6 GHz and Delicensing for Wi-Fi Access

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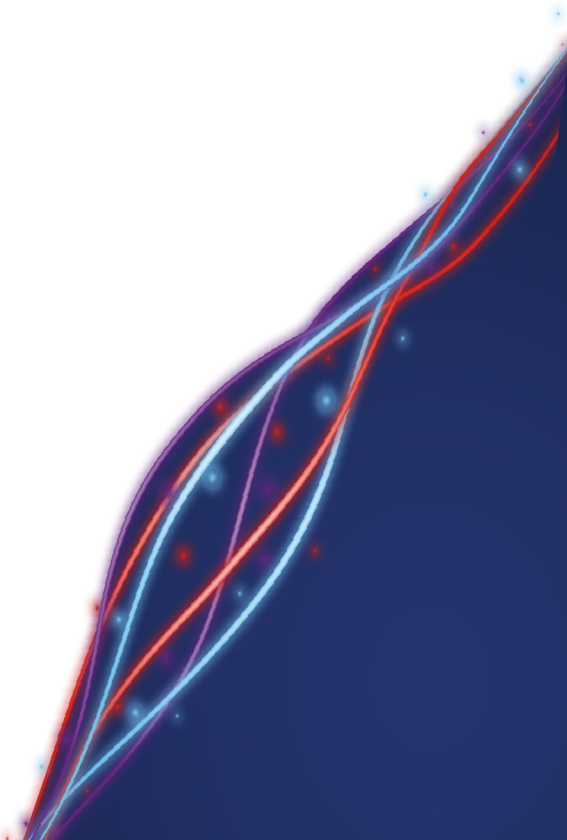
ITU-APT Foundation of India
ITU's Association in India



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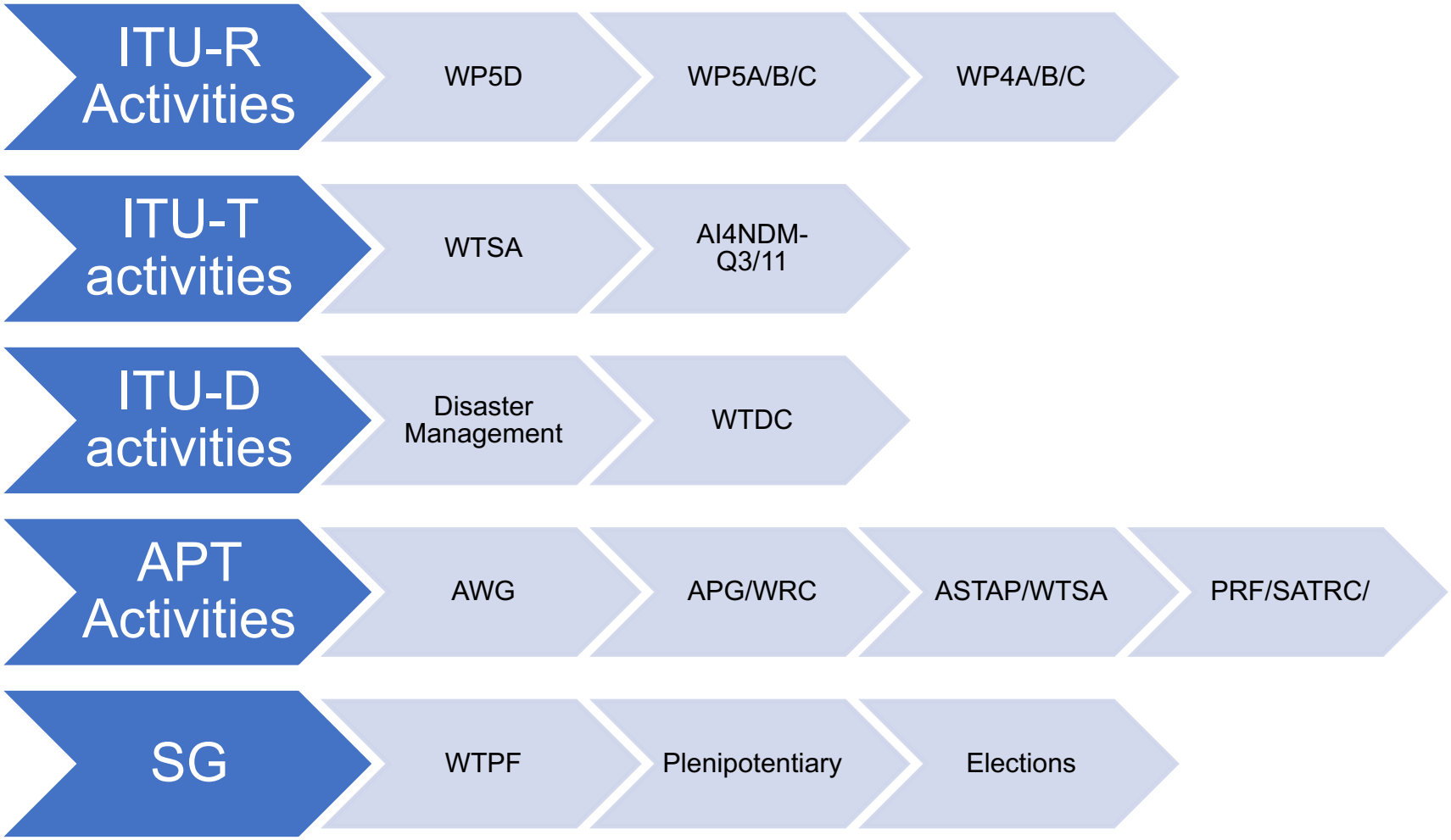
About ITU-APT Foundation (IAFI)

- ITU-APT Foundation of India (IAFI) was founded in 2003 by a group of Telecom professional,
- IAFI is a non-profit, non-political registered society based in India
- IAFI is a nonpartisan Foundation and does not identify with any Industry sector or group. We support all telecom and IT sectors : 4G, 5G, GSO –NGSO Satellites, Wi-Fi, Broadcasting, Aviation, etc.
- IAFI is recognized by the ITU as an international/regional Telecommunications organization and granted sector Member of all the three ITU Sectors - ITU-R, ITU-T and ITU-D.
- We are working for the last 18 years with the prime objective of encouraging involvement of professionals, corporate, public/private sector industries, R&D organizations, academic institutions, and such other agencies in the activities of ITU and APT
- IAFI Our members include many stalwarts of the telecom sector including former telecom secretaries, members, advisors and DDGs of the DOT and Telecom Commission, former Wireless Advisors and other DOT and WPC officers.
- We also have many corporate members from India and other countries including R&D organizations, telecom operators, manufacturers and technology provider

Increased IAFI work in ITU and APT Activities



What is 6GHz WiFi

Wi-Fi today uses two frequency bands: 2.4GHz and 5GHz. The new Wi-Fi utilizes a third band: 6GHz band.

Wi-Fi 6E extends the same Wi-Fi capabilities into the 6 GHz band to allow greater efficiency, higher throughput, and increased security

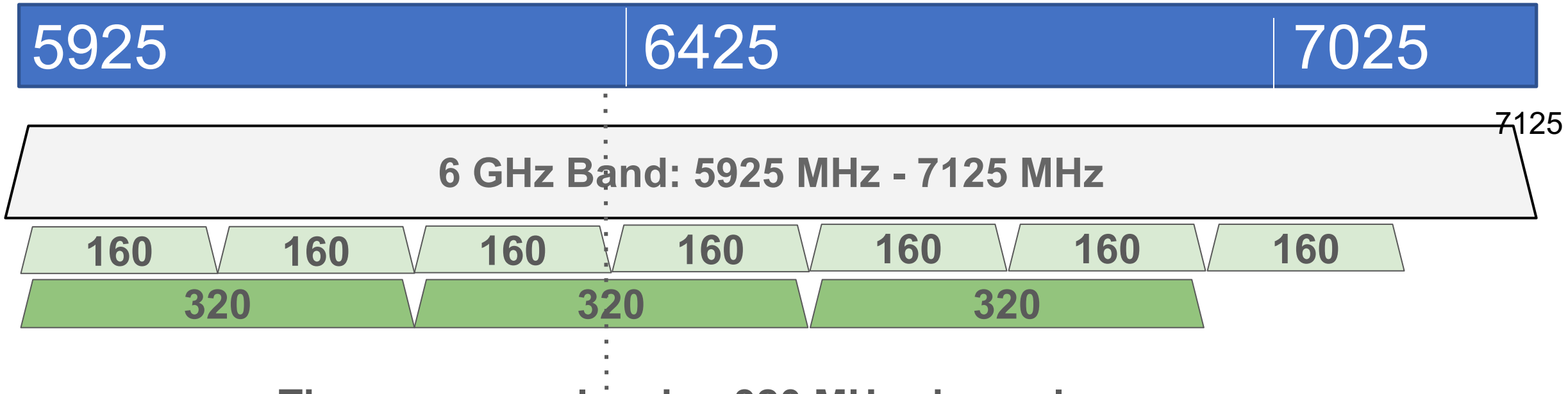
Spectrum is critical for the country's development

- ✓ 600/700/800/900 MHz Bands (612-960 MHz)
- ✓ 2/2.5 GHz Bands (1710-2690 MHz)
- ✓ 3 GHz (3300-4200 MHz
- ✓ mm Wave Bands 26GHz/37 GHz/50 GHz

- ✓ 2.4 GHz Band (2400-2483.5 MHz)
- ✓ 5 GHz Band(5125-5925 MHz)
- ○ 6 GHz Band (5925-7125 MHz)

Auctioned spectrum needs to be complemented with unlicensed spectrum to increase its usefulness

6 GHz Wi-Fi is specifically 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

Why 6 GHz bands needs to be delicensed Wi-Fi in India

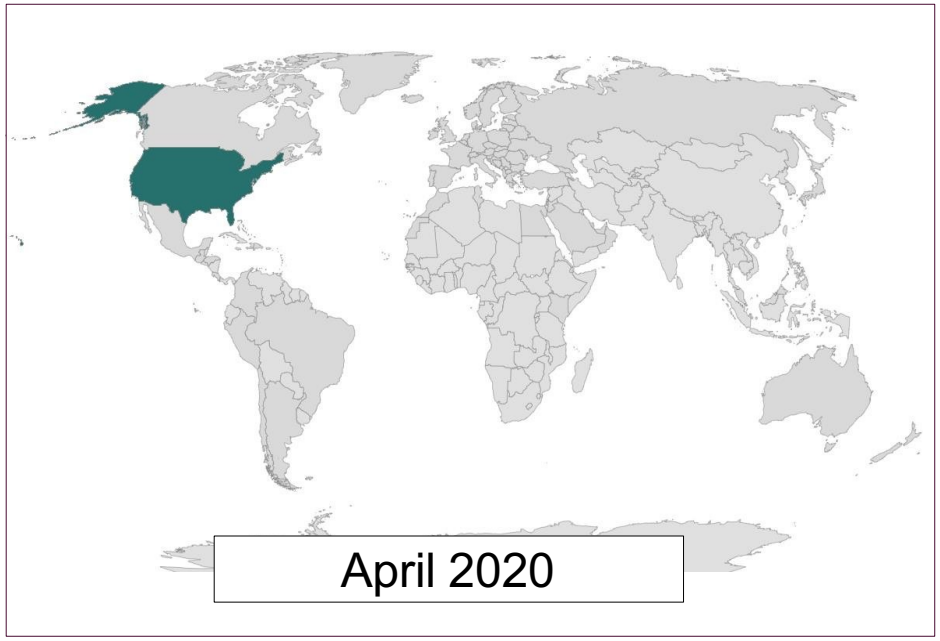
- Most Countries around the World have already delicensed 6GHz band for WiFi6e
- Current WiFi Spectrum is Inadequate
- Current WiFi Technologies can not support new applications such as AR/VR/XR
- Due to current satellite usage, this band can not be used for 5G
- Except for Chinese vendors, no other country is promoting 5G in this band

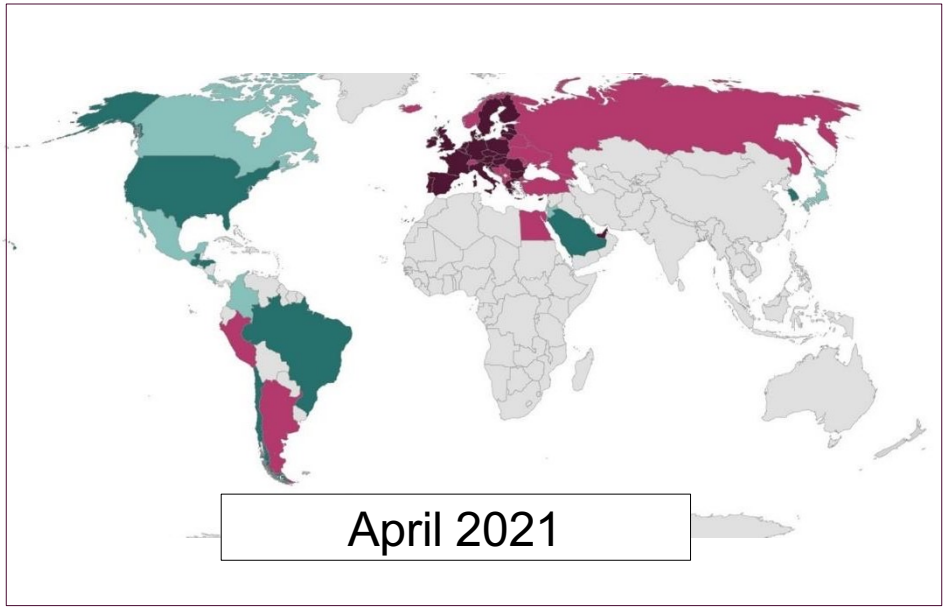
Most Countries in all Regions have already adopted 6GHz WiFi

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 WiFi expansion in around the World 2020-2022





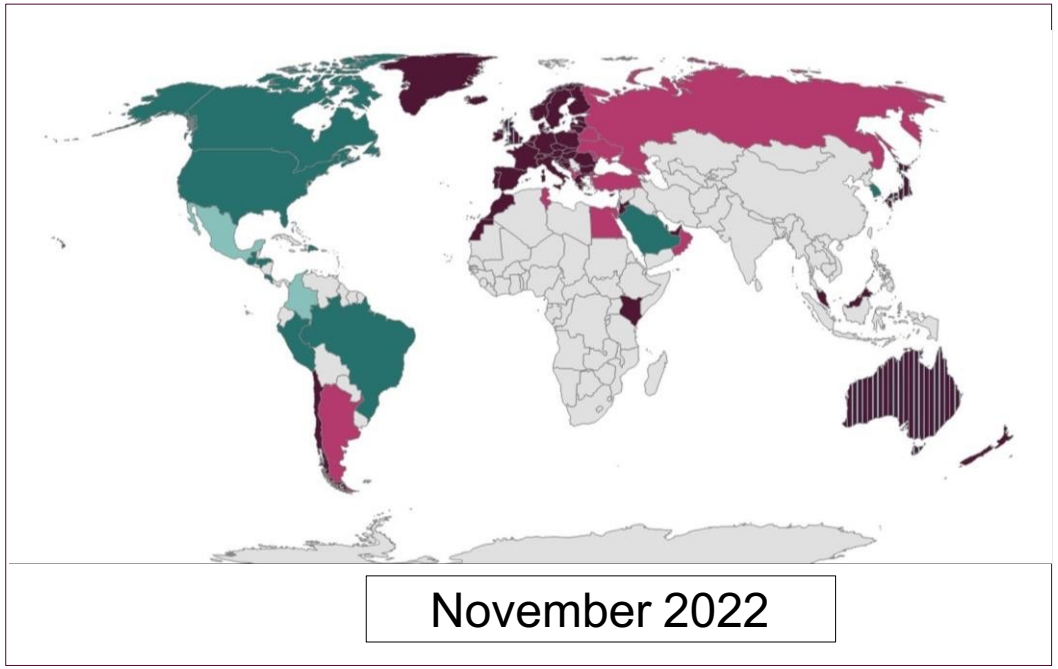
Adopted 5925-6425 MHz

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 "

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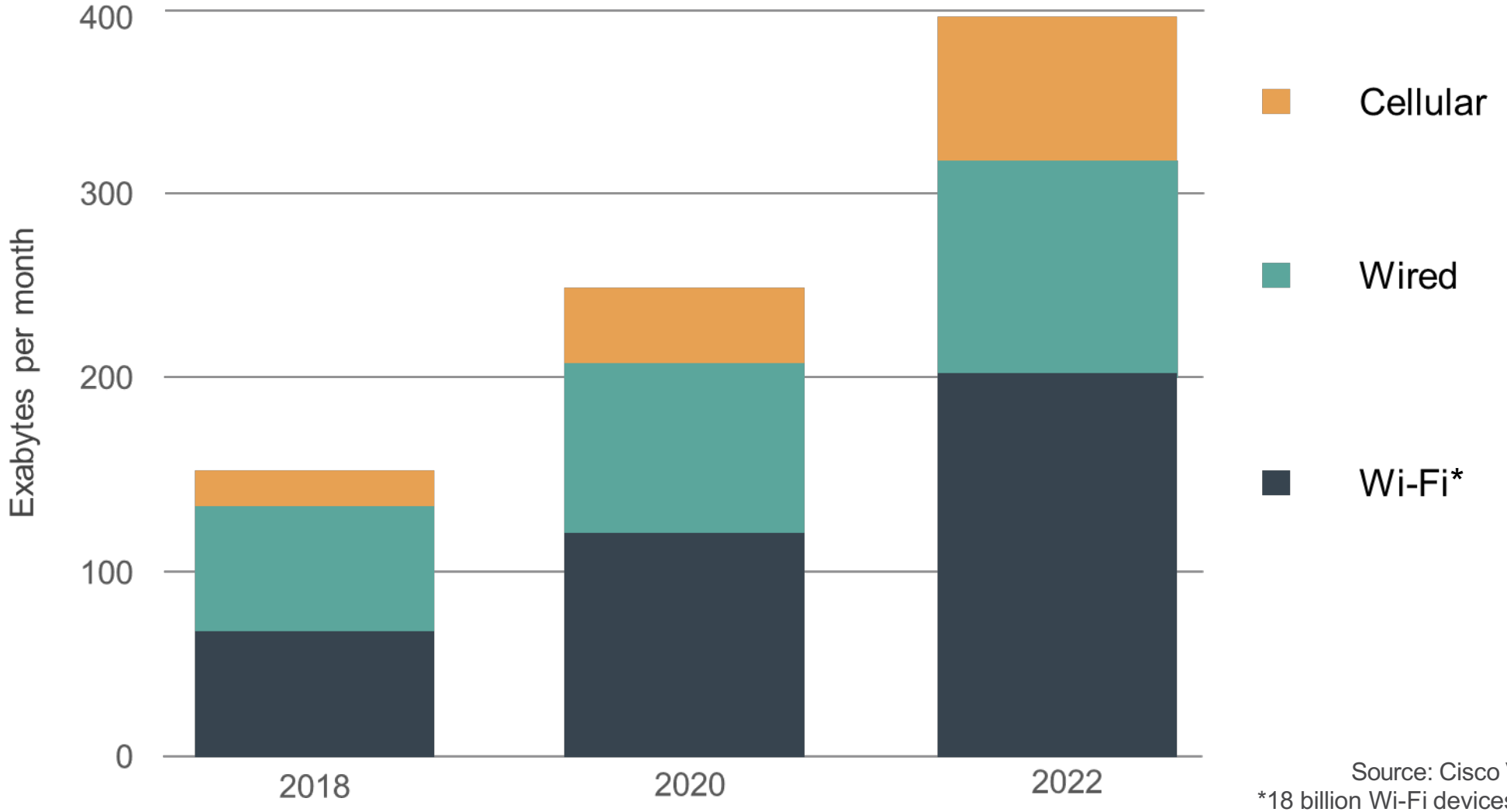
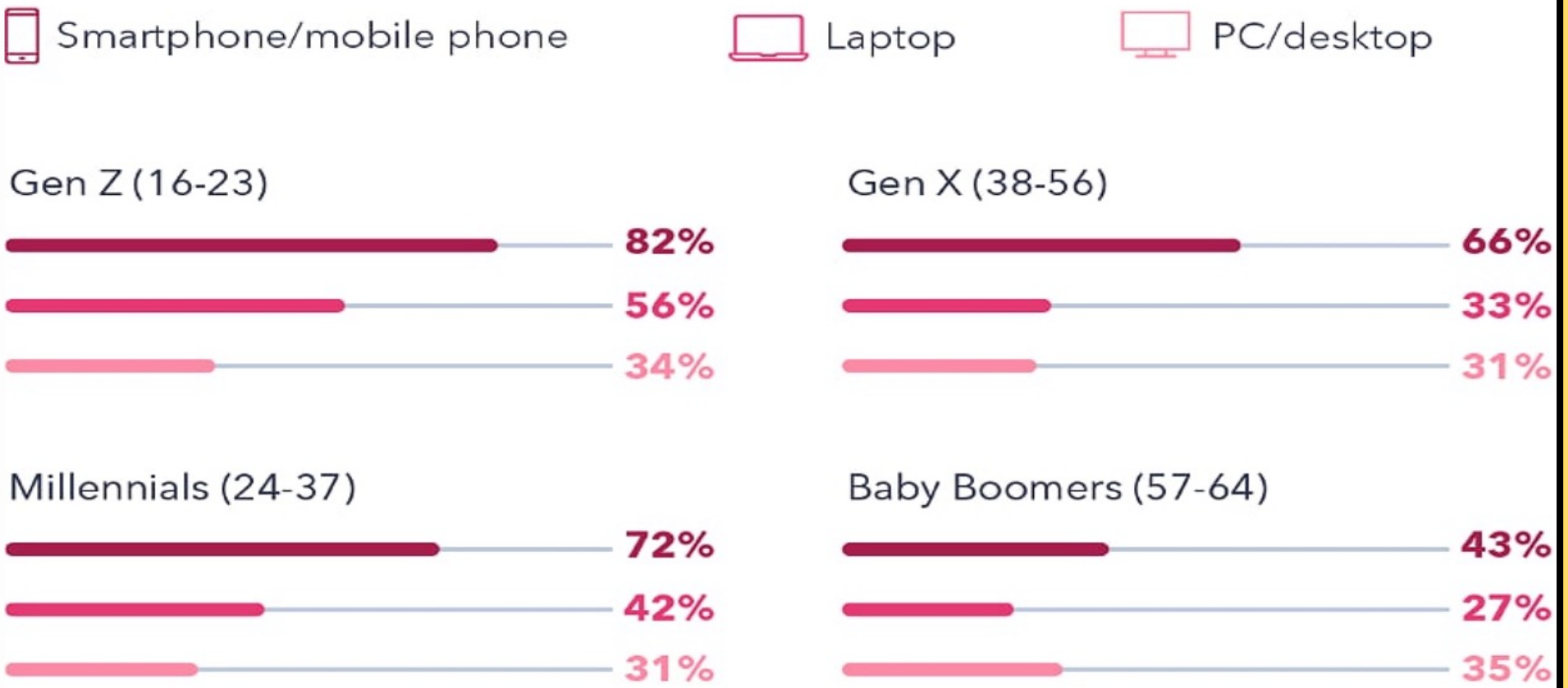
WiFi data usage is growing much faster with the rollout of 5G



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

USE OF WI-FI has almost doubled since COVID-19



A recent Wi-Fi Alliance study" found that the **Wi-Fi traffic increased by over 80%** and there was a **70% to 94% increase in Wi-Fi use during the day**

Everyone is on one or the other device most of the time on a home Wi-Fi network - Even the mobile
In many cases 6-7 devices on the same network – all on a VC

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Current Wi-Fi spectrum is inadequate to meet this demand

Currently only 2.4 GHz and 5 GHz bands have less than 1 GHz shared spectrum for all users of Wi-Fi

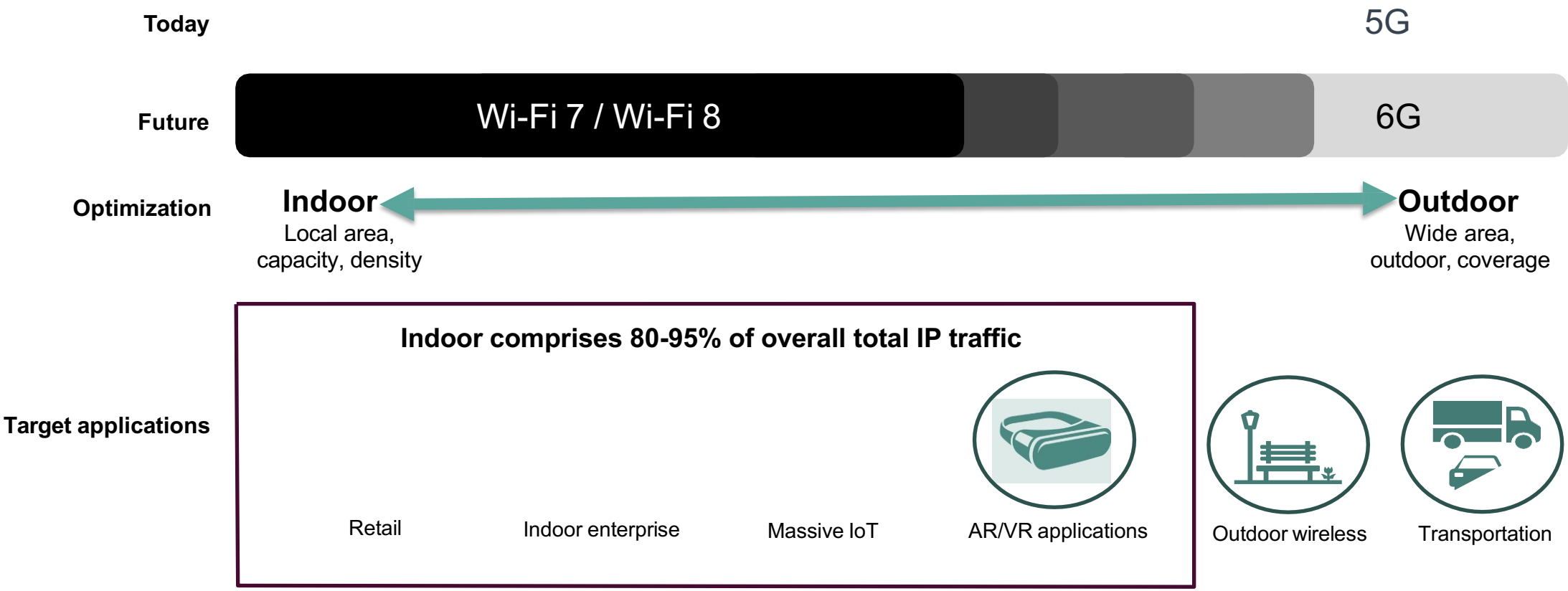
INDIA unlicensed bands for Wi-Fi (2.4 GHz)
2400-2483.5 MHz (83 MHz);

INDIA unlicensed bands for Wi-Fi (5GHz):
5150-5350 MHz & 5470-5875 MHz (IND 29)
605 MHz

Studies have shown a need of at least 2 GHz spectrum to meet the increased need to respond to increased home working, particularly in high human density countries such as India.

With only 690 MHz Wi-Fi spectrum, India's economic development is being constrained by limited Wi-Fi Spectrum, while the useful Wi-Fi Spectrum is lying underutilized

WiFi Data growth is predominately indoors to support 5G



Wi-Fi traffic share has been increasing with each successive cellular generation

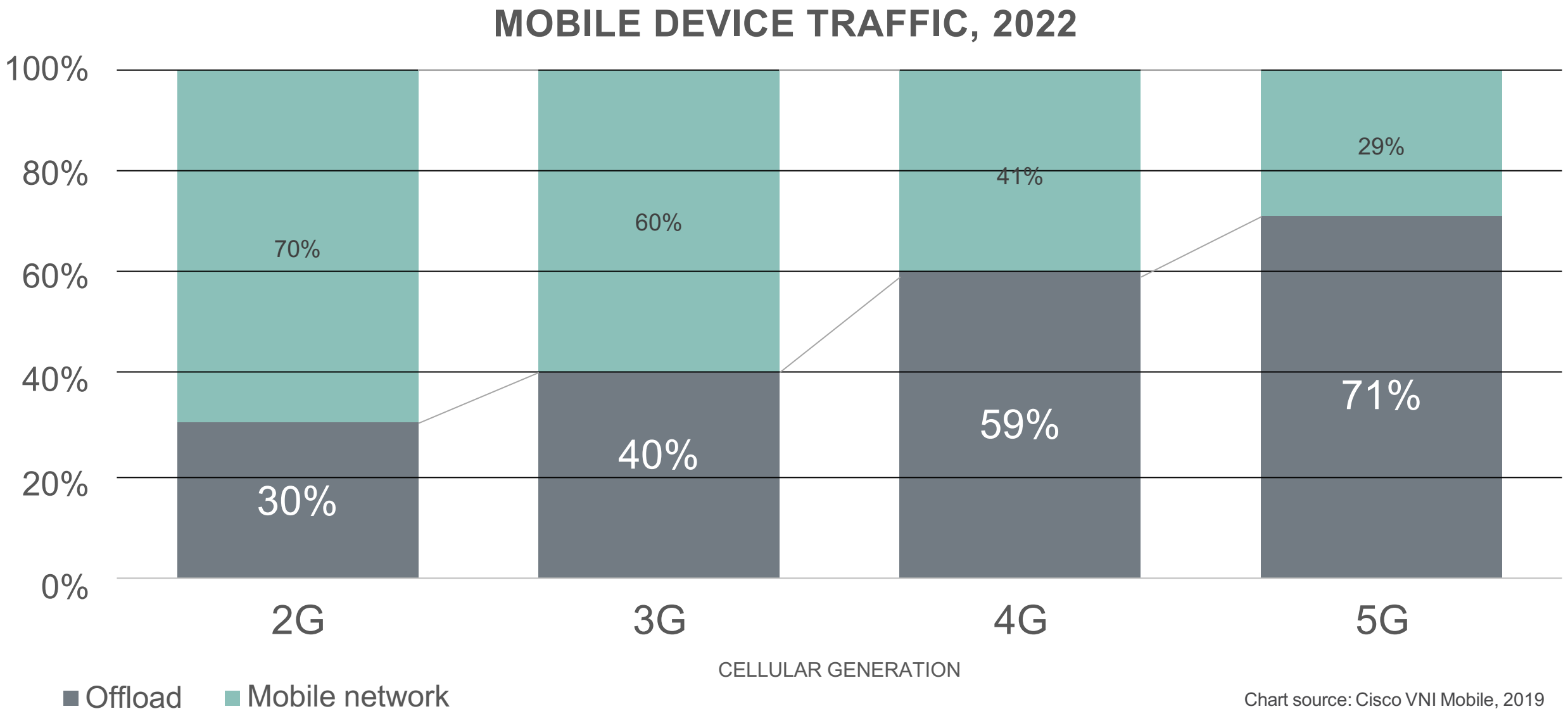


Chart source: Cisco VNI Mobile, 2019

6 GHz band is extensively being used in India for TV up-linking and VSATs and impossible to be used for Mobile Cellular

(But can be used by low power Wi-Fi without impacting these services)

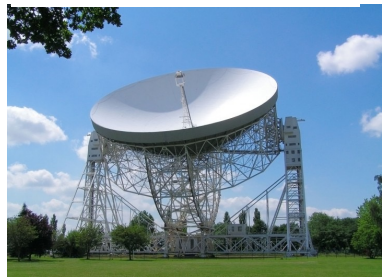
- Cable Headend & HITS uplink: Free-to-air & pay TV channels
  - **Over 900 satellite TV channels Including 300+ Pay TV channels**
  - **1600 Registered MSOs with 117 Million subscribers**
  - **Almost 200 Million TV households in India**
- Large satellite earth stations (feeder links), used for trunk & heavy traffic
- Telemetry, tracking, and command (TT&C) uplink, used for monitoring & control of the satellites
- VSATs (deployed ubiquitously), primarily used by businesses, military and government applications. **~300,000 VSAT Terminals in C and KU bands:**
- Niche services such as feeder links for MSS, navigation satellites, satellites ranging, etc.

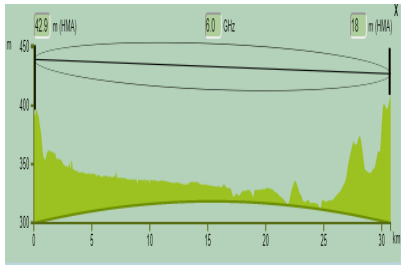
Source: TRAI Report & MI&B Annual Report

5G networks are not feasible in 6 GHz

- Countries in all regions are deploying Wi-Fi in 6 GHz
  - IMT frequency harmonization cannot be achieved; no interoperability
- Market fragmentation precludes economies of scale necessary for a viable 5G ecosystem in 6 GHz as massive investments are needed to
  - design and produce cellular chipsets for 6 GHz
  - to integrate chipsets into devices and bring them to market
  - to deploy IMT technology network
  - to operate IMT network
- It is unlikely that any company will risk investing in 6GHz 5G 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

Sharing between low power Wi-Fi with Satellite uplink and Point to Point microwave links will increase spectrum utilization of this important band





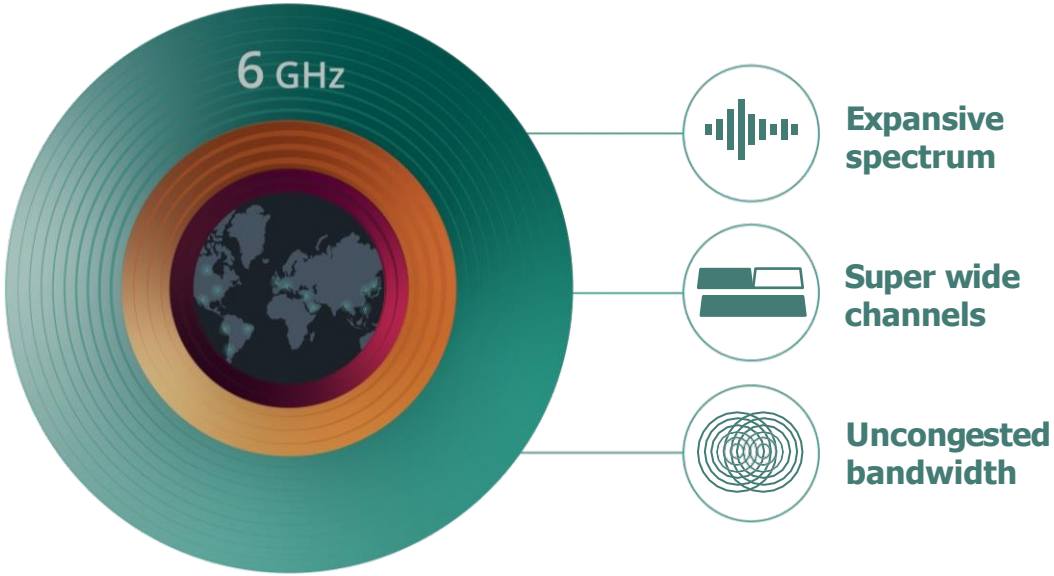
- This Band Will increase the efficiency of WLAN networks 4x the throughput of 802.11ac
- FSS studies indicate that allowing for up to 2% outdoor usage with max EIRPs up to 1W, sharing with satellites was feasible .
- it is not possible to allocate this band to cellular services as any unrestricted outdoor usage would cause heavy interference to satellite services and disrupt TV broadcasts
- WRC-19 has already decided there will no IMT in this band in Region 3
- Based on the studies, sharing between Wi-Fi and satellites is feasible with appropriate technical conditions and regulatory models.

Next generation use cases require much faster data

- Immersive experiences such as robotic surgeries, Industrial automation, AR/VR
- 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

6 GHz has transformed 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

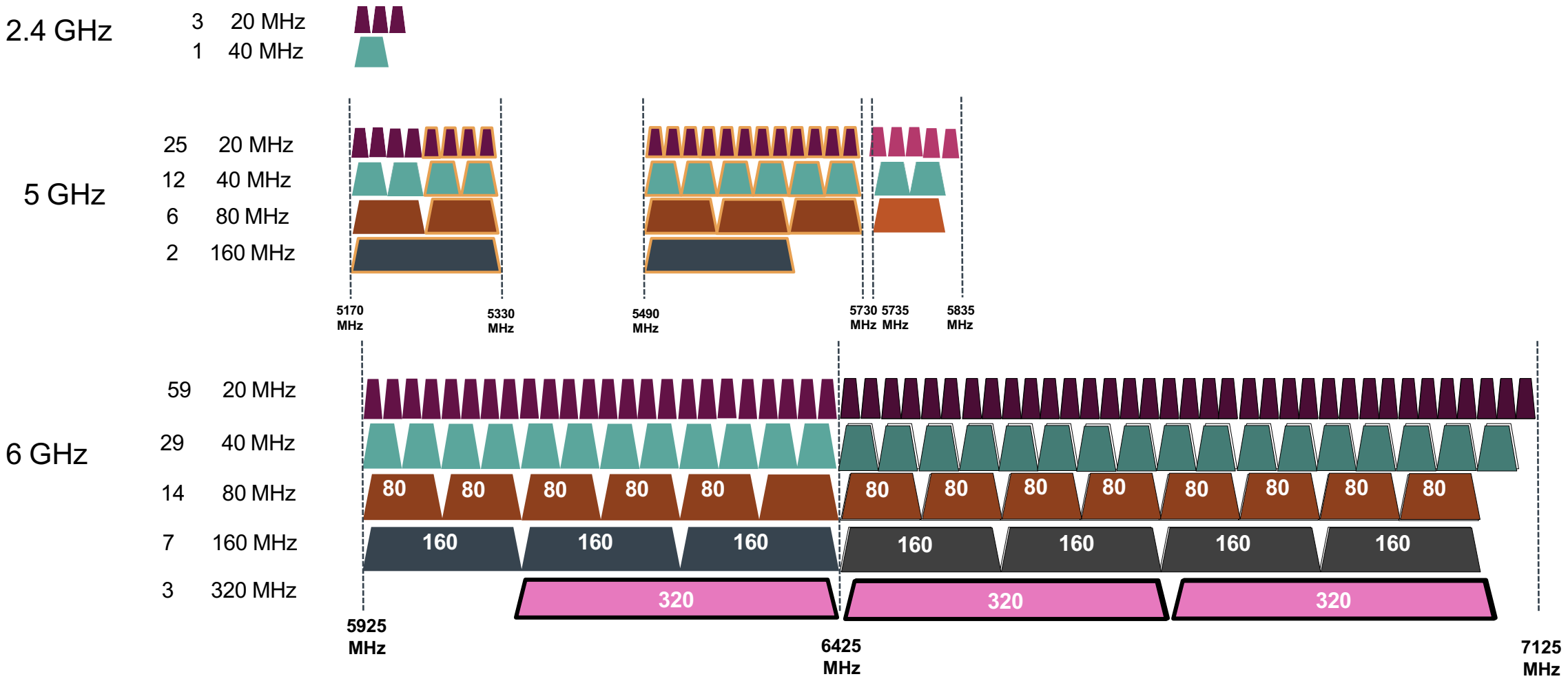


Wi-Fi 6E video

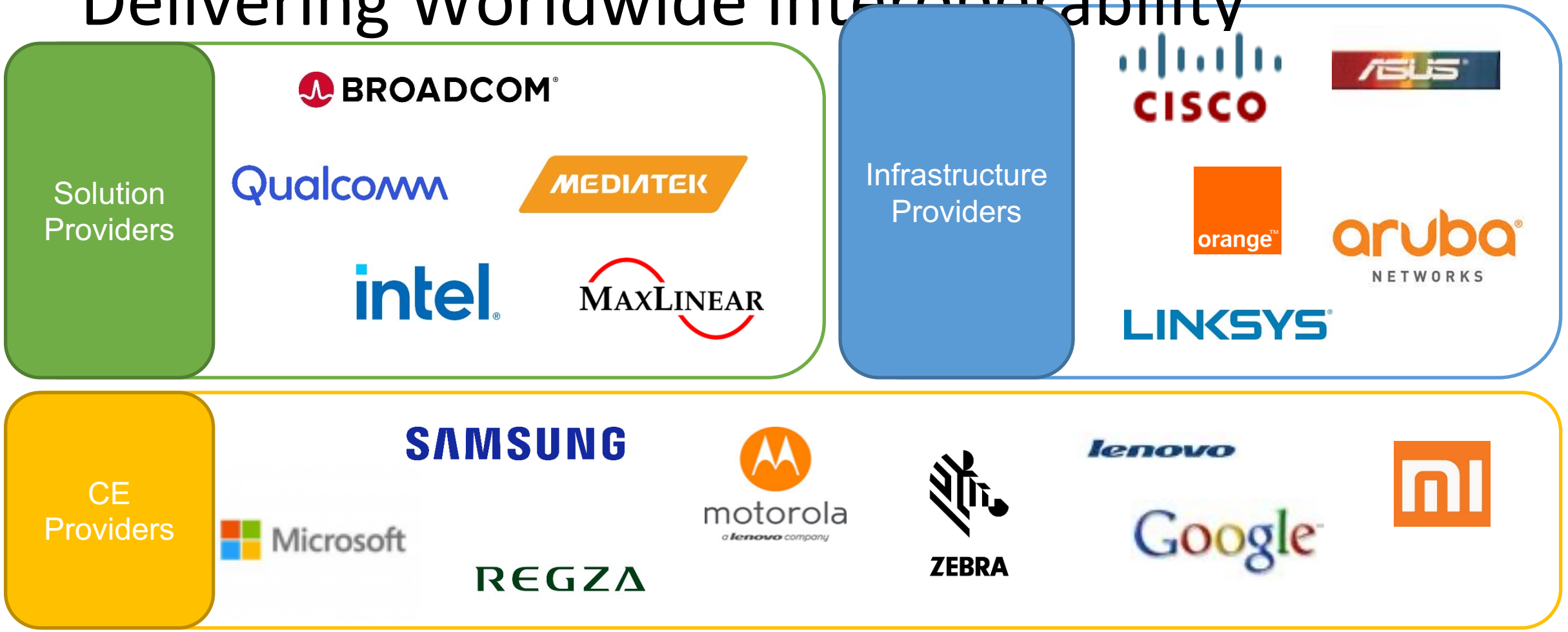
Wi-Fi Alliance®

*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

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

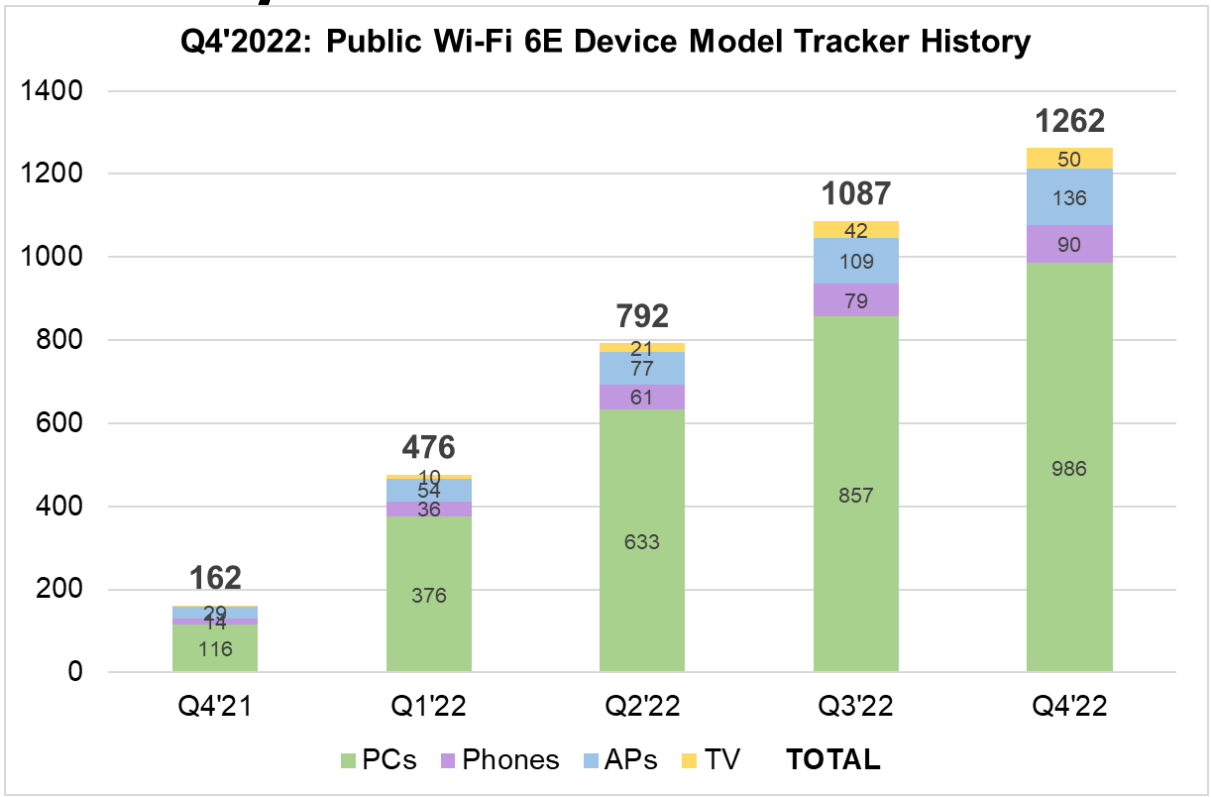


790+ Wi-Fi CERTIFIED Devices in 6 GHz Delivering Worldwide Interoperability



Fast Growing Wi-Fi 6E Ecosystem

- The number of Wi-Fi 6E products grew by more than 2.5 times from Q1 to Q4 last year to reach over 1200
- In 2022 over 1.5 million Wi-Fi 6E access points and 350 million Wi-Fi 6E devices
- In 2023, more than 473 million Wi-Fi 6E devices will enter the market
- By 2025, over 5.2 million Wi-Fi 6E access points and over 1 billion devices will be shipped



Source: https://wifinowglobal.com/news-and-blog/

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

IAFI has been urging Government of India to:

Delicense the lower 500 MHz (5925-6425 MHz) for indoor and outdoor Wi-Fi with necessary power limits and conditions for protecting Satellites and Microwave Links to support PM-WANI

Delicense the upper 600 MHz (6425-7025 MHz) for Low Power Indoor only Wi-Fi to support PM-Wani and for promoting digital innovation in the Country.

THANK YOU

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