6 GHz BAND

IMPORTANCE OF LICENSE EXEMPT ACCESS TO THE BAND IN THE CARIBBEAN COUNTRIES

SMTF CTU Meeting – February 2023

DSA

DYNAMIC • SPECTRUM ALLIANCE

SEBASTIAN KAPLAN

META

Head of Connectivity & Access Policy, Spanish Speaking Latam

sebastiankaplan@meta.com

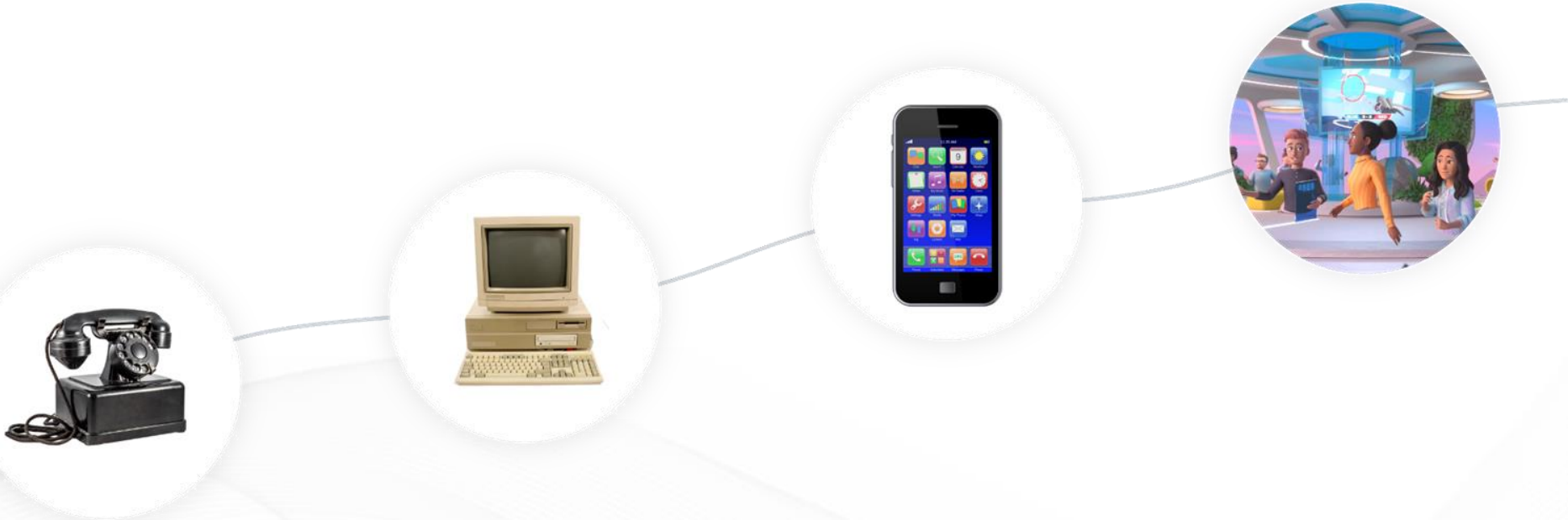
DYNAMIC SPECTRUM ALLIANCE

The Dynamic Spectrum Alliance (DSA) is a global, cross-industry, not for profit organization advocating for laws, regulations, and economic best practices that will lead to more efficient utilization of spectrum, fostering innovation and affordable connectivity for all.

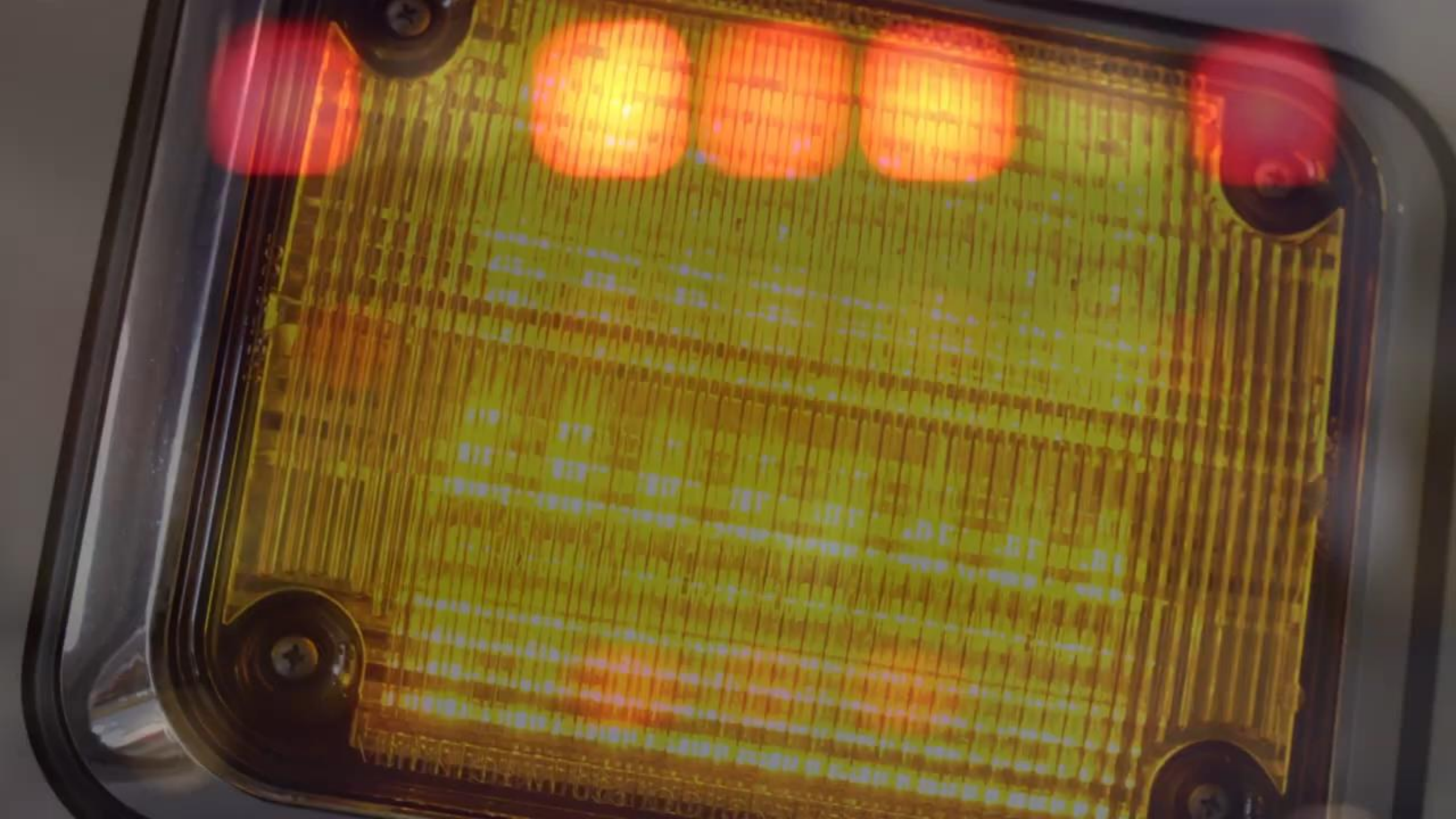
AGENDA

- Why is Wifi relevant. A look into the future of Connectivity.
- Update on the latest developments in the region
- Economic Impact Study for the Caribbean
- Conclusions and closing remarks

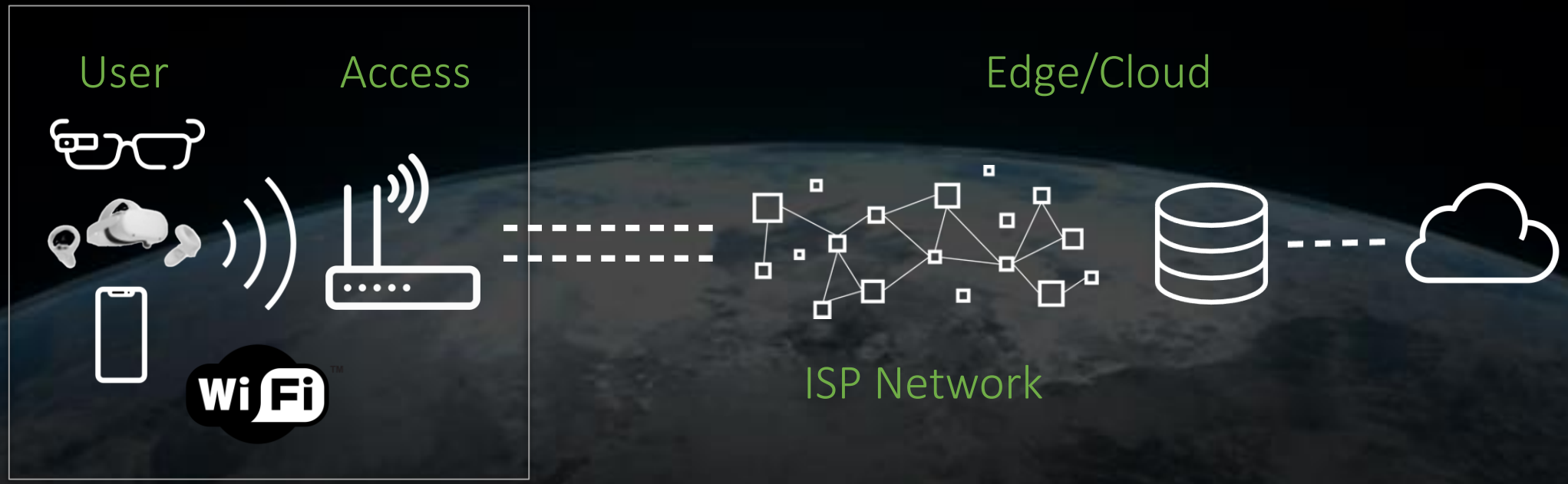
Technology has democratised connection and expression



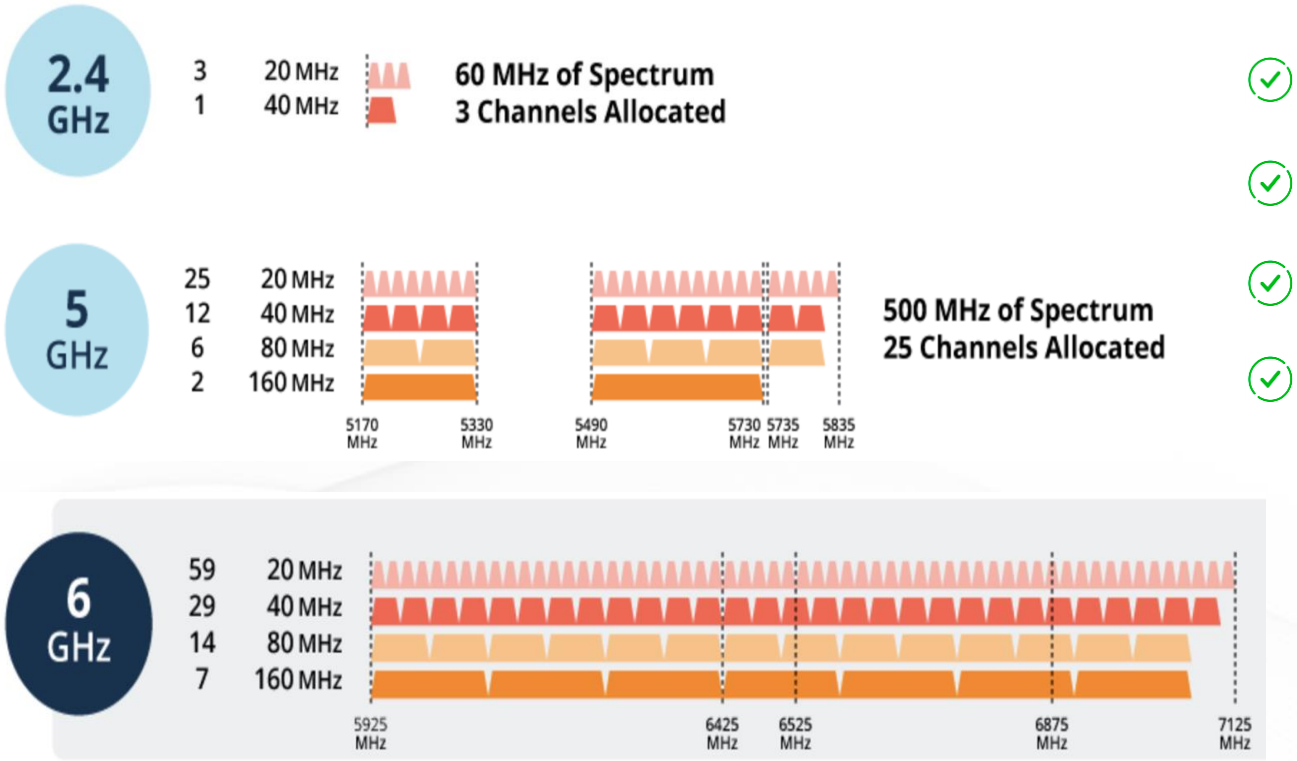
DSA
DYNAMIC · SPECTRUM · ALLIANCE



Improving Connectivity and the Metaverse experience will require looking at the E2E network holistically and 6 GHz Wi-Fi is a key component



What represents the 6 GHz band?



- 1200 MHz new greenfield spectrum for Wi-Fi
- Wider channels enable Gigabit capacity
- Wider channels enable lower latency and reduced power
- Only opportunity for new spectrum for Wi-Fi !

USE CASES

Very Low Power (VLP)
Mobile Indoor/Outdoor

- Augmented/Virtual/Extended Reality (AR/VR/XR)
- UHD Video Streaming & Multicasting
- High Speed Tethering/File Sharing
- In-Vehicle Entertainment

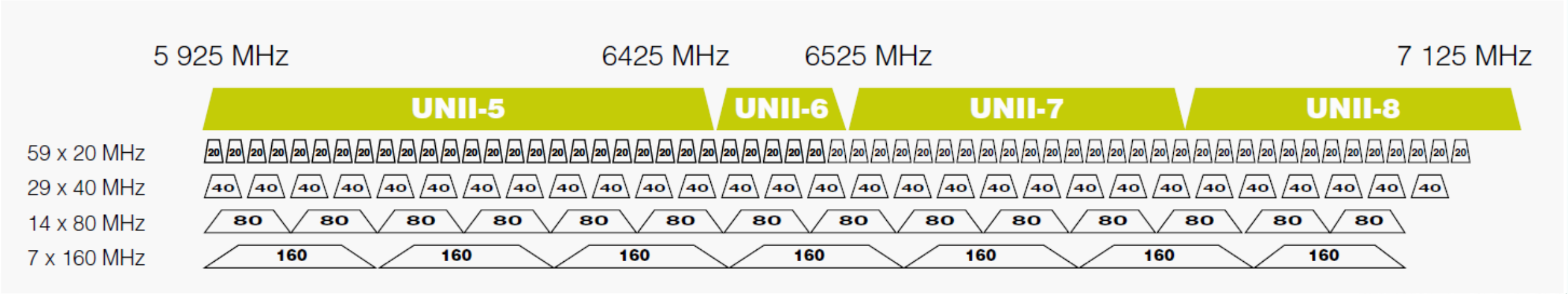
Low Power Indoor (LPI)
Fixed Indoor Only

- Residential Multi-AP/ mesh networks
- High-density enterprise networks
- Indoor public venues
- Industrial IoT

Standard Power (SP)
Fixed Indoor/Outdoor

- Multigigabit per second outdoor coverage (stadiums, LinkNYC, parks)
- Multigigabit point-to-multipoint rural connectivity
- Low-latency Wi-Fi calls, and next-gen experiences with AR/VR/XR

Coexistence considerations

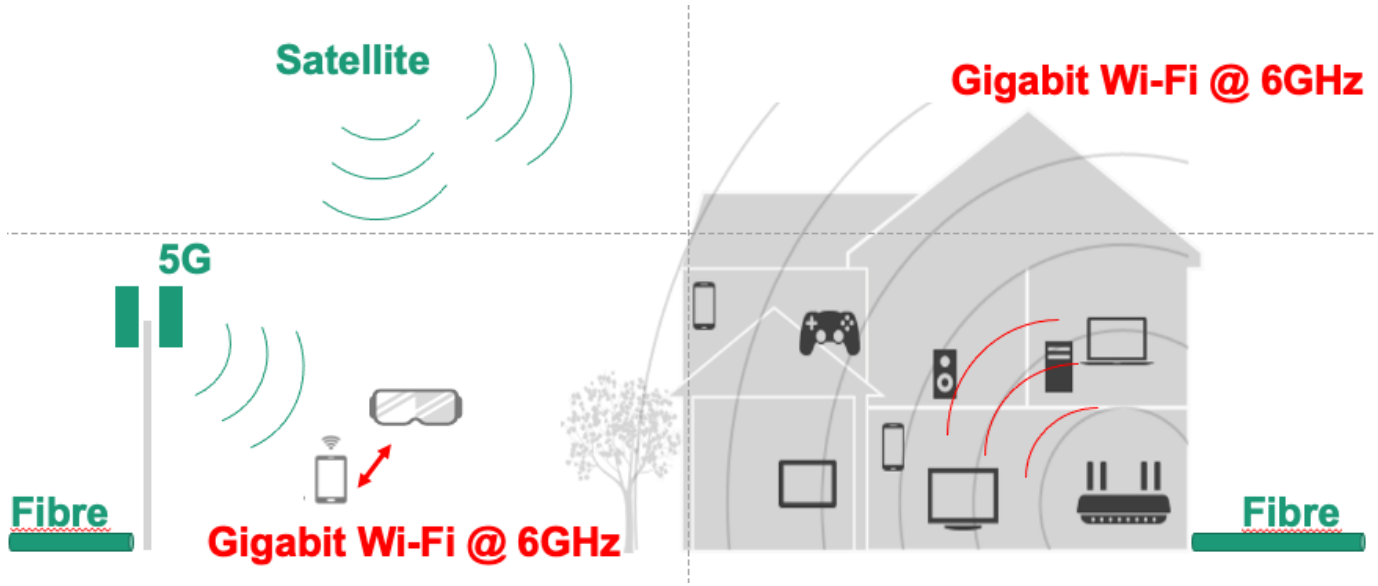


- LPI and VLP RLANs can coexist with existing incumbent services in the band.
- Standard Power RLANs can coexist with incumbents using Automated Frequency Coordination (AFC).

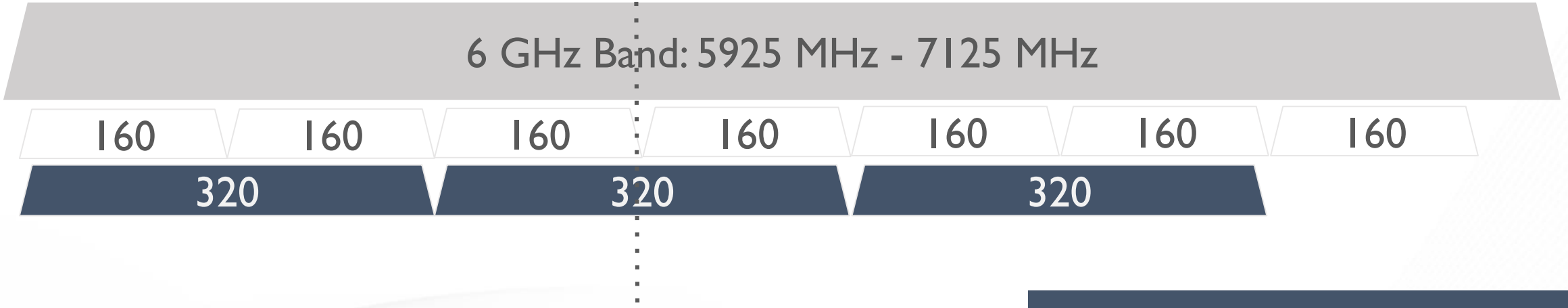
Need for more unlicensed spectrum for Wi-Fi

Affordable gigabit connectivity

- The digital transformation of the whole society relies on the availability of pervasive very high-capacity connectivity, including Wi-Fi.
- Thanks to their low cost, easy deployment, Wi-Fi will support the widespread adoption of digital solutions, especially advanced technologies such as IoT and robotics.



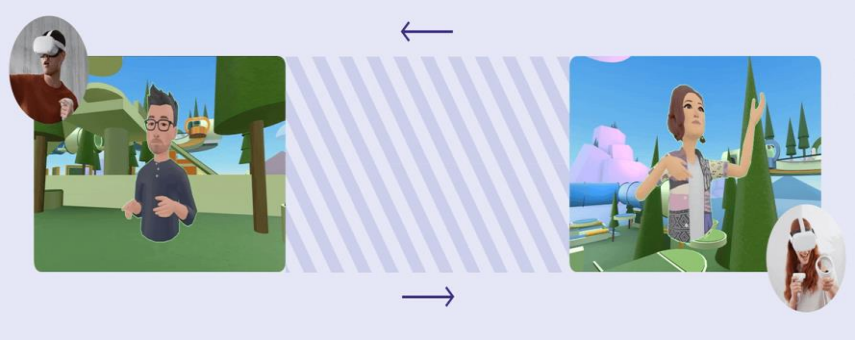
6 GHz Wi-Fi is specially designed for gigabit broadband and immersive wireless applications



- Three non-overlapping 320 MHz channels
- Seven non-overlapping 160 MHz channels
- Fourteen non-overlapping 80 MHz channels

Countries that only enable 500 MHz will have degraded performance

Importance of 6 GHz spectrum for AR/VR



Predictable low latency and jitter

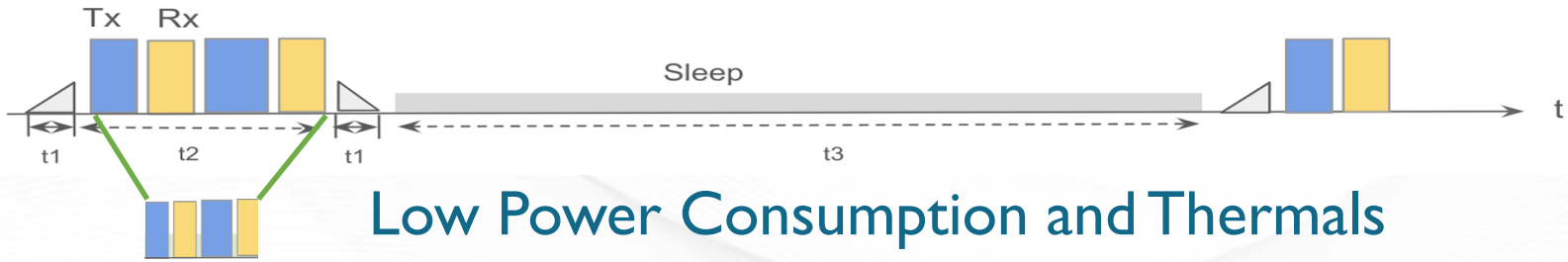
Improves end-to-end performance and protect against motion sickness.

Sustainable throughput

More Speed and More Capacity

Meta

REALITY LABS

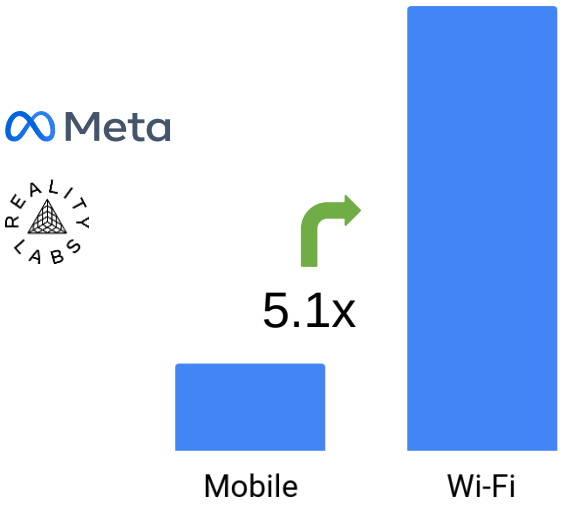


Low Power Consumption and Thermals

Minimize on-air time(Duty cycle) = saved power and reduced heat

DSA
DYNAMIC · SPECTRUM · ALLIANCE

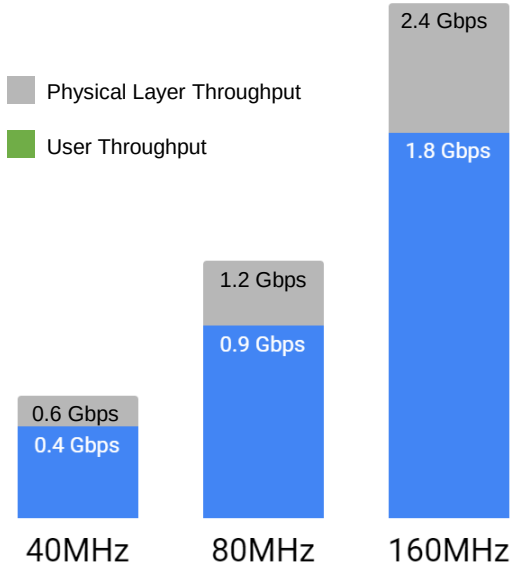
Why 1200 MHz? Wider Channels + Higher throughput + Lower Latency



Wi-Fi is critical to connectivity

Wi-Fi carries **5.1 times more internet traffic than mobile***. In most cases It provides the critical first link from device to the rest of the network and can be the limiting factor to Quality of Experience (QOE)

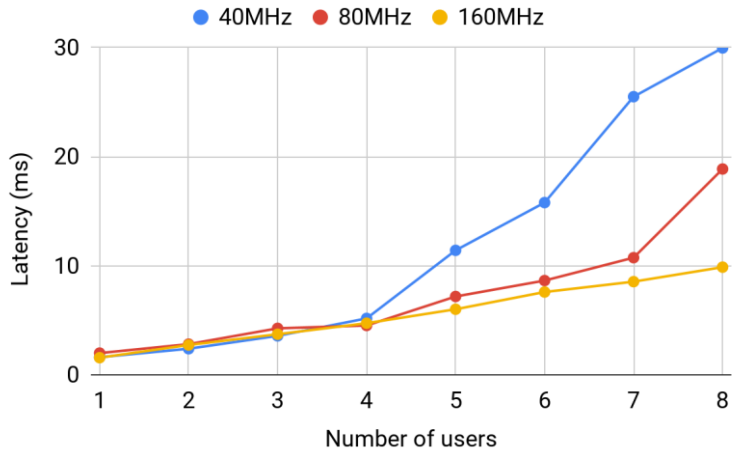
*Source: Analysys Mason, Wireless network data traffic trends 2021-2026



Wider channels enable Gigabit capacity

Higher Wi-Fi throughput enables Gigabit capacity to flow all the way through to the end user devices.

Data rates at MCS11 (1024QAM, 5/6 coding), 2 spatial streams, 0.8µs guard interval



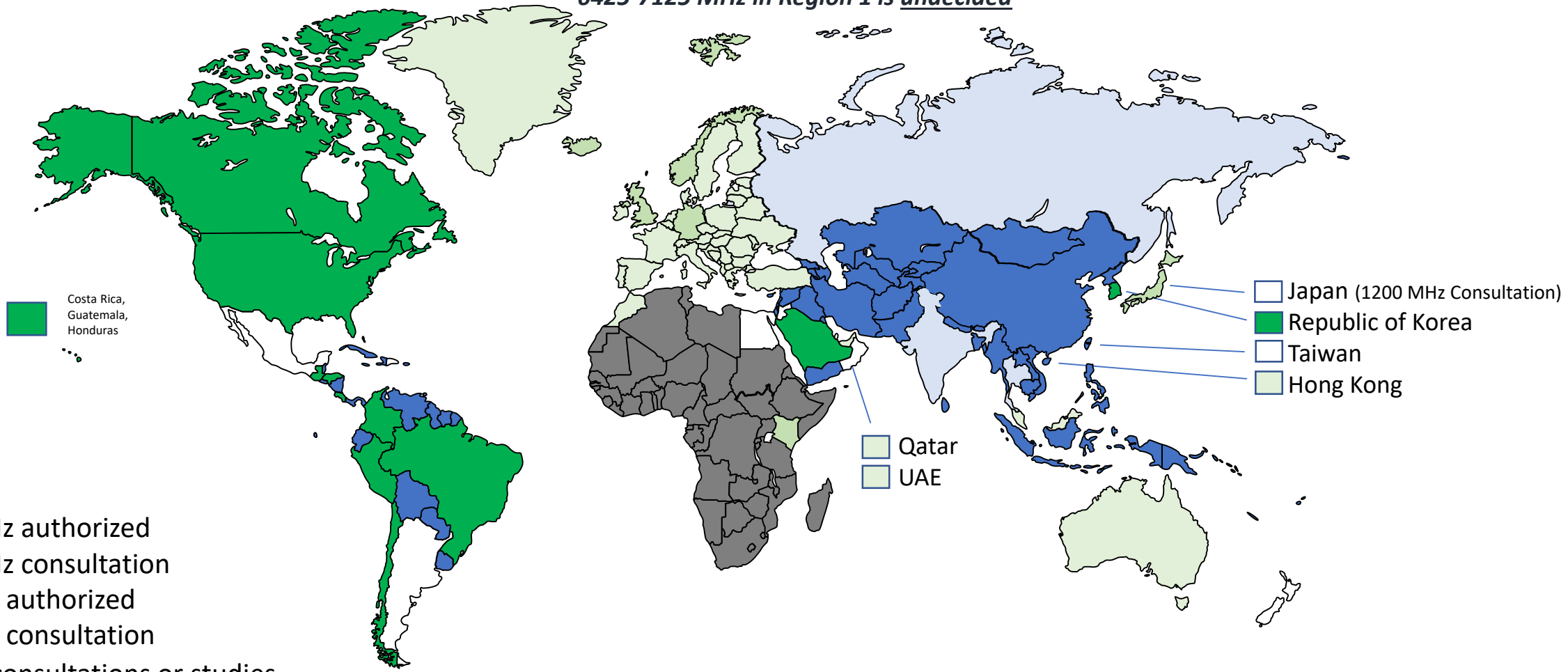
Wider channels enable lower latency

Wider channels reduce latency in multi-user environments such as Enterprises or the classroom.

Chart shows P90 one way Latency, 10Mbps per user, as measured during lab testing by Meta

64% of the World's GDP has opened a portion of the 6 GHz band

6425-7125 MHz in Region 1 is <u>undecided</u>



- 1200 MHz authorized
- 1200 MHz consultation
- 500 MHz authorized
- 500 MHz consultation
- General consultations or studies
- No public activity
- 500 MHz recommendation

31% GDP
designated full band

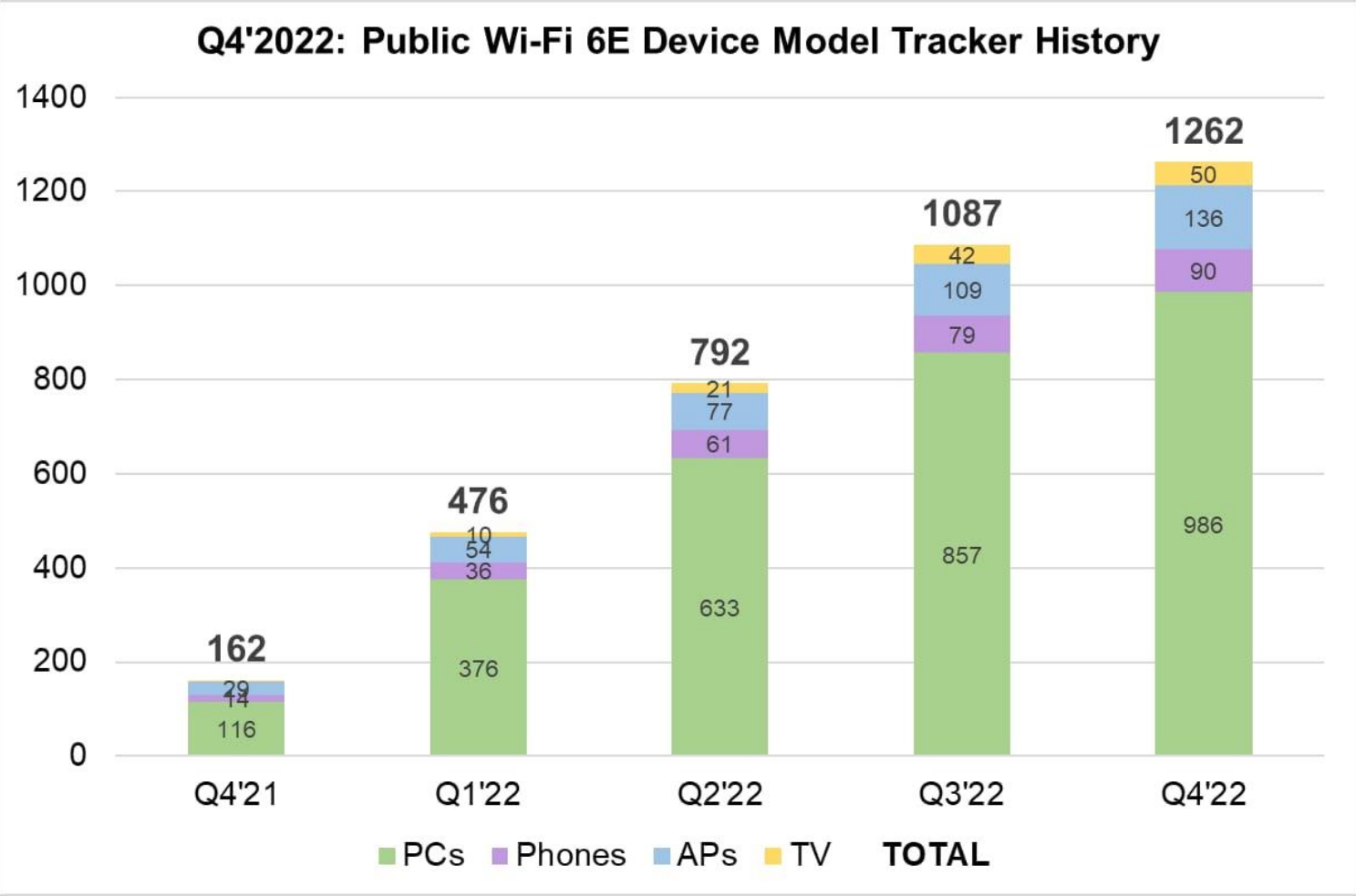
10% GDP
considering full band

25% GDP
studying full band

Regional Trend: 1200 MHz Harmonization is Key

DSA
DYNAMIC · SPECTRUM · ALLIANCE

Wi-Fi 6E device count surpassed 1200 devices by December 2022



Source: Intel. Wi-Fi 6E device tracking summary is public information compiled by Intel from vendor websites, press releases announcements, and third-party device reviews. Intel provides this assessment for informational purposes only, cannot guarantee its accuracy, and it is subject to change without notice.

Wi-Fi 6E is essential for broadband

Orange Livebox: A Super-Fast Connection with Wi-Fi 6E

"Livebox 6 brings users not just Wi-Fi 6 (802.11ax), but Wi-Fi 6E ("E" for "extended")."

"Wi-Fi 6E **reduces network saturation** during simultaneous use and in places with a lot of traffic."

Having the latest generation of Wi-Fi components along with antennas built into its design gives the Livebox 6 extended Wi-Fi coverage and **throughput of up to 2 Gbps — triple that of Wi-Fi 5**.

The result is **faster Wi-Fi** even during simultaneous use, **faster speeds** to reduce load times, and **lower latency** for networked gaming and video calls. These use cases are guaranteed to have no interruptions, thanks to intelligent Wi-Fi, which automatically manages Wi-Fi and the use of different frequencies in real time."

Vodafone UK Pro II Ultra Hub and Wi-Fi Booster

The new Ultra Hub and Super WiFi booster use the latest WiFi 6E technology - the first from any major broadband provider in the UK - **which can deliver WiFi to more than 150 devices**.

Max Taylor, Chief Commercial Officer, Vodafone UK, said: "**Vodafone Pro II sets the new standard for the UK broadband market. It combines the UK's fastest and most reliable WiFi technology** in the all-new Vodafone Ultra Hub router with the UK's largest full fibre footprint."

Bouygues Bbox Fiber Wi-Fi 6E:

What are the advantages of Wi-Fi 6E?

1. WiFi 6E (Extended) offers: **better performance, lower latency, faster speeds**.
2. The 3rd 6 GHz band is used only by new WiFi 6E compatible equipment: these **latest generation products are not "slowed down" by the old products** (non 6E) and therefore traffic in WiFi 6E on 6Ghz with the benefits associated with this new wifi band
3. WiFi 6E makes it possible to **make the most of services requiring a substantial bandwidth**: augmented reality, streaming in 4K, 8K, gaming or multi-use.

Swisscom WLAN-Box 3

Wi Fi 6 CERTIFIED

The WLAN-Box 3 is a triband WLAN device and supports the very latest Wi-Fi 6E standard **with the interference-free 6 GHz WLAN band**.

*"With the new WLAN-Box 3, Swisscom proves its commitment to bringing the best Wi-Fi products to our end customers," said Marcel Burgherr, Head of Home Devices at Swisscom. "Thanks to SoftAtHome's software, this triband premium product delivers a **superfast and reliable Internet connection for the increasing number of Wi-Fi devices at home**."*

Wi-Fi 6E is essential for broadband

Comcast xFi Advanced Gateway

"The next generation gateway underpins our commitment to providing the best **whole-home WiFi experience with the fastest speeds, ultimate control, advanced cybersecurity protection and broad coverage in the home**, "said Dave Watson, CEO, Comcast Cable.

Leveraging next-generation WiFi 6E technology, **provides 3X more bandwidth** than the previous generation and is **capable of twice as many simultaneous connections.**

Bell Canada: Gigahub

"We're thrilled to be launching North America's fastest Internet speeds and Wi-Fi technology. With download and upload speeds of up to **8 gigabits per second**, and the availability of gigabit plus speeds with Wi-Fi 6E, we are making consuming content at home even better for our customers, allowing them to do more of what they want online, even faster."

Wi-Fi 6E is the next phase of Wi-Fi advancement, enabling faster speeds and lower latency when used with a compatible device and allows customers to work, learn, video chat, stream and game online on any or all of their household devices simultaneously.

Frontier Ultrafast Wi-Fi 6E System

…designed to provide **better overall performance and network efficiency** while also being able to **support more users at the same time**.

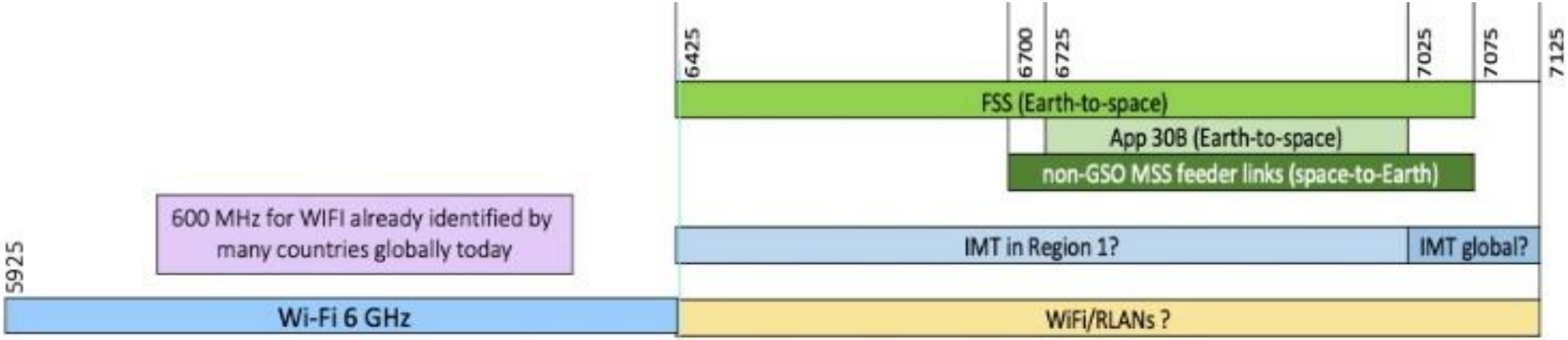
Wi-Fi 6e is the new standard in wireless internet technology. It supports the 6GHz wireless spectrum, **enabling faster speeds and lower latencies** for wireless networks and more devices to connect at the same time. **Wi-Fi 6e is built for speed, reliability and security.**

Apple iPad Pro

Superfast Wireless Connectivity

The new iPad Pro supports the fastest Wi-Fi connections with support for Wi-Fi 6E, so users who need fast connections can take their demanding workflows with them everywhere. **Downloads are up to 2.4Gb/s, 2x faster than the previous generation**.

SATELLITE USE OF THE UPPER 6 GHz BAND



6425-7075 MHz – FSS E-S

- For geostationary uplinks used by large numbers of GSO FSS networks covering all regions, includes Inmarsat use
- *Studies required on*
  1. *Interference from IMT to satellite receivers*
  2. *Interference from FSS earth stations to IMT stations*

6725-7025 MHz - Appendix 30B

- Allocated to the FSS globally and used for FSS as per the provisions of Appendix 30B.
- Objective: to "...guarantee in practice, for all countries, equitable access to the geostationary-satellite orbit..."
- Provides administrations with a preserved orbital slot and frequency allotments.
- *Studies required on interference from IMT to planned national allotments*

6700-7075 MHz - NGSO MSS DL

- Gateway earth stations deployed around the world for NGSO MSS systems (e.g., GlobalStar, OmniSpace, EchoStar Helios)
- Providing voice, data, and Internet of Things globally
- *Studies required on Interference from IMT to receiving earth stations*

Source: Inmarsat

Ofcom

making communications work for everyone

Update on the upper 6 GHz band

Our current position in preparation for WRC-23

At this stage, for the upper 6 GHz band, we favour a "no change" outcome at WRC-23, based on the balance of risks and opportunities.

Publication date: 6 December 2022

See: https://www.ofcom.org.uk/__data/assets/pdf_file/0028/248770/update-on-upper-6hz-band.pdf

CITEL
AI 1.2: SPECTRUM 6425 – 7025 & 7025 – 7125 MHz

In 2020, the **United States** made 1200 megahertz of spectrum available for unlicensed use in 5 925-7 125 MHz. This decision allows unlicensed devices (e.g., Wi-Fi 6E, LAA, NR-U) to share this spectrum with incumbent services under rules that are carefully crafted to protect the licensed services and to enable both unlicensed and licensed operations to continue to thrive throughout the band. A number of countries, including nine CITEL administrations, have already decided to allow **license-exempt use of the frequency band 6 425-7 125 MHz** and others are considering such use. Global regulatory harmonization would ensure economies of scope and scale to enable commercially viable unlicensed device 6 GHz ecosystem.

Further, studying and considering identification of the 6 425-7 025 MHz frequencies for the terrestrial component of IMT for Region 2 and Region 3 is outside the scope of agenda item 1.2 and as such there will be no change in the Radio Regulations involving these frequencies with respect to these Regions. **Accordingly, the United States is proposing a no change (NOC) to the Radio Regulations for the bands 6 425– 7 125 MHz in order to support the flexible use of the mobile service allocation, including for RLAN use, and supports the further harmonization of the 6 GHz band for unlicensed devices.**

AI 1.2: SPECTRUM 6425 – 7125 MHz
Status Citel: DIAP

- Reasons: **No change to the Table of Frequency Allocations in the band 6 425 – 7 125 MHz in order to harmonize license-exempt use of the band**. Regulatory harmonization will create economies of scope and scale and produce a robust equipment market, benefitting consumers and national economies worldwide. Given the existing mobile allocation, administrations may deploy and operate systems and applications of the mobile service (e.g. IMT or **RLAN**) based on their national priorities and requirements.

AI 1.2: BTP POSITION ON SPECTRUM 6425 – 7025 & 7025 – 7125 MHz

In the national frequency table, the frequency band 6425 – 7125 MHz, as in region 2, is mainly allocated to the fixed service, fixed satellite, and mobile on a primary basis. The 6425 – 7025 MHz band is occupied with several microwave links.

7025-7075 MHz: Satellite Digital Audio Radio Services (SDARS) for GEO feeder links in the Earth-space direction to provide audio programming to subscribers in the United States, Canada, and the Caribbean**.**

In an effort to accommodate the 6 GHz band to facilitate new (unlicensed) **WiFi-6E** services as these are also already being implemented in the region, Curacao does not consider identification of IMT a valuable option for this band, and therefore supports a “no change” in the Radio Regulations involving these frequencies.

[NED position: TBD]

Why opening the full 6 GHz band for unlicensed use is good for the region

Opening the full 6 GHz band for Wi-Fi is positive spectrum policy for the region and protects satellite connectivity

- *Considering the importance of satellite connectivity in the Caribbean region, FSS deployments in the 6 GHz band could be impacted by IMT deployments in different regions as they can be in the field of view of the satellite beam.*
- *For example, an MSS uplink in the 2.6 GHz band in Region 3 is interfered by IMT usage in Region 1, hence, there is a cross-regional interference that is still pending resolution.*

Wi-Fi in 6 GHz will better serve remote communities; whereas the potential benefit of 5G in 6 GHz would be limited to marginal additional capacity for dense urban and not serve rural or remote areas, critical for the Caribbean

- *For example, in Europe, 5G base stations represent 23.51% of the total number of 4G base stations, but most of those 5G base stations are using DSS in 4G bands and 5G base stations in the 3.4-3.8 GHz band (for which IMT wants 6 GHz as an extension) only represent 3.61% of the total number of 4G base stations. Whilst there is a sizable 5G deployment in Europe today (about 147,000 5G base stations), the share of 5G base stations deployed in the 3.5 GHz is very limited[1][2].*

The region stands to see economic benefits through low-cost enablement of advanced applications in the Caribbean and bridging the digital divide in remote / isolated geographies

- Enabling unlicensed access to the full 1200 MHz of the 6 GHz band in the Caribbean will result in total cumulative value of 79.84 billion dollars[2] in the next 10 years. Countries making the full band available for Wi-Fi will see greater socioeconomic benefits.

(1) See European 5G Observatory available at https://5gobservatory.eu/observatory-overview/eu-scoreboard/
(2) Study available at http://dynamicspectrumalliance.org/wp-content/uploads/2022/06/Assessing-the-economic-value-of-unlicensed-use-of-the-6GHz-Band-Caribbean.pdf

IT'S THE RIGHT TIME FOR CARIBBEAN ADMINISTRATIONS TO

OPEN THE FULL 6GHZ BAND FOR UNLICENSED USE

AND

SUPPORT THE NOC DIAP AT CITEL'S PCCII MEETING IN MEXICO

DSA
DYNAMIC · SPECTRUM · ALLIANCE

www.dynamicspectrumalliance.org

Thank you!