6 GHz Wi-Fi:
Connecting to the Future

October 2022

Wi-Fi Alliance Vision:

Connecting everyone and everything, everywhere

The principles that drive us

Wi-Fi Alliance: 900+ companies comprising a who's who in technology and beyond

Wi-Fi Alliance membership enables you to…

DRIVE
development and evolution of Wi-Fi technology and access worldwide

CERTIFY
devices and leverage the globally respected Wi-Fi CERTIFIED™ brand

LEARN
from Wi-Fi experts across the globe

NETWORK
with peers at exclusive events

COLLABORATE
with companies worldwide to supply quality Wi-Fi devices to market

PROMOTE
company exposure through Member Marketing Network opportunities

ADVOCATE
for global spectrum policy that encourages Wi-Fi growth

DELIVER
positive user experiences on secure devices

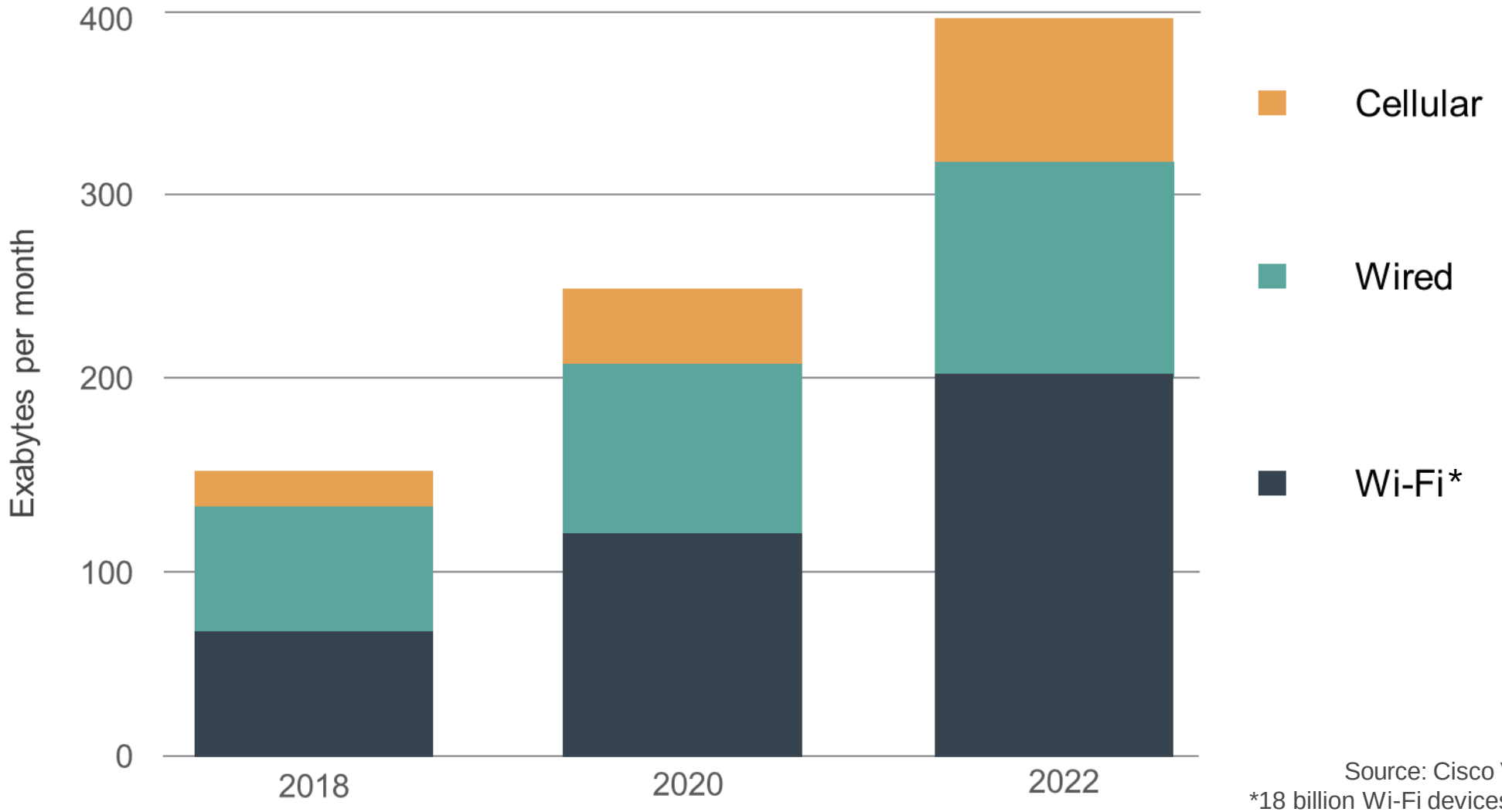
Membership benefits

6 GHz Wi-Fi: Connecting to the Future

- Trends
- Considerations
- Conclusions

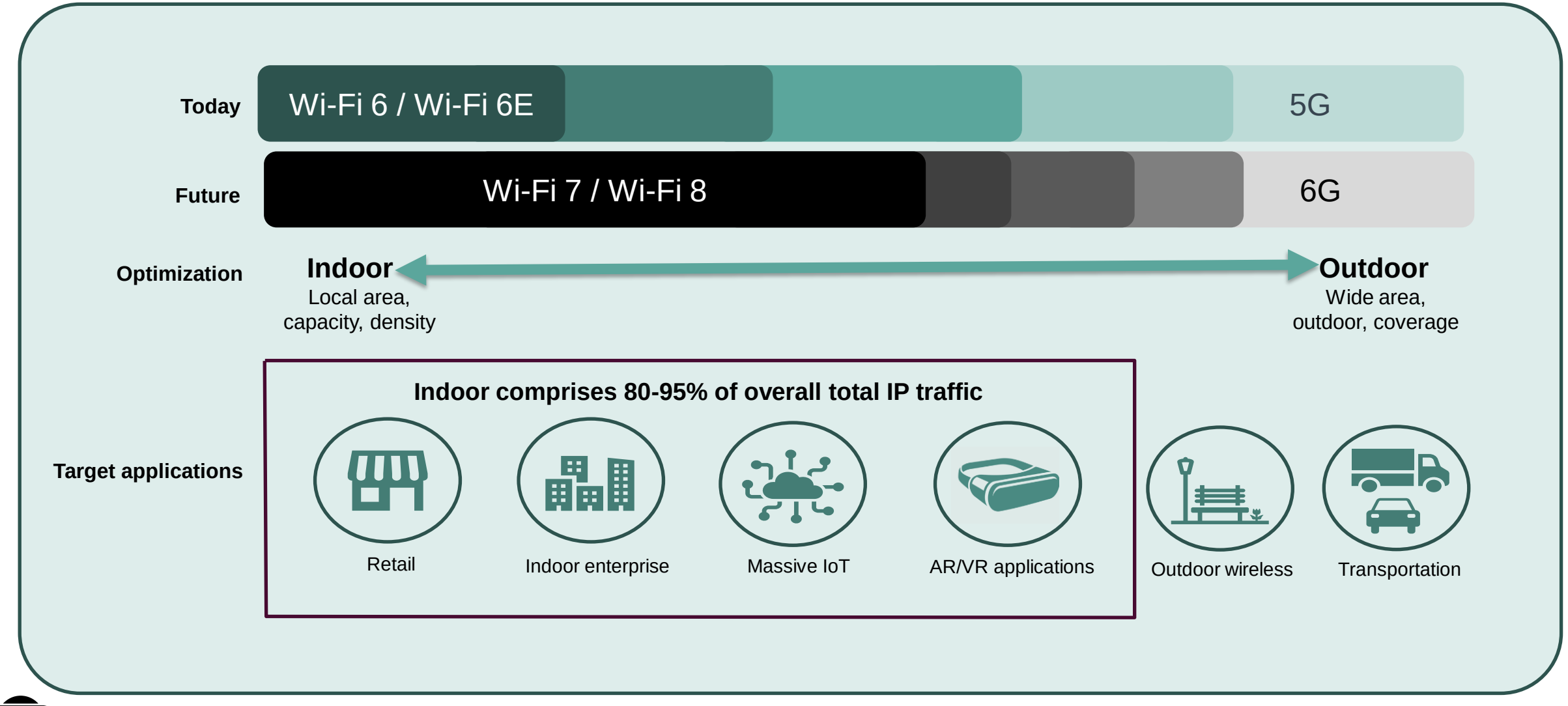
Trends

Trend #1: Data growth



Source: Cisco VNI 2017-2022
*18 billion Wi-Fi devices in use in 2022

Trend #1 corollary:
Data growth now and in future predominately indoors



Trend #2: Wi-Fi traffic share increases with each cellular generation

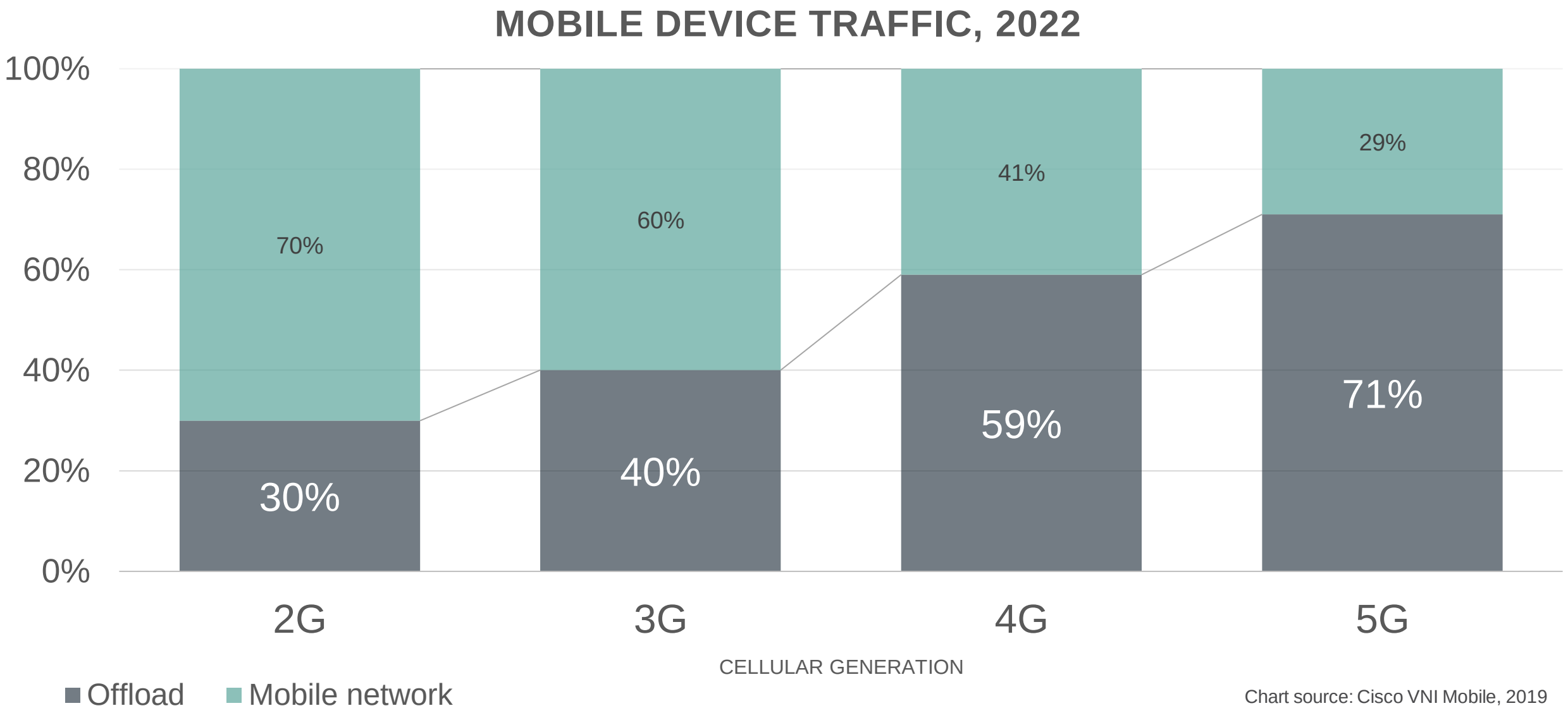


Chart source: Cisco VNI Mobile, 2019

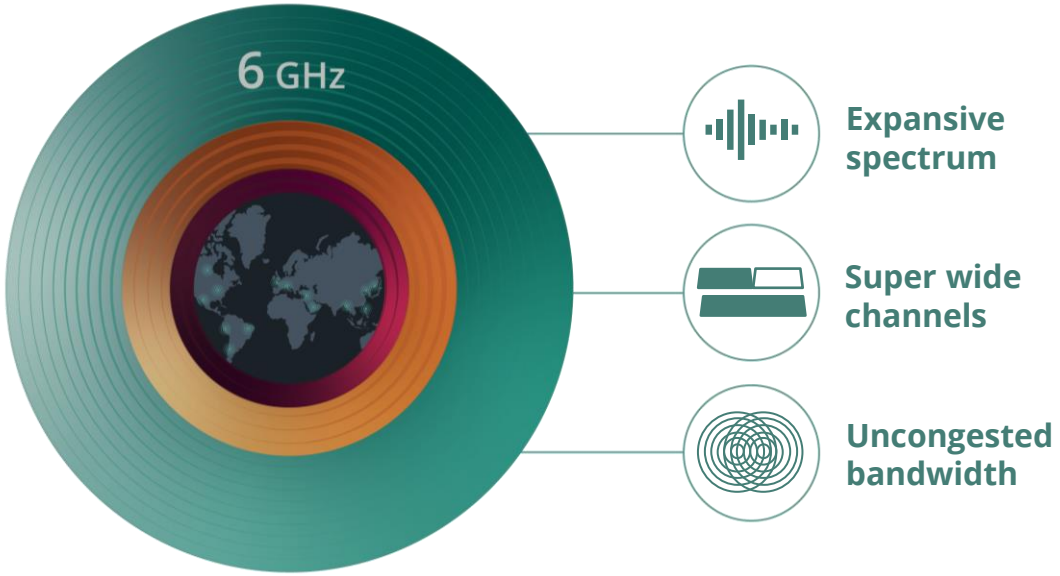
Trend #3:
Distributed cloud computing next generation use cases

- Immersive experiences such as VR/AR/XR, telehealth, Industrial IoT / Automation, 3D-video
- Require expansive computational resources and connectivity hundreds, if not thousands, of times faster than 5G
  - Cannot be delivered by a wide-area networks such as IMT
  - Require local-area, short range communications such as the next generation Wi-Fi technologies designed for extremely high throughput and spectral reuse

Considerations

Consideration #1: 6 GHz is transforming Wi-Fi technology**

- Wi-Fi 6E: capabilities required for advanced use cases: faster speed, lower latency, higher efficiency, higher density
  - In 2022 over 1.5 million Wi-Fi 6E access points and 350 million Wi-Fi 6E devices*
  - In 2024 over 5.2 million Wi-Fi 6E access points and over 1 billion devices*
- Wi-Fi 7: enhanced VR/AR/XR, Industrial IoT, automotive, telepresence, immersive 3-D support with higher data rates, stringent latency, reliability, and QoS
  - Data transfers rates up to 30 Gbps
  - 92 million units expected to ship in 2024

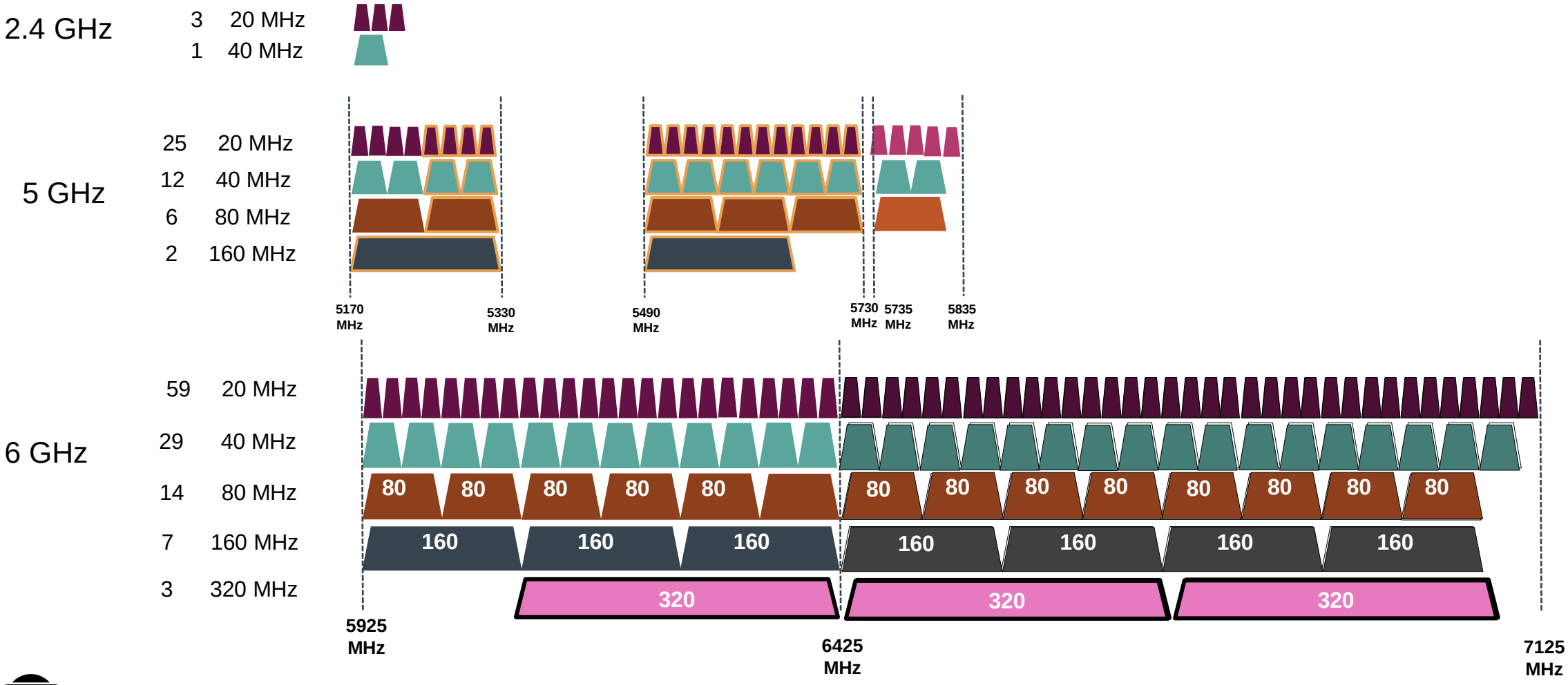


Wi-Fi 6E video

Wi-Fi Alliance®

*Source: IDC Research, Jan 2022
**In a recent survey, 58% of companies said 6 GHz is critical or very important to their strategy
Intel predicts in 2022 around 30 percent of their product mix will be Wi-Fi 6E

Consideration #2:
6 GHz frequency band is uniquely suited to meet growing demand for Wi-Fi connectivity – *no alternative spectrum* now or in the future



Consideration #3:
IMT networks in 6.425-7.125 GHz are not feasible

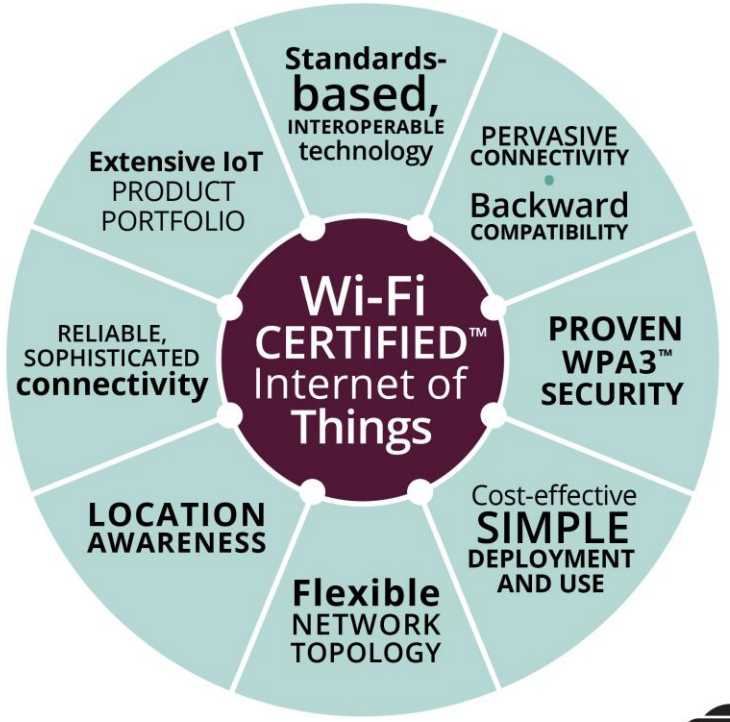
- Countries in all regions are deploying Wi-Fi in 6.425 - 7.125 GHz
  - IMT frequency harmonization cannot be achieved; no interoperability
- Market fragmentation precludes economies of scale necessary for a viable IMT ecosystem in 6 GHz
  - billions of $ to design and produce cellular chipsets for 6.425-7.125 GHz
  - billions of $ to integrate chipsets into devices and bring them to market
  - billions of $ to deploy IMT technology network
  - billions of $ to operate IMT network

  That's a lot of billions that no one is going to risk without a stable regulatory framework that offers market scope and scale
- No 6 GHz IMT equipment on the market now or in the near future

Upcoming Wi-Fi advances

Wi-Fi® delivers an IoT advantage

- **Standards-based, interoperable technology:** Wi-Fi provides a common platform to deliver a growing range of IoT applications that vary in performance, power, and latency requirements
- **Pervasive connectivity:** IoT systems are often controlled through mobile devices: Wi-Fi allows seamless control of smartphones, tablets, and 18 billion Wi-Fi devices already in use today
- **Proven WPA3™ security:** Wi-Fi delivers proven, WPA3™ security to protect information exchanged in personal and enterprise environments
- **Cost effective, simple deployment:** Wi-Fi is an easy-to-deploy and cost-effective foundation that requires no separate gateways or specialized skills to deliver IoT applications
- Backward compatibility, location awareness, sophistication among other core competencies for IoT



Learn more about Wi-Fi's role in IoT

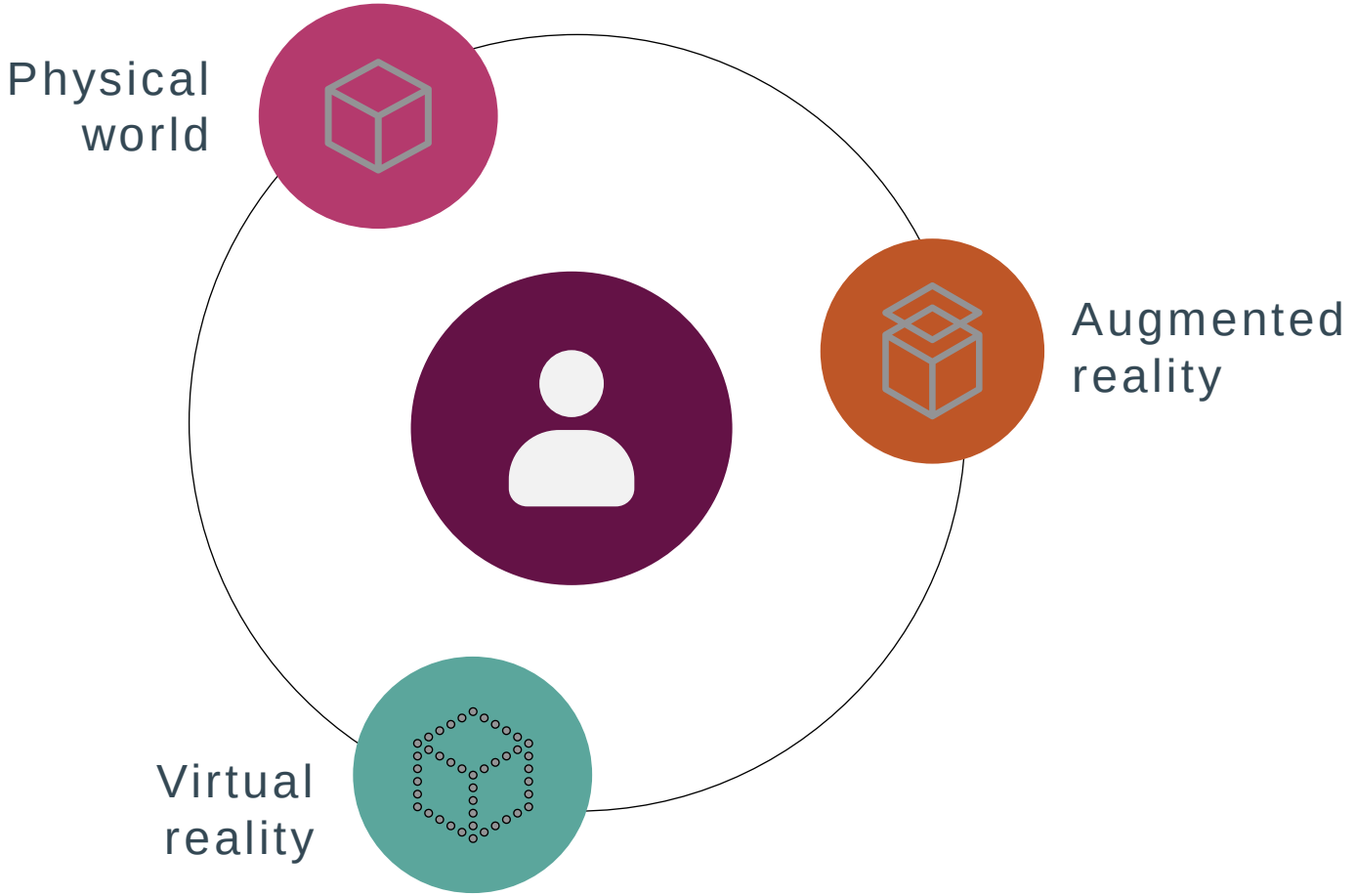
Wi-Fi 7

- Expect extremely high throughputs, low latency and jitter, and high-reliability
- Wi-Fi Alliance certification
  - Essential for interoperability, and the inflection point for mass market adoption
  - Will be based on the IEEE 802.11be standard
  - Technical development phase began mid-year 2022 and typically marks 18-24 months until certification program is completed
- Analysts predict Wi-Fi 7 shipments will comprise about 2% of all Wi-Fi shipments in 2024*

** Source: IDC*

Extended-Reality (XR): An emerging exciting opportunity

- Promising immersive applications emerging, e.g., How VR Is Helping Heal Soldiers With PTSD
- Wi-Fi XR device development with Wi-Fi 6 and Wi-Fi 6E reported at Apple, Samsung, Meta, Google, Amazon and more...
- $125 B market by 2026

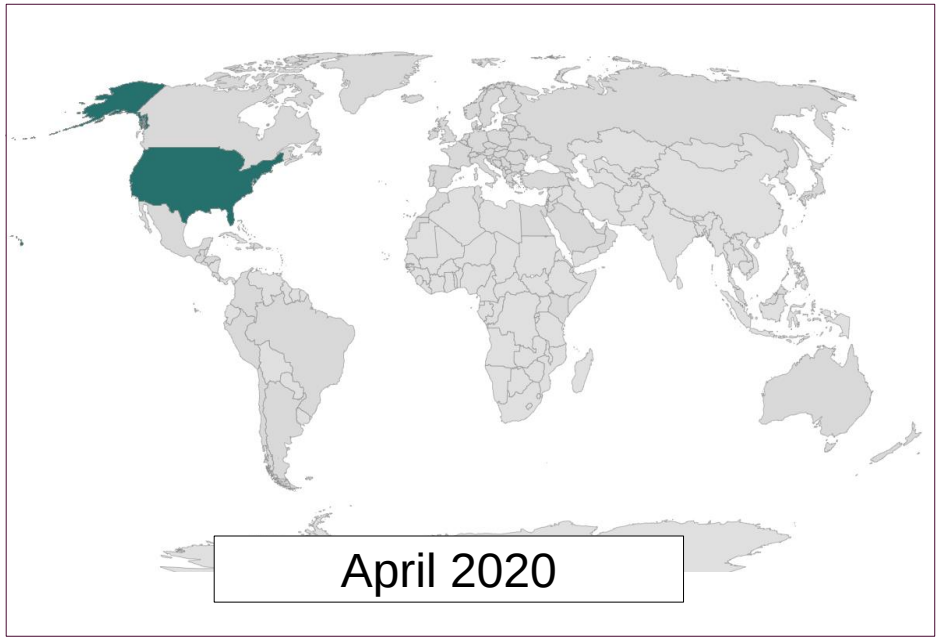


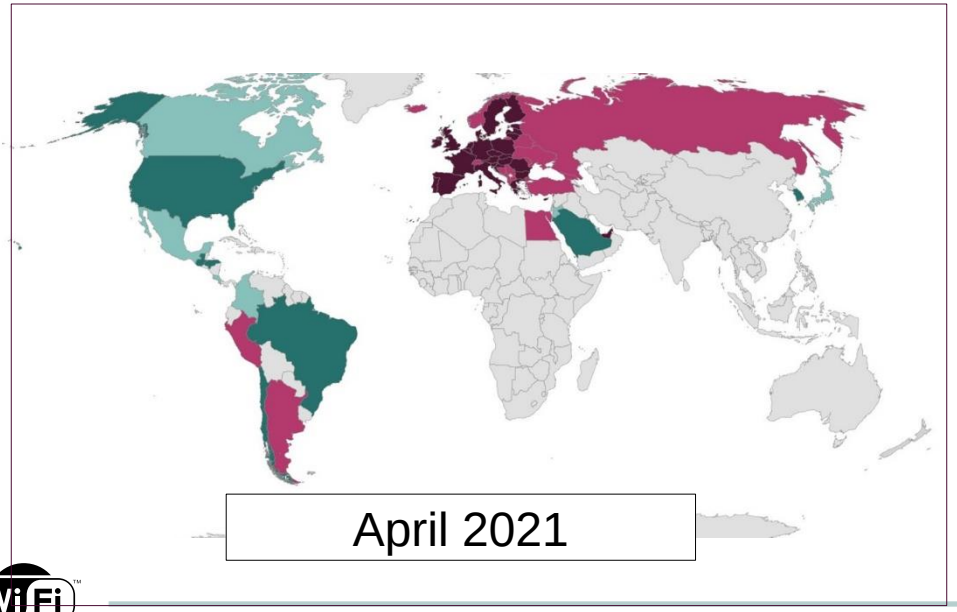
XR experiences require high performance Wi-Fi

- Advanced Power Efficiency
- Multi-Gigabit Performance
- Ultra Low-Latency
- Extreme Reliability

Wi-Fi and regulatory considerations

6 GHz in 2020-2022





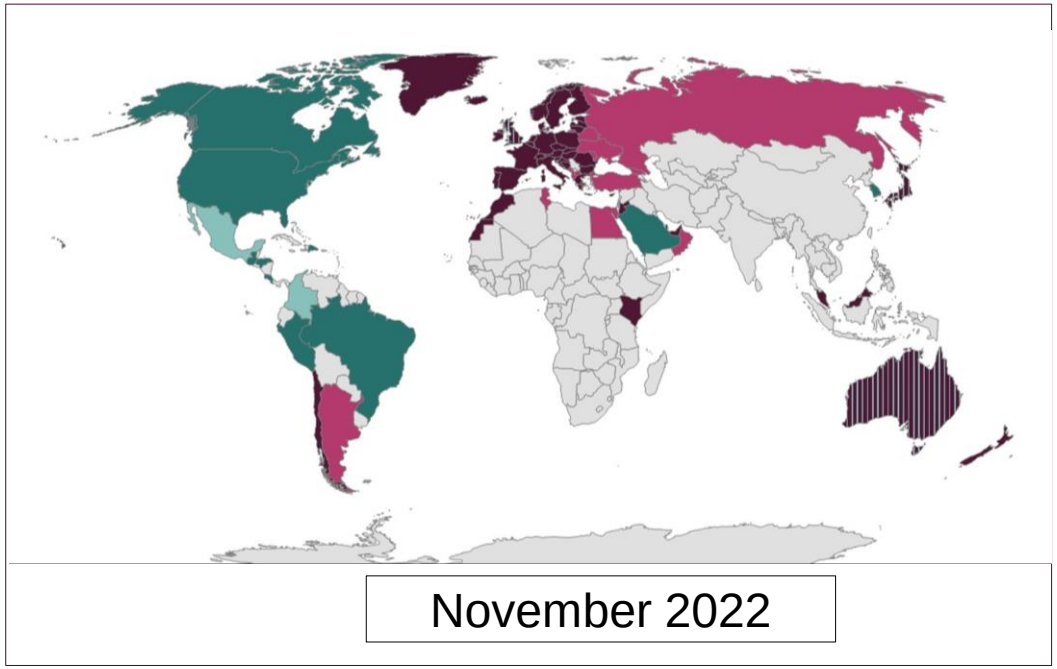
Adopted 5925-6425 MHz

Adopted 5925-7125 MHz

Considering 5925-6425 MHz

Considering 5925-7125 MHz

Adopted 5925-6425 MHz, Considering 6425-7125 MHz



Follow 6 GHz progress at "Countries Enabling Wi-Fi 6E "

6 GHz Regulatory Update

Americas	APAC	Europe	MENA
• Argentina • **Brazil** • **Canada** • **Chile** • Colombia • **Costa Rica** • Dominican Republic • **Guatemala** • **Honduras** • Mexico • **Peru** • **United States**	• **Australia** * • **Hong Kong** • **Japan** * • **Malaysia** • New Zealand • **South Korea**	• **European Union** • **Norway** • **Switzerland** • Turkey • **United Kingdom** *	• Egypt • **Jordan** • Kenya • **Morocco** • Oman • **Qatar** • **Saudi Arabia** • Tunisia • **UAE**

* considering 6425-7125 MHz

6 GHz: Regulatory Framework

Countries regulatory framework for 6 GHz RLAN devices converged on three regulatory-classifications:

1. **Very Low Power (VLP) devices**: (25 mW)

2. **Low Power Indoor-only (LPI) devices**: low-power (200 mW)
   - Restricted to indoor use only

3. **Standard Power Devices (SPD)**: standard power (1000 W)
   - Restricted to operate under control of Automated Frequency Coordination System (AFC)
   - Limit transmit power at 30 deg. elevation angle

6 GHz: Decisions - Adopted Regulations

VLP	LPI	SPD with AFC
• Australia • Brazil • Canada • Costa Rica • European Union • Hong Kong • Japan • Jordan • Malaysia • Morocco • Norway • Qatar • Saudi Arabia • South Korea • Switzerland • United Kingdom	• Australia • Brazil • Canada • Chile • Costa Rica • European Union • Guatemala • Honduras • Hong Kong • Japan • Jordan • Malaysia • Morocco • Norway • Peru • Qatar • Saudi Arabia • South Korea • Switzerland • UAE • United Kingdom • United States	• Canada • United States

Conclusion

- Wi-Fi is optimized for high performance indoor, and therefore delivers the bulk of the world's data traffic, including most data traffic on mobile devices. Demand for Wi-Fi will continue to grow with increased fiber deployments and cellular generations
- Wi-Fi 6E is a resounding success and by 2024 there will be billions of devices installed globally able to operate from 5.925 to 7.125 GHz. Only countries that allow Wi-Fi access to the entire 6 GHz spectrum range will get the most benefits
- Wi-Fi 7 and Wi-Fi 8 will depend on 6GHz access, and 320 MHz channels will be optimized for demanding emerging use cases
- 6GHz is perfectly suited for Wi-Fi to continue to deliver the connectivity users need, there is no alternative spectrum for Wi-Fi, and 6GHz is unsuitable for IMT

Thank you

For follow up, please contact:

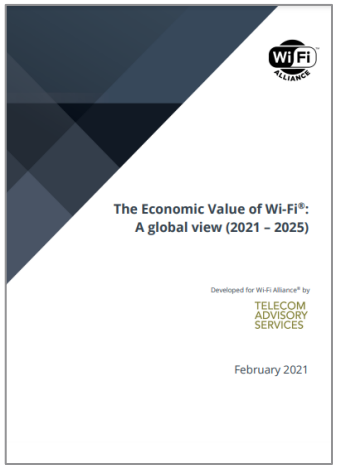
Paramjit Singh Puri
Director Membership
Wi-Fi Alliance

+91 9901255116
ppuri@wi-fi.org
www.wi-fi.org

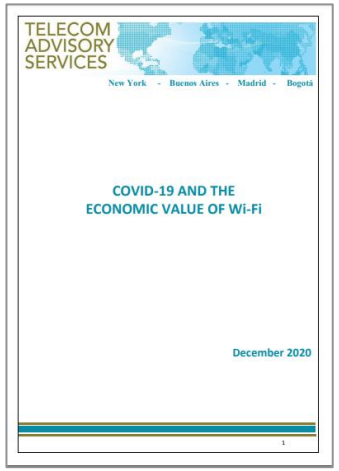
References

Highlights sheet

Study summary



Study details



COVID-19 and Wi-Fi