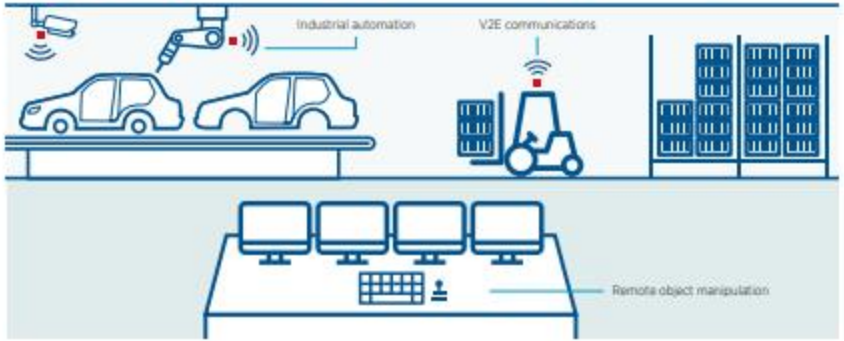
EXTRACTIVE INDUSTRIES





TRANSPORT

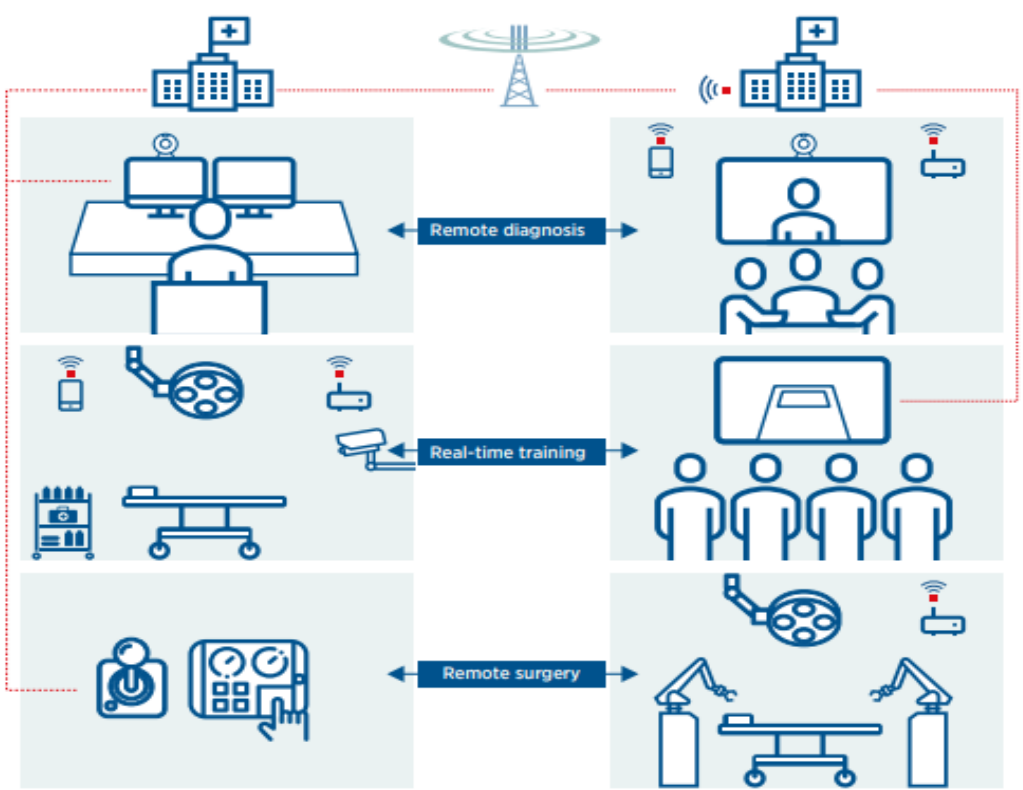




LOGISTICS

MANUFACTURING

Case Study : Healthcare



- **Remote diagnosis**: qualified staff not on-location can diagnosis in real-time with 5G-enabled devices
- **Real-time training**: Ad-hoc and ongoing training from remote specialists using mmWave 5G networks, tactile AR/VR learning applications, and next-generation video conferencing
- **Remote surgery**: remote object manipulation allows remote surgery using mmWave 5G's low latency and high-speed data rates

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THE FUNDAMENTAL ELEMENT OF MOBILE

5G Ecosystem

Alexander Gulyaev

GSMA

5G ECOSYSTEM UPDATE

Alexander Gulyaev

GSA CIS

VISION

VISION

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

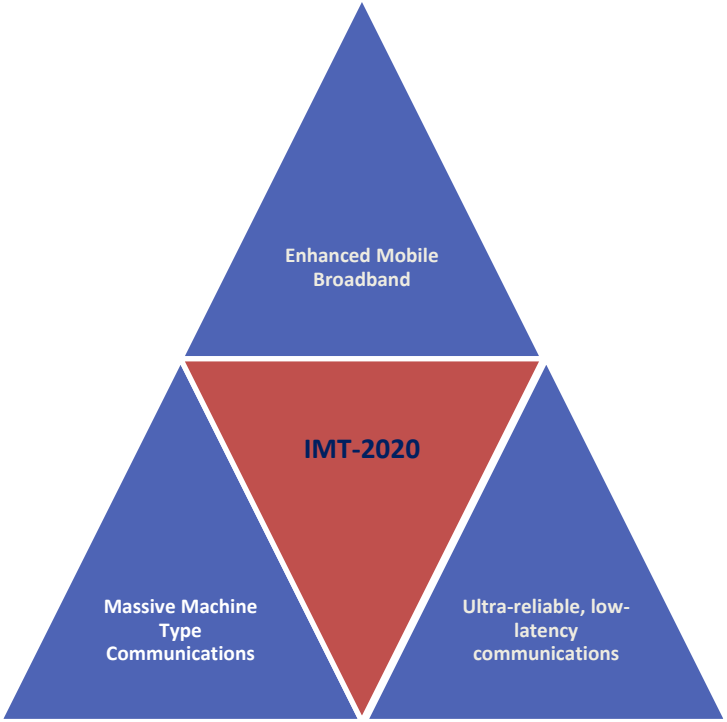
HOW

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

USE CASES



STANDARDS

GLOBAL INITIATIVE

Release 15 complete (2017-2018)

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

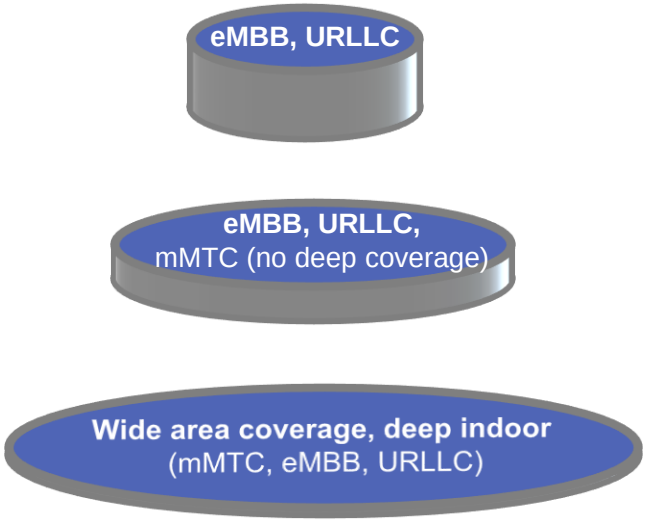
PRODUCTS

BASE STATIONS

DEVICES

CHIPSETS

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

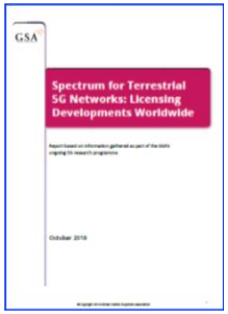
Various applications and services require access to spectrum from low, mid and high bands

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

Konstantin Savin

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)

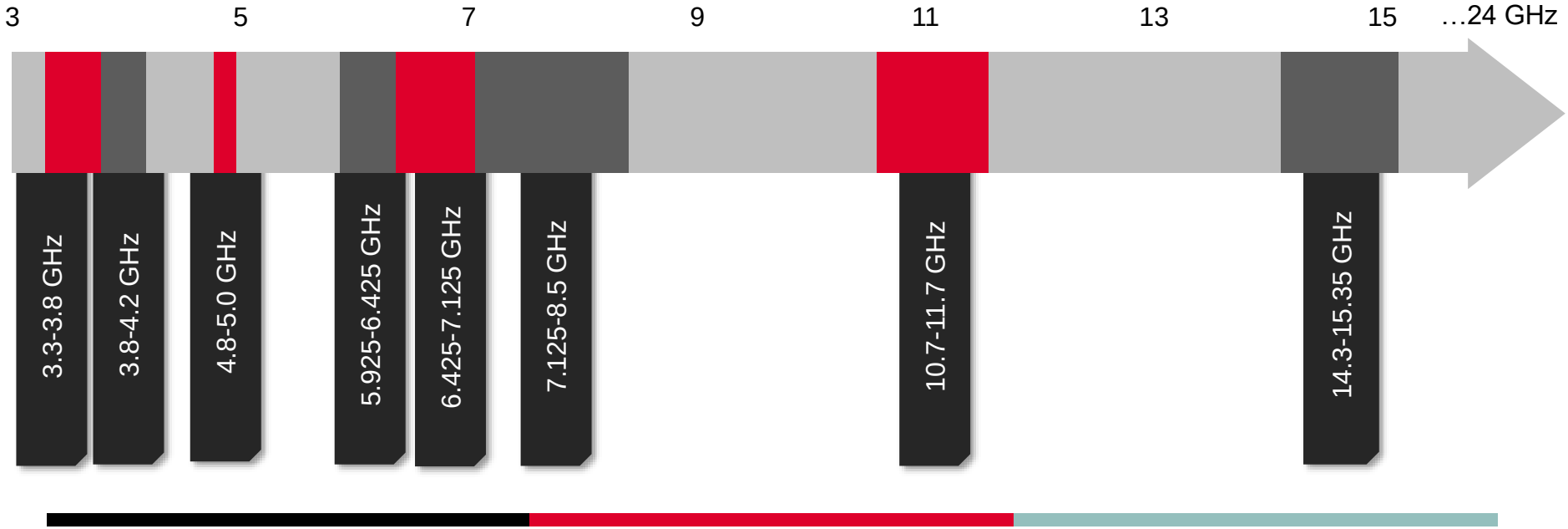
- Good options to support future 5G growth
- Studies have been performed and show sharing is possible

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