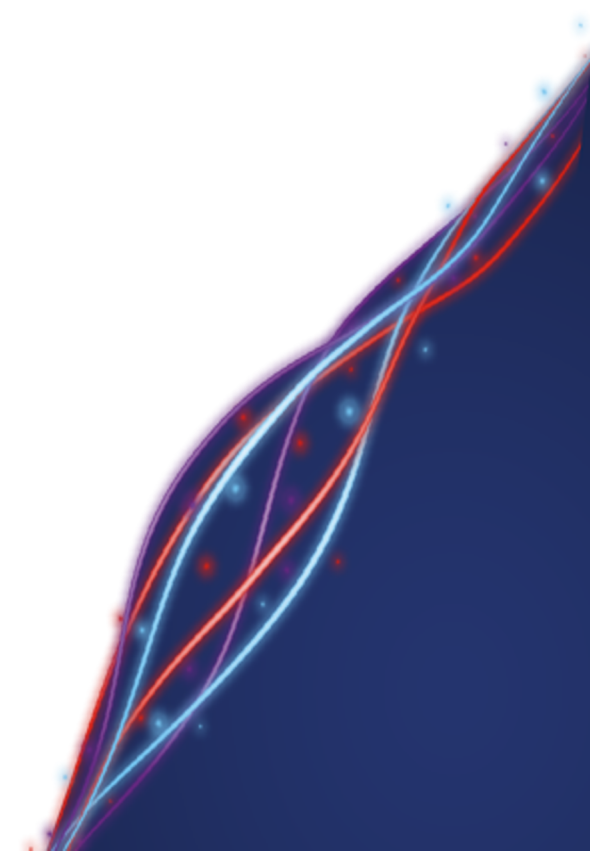


Wi-Fi in 6 and 60 GHz

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President, ITU-APT Foundation of India ([IAFI](#))

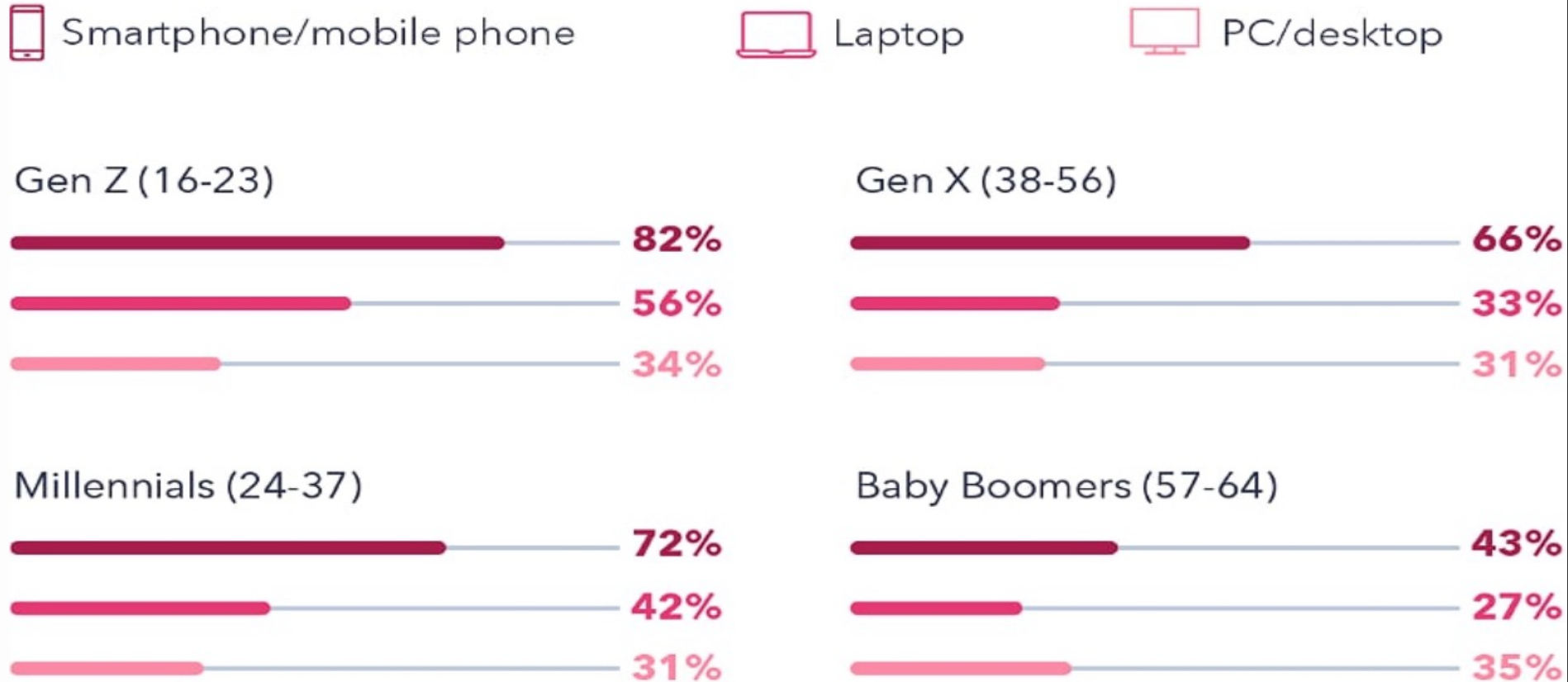
Vice Chairman, World Wireless Research Forum ([WWRF](#))



About ITU-APT Foundation of India

- ITU-APT Foundation of India (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.
- IAFI has submitted 18 contributions to ITU-R, 4 contributions to APT and 6 docs for WRC-23 in 2021
- 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 was founded in 2003 by a group of Telecom professional,
- 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

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

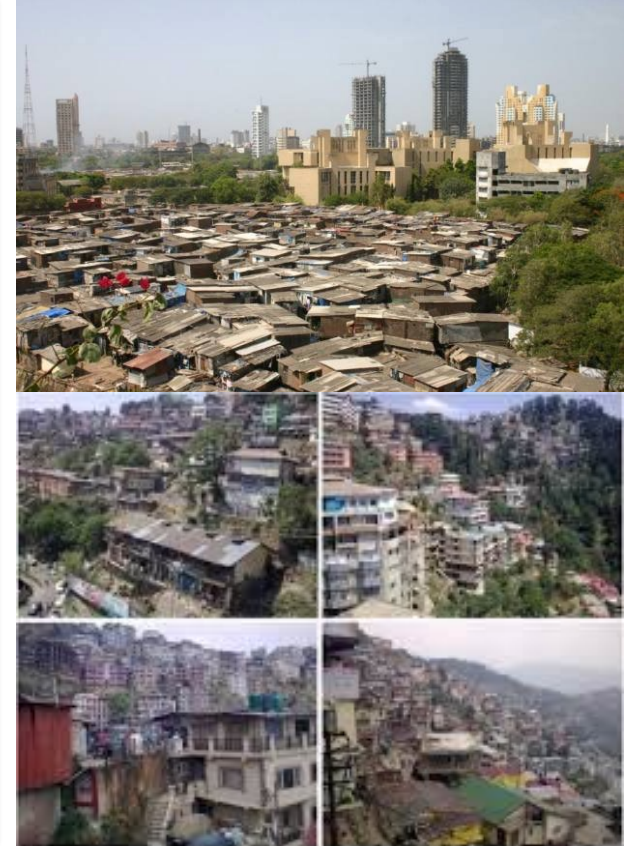


A recent [Wi-Fi Alliance](#) study” found that the **Wi-Fi traffic increased by over 80%** and there was a **70% to 94% increase in Wi-Fi use during the day**

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

Half of the most populated cities in the world are in India – Current Wi-Fi spectrum is just not enough

Rank	City	Density (/km ²)	Country	Rank	City	Density (/km ²)	Country
1	Manila	43,079	Philippines	11	Levallois	26,126	France
2	Bogor	40,169	Indonesia	12	Neapoli	25,879	Greece
3	Titagarh	38,337	India	13	Caloocan	25,850	Philippines
4	Baranagar	35,220	India	14	Chennai	25,501	India
5	Serampore	33,649	India	15	Sukabumi	24,748	Indonesia
6	Delhi	12,794	India	16	Hyderabad	23,559	India
7	Dumdum	28,984	India	17	St-Noode	23,235	Belgium
8	Kamarhati	28,696	India	18	Malabon	23,076	Philippines
9	Kolkata	27,774	India	19	Kallithea	23,076	Greece
10	Mandaluyong	27,138	Philippines	20	Mumbai	22,937	India



In many cases 6-7 students/work from home devices on the same Wi-Fi network – all on a VC

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

Globally many countries around the world have found the new Wi-Fi spectrum in 6 and 60 GHz bands

- In the US, the FCC has decided to make 5925-7125 MHz available for unlicensed shared use for Low Power Indoor use.
- In the Republic of Korea, the draft regulation for 6 GHz unlicensed use permitting LPI (5925-7125 MHz) and VLP (5925-6425 MHz) was published and a public consultation.
- In Brazil, the table of frequency allocations was changed earlier this year to allow for the full use of the 5925-7125 MHz band by Wi-Fi.
- In Europe, CEPT has developed draft regulation with harmonized technical conditions for license-exempt LPI and VLP use of the 5925-6425 MHz band in response to a European Commission Mandate.
- UK has already held a national consultation on their plans to open the 5925-6425 MHz band for license-exempt use.
- Other countries around the world (e.g. UAE, Taiwan) are currently also considering consultations for the unlicensed/license-exempt use of the 6 GHz range to provide sufficient spectrum for Wi-Fi

6 GHz band is extensively being used in India for TV up-linking and VSATs in India

(But can be shared by low power Wi-Fi)

- 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.

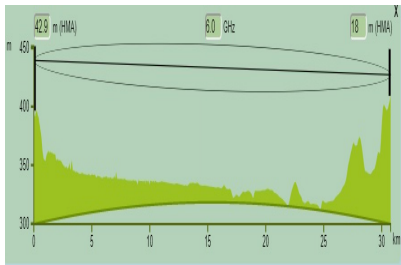
Sharing between low power Wi-Fi with Satellite uplink and Point to Point microwave links is possible



- This Band Will increase the efficiency of WLAN networks 4x the throughput of 802.11ac

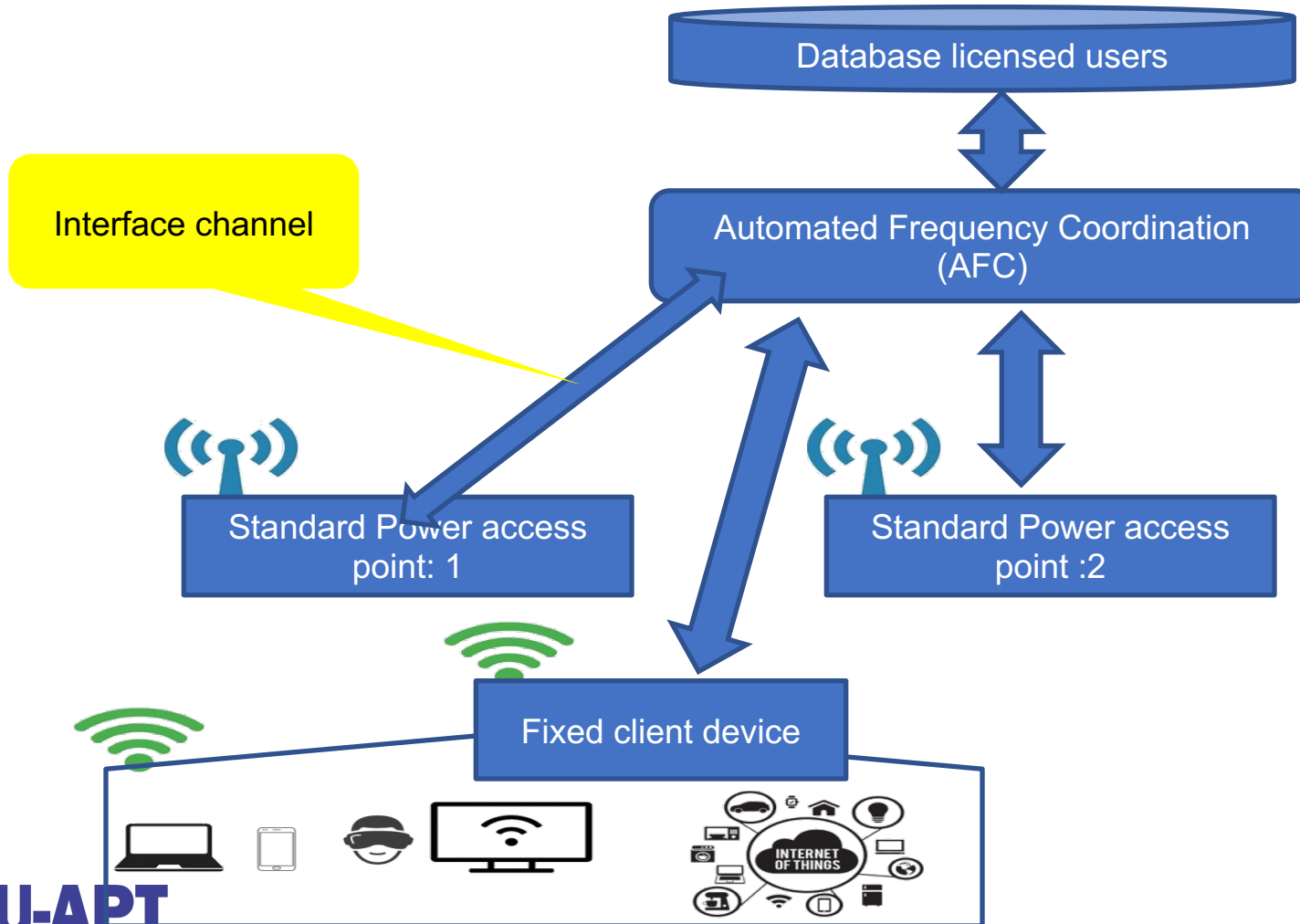


- FSS studies indicate that allowing for up to 2% outdoor usage with max EIRPs up to 1W, sharing with satellites was feasible . However unrestricted outdoor usage would cause interference to FSS. Therefore it is not possible to allocate this band to IMT as already agreed at WRC-23



- Based on the results of studies, sharing between the FS and Wi-Fi is feasible with appropriate technical conditions and regulatory models.

Cognitive technologies can help sharing between outdoor Wi-Fi and other licensed users



Consider location and tech parameters of

1. license user
2. Access point (ID, Geo-Loc, height, antenna type), and then assign channel & max power to AP

Regulation on high power access point

1. Type approval
2. Registration to generate ID
3. Density etc

No regulation on low power client device

Unlicensed 60 GHz (V band) will help create new Industrial automation economy and support manufacturing and exports.

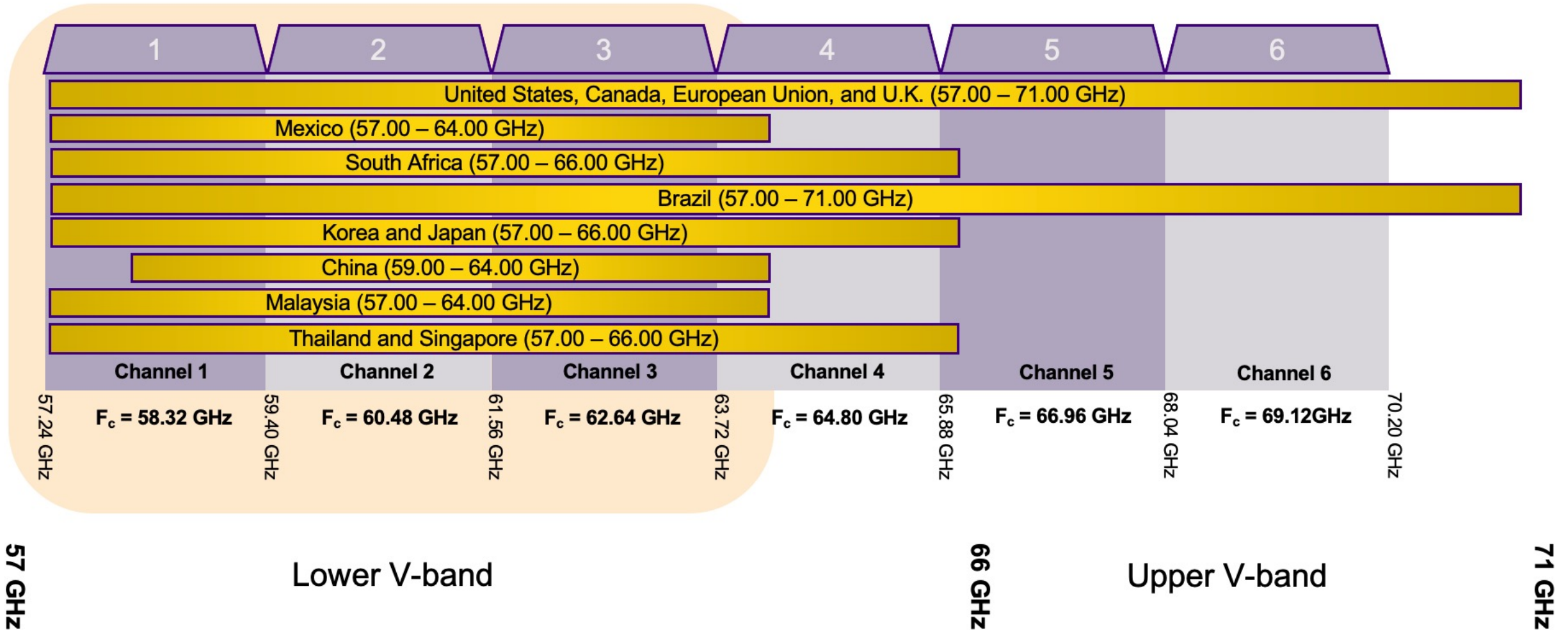
- **V-band** is the optimal solution Giga byte connectivity applications for extremely short distances.
- **High oxygen attenuation and narrow beams** at 60 GHz reduces interference between links making it particularly suited for uncoordinated operation.
- Complementary antenna, modulation and signal processing technologies (beam forming, null steering) help implement interference rejection.
- The V-band will complement the existing 5GHz, the new 6GHz Wi-Fi bands with much more available spectrum and much higher data speeds
- **V band is extremely useful band for Industrial automation and Robotics. New Innovations in this band will help create new Industrial automation economy and support manufacturing and exports.**
- **IEEE 802.11ad**, or WiGig, and successor standards will enable lowcost semiconductors and system solutions.
- **Many countries** including United States, Canada, Mexico, Brazil, United Kingdom, Germany and South Africa have made V-band available for *unlicensed outdoor* operation.

Countries that have delicensed V band

America	EMEA	Asia Pacific
USA	UK	AUSTRALIA
CANADA	GERMANY	JAPAN
BRAZIL	SPAIN	SINGAPORE
ARGENTINA	SWEDEN	MALAYSIA
MEXICO	BELGUIM	NEW ZEALAND
	POLAND	
	SOUTH AFRICA	

V-band Wi-Fi (802.11ad) in major countries

Channel Plan and Availability (unlicensed)



ITU-APT Foundation urges Government of India to

Delicense 5925-7025 MHz for Low Power Indoor only Wi-Fi to support Atamnirbhar Bharat and for promoting digital innovation in the Country. Initiate Studies for sharing of parts of 5925-6425 MHz for Low Power outdoor Wi-Fi without impacting the existing Satellite and Fixed services usages

Delicense 60 GHz V band to help create new Industrial automation economy and support manufacturing & exports.

Support studies in ITU for WRC-19 agenda for IMT in 7025-7125 MHz



THANK
YOU

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