India: economic benefits of UHT satellite broadband

Broadband India Forum

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India: the emerging digital giant

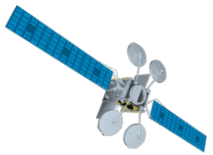
Expanding digital connectivity through next-gen satellite broadband: bridging the digital divide

Indicators India	Value	Source
Population (million)	1,380.0	ITU
Households (million)	273.4	ITU
Proportion of rural population (%)	65%	World Bank
Labour force participation (% of total 15+ population, 2019)	48.1%	World Bank
GNI per capita (current USD)	1,900	World Bank
Broadband indicators		
4G mobile broadband coverage (% population)	97.9%	ITU
Mobile broadband subscriptions (% population)	52.5%	ITU
Mobile broadband adoption, unique subs (% population)	36.1%	GSMA
Mobile broadband data usage per subscription (GB per month, 2019)	9.9	ITU
Mobile spectrum supply, all sub-6 GHz and sub-1 GHz (MHz)	391 (81)	Plum analysis
Fixed broadband adoption (% households)	8.2%	ITU
Fixed broadband ≥ 10Mbps (% households)	6.5%	ITU
FTTH coverage (% homes passed, end-2019)	3.0%	FTTH Council Asia Pacific

Viasat is a global communications company that believes everyone and everything can be connected

How is Viasat going to help bridge the digital divide?

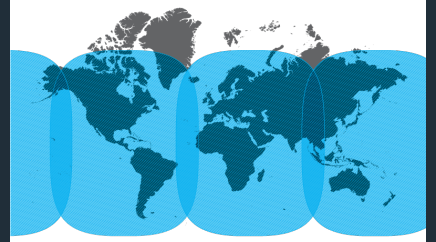
ViaSat-3



Launch: 2022+

Capacity: 1+ Tbps each

Coverage: 1st Global ISP

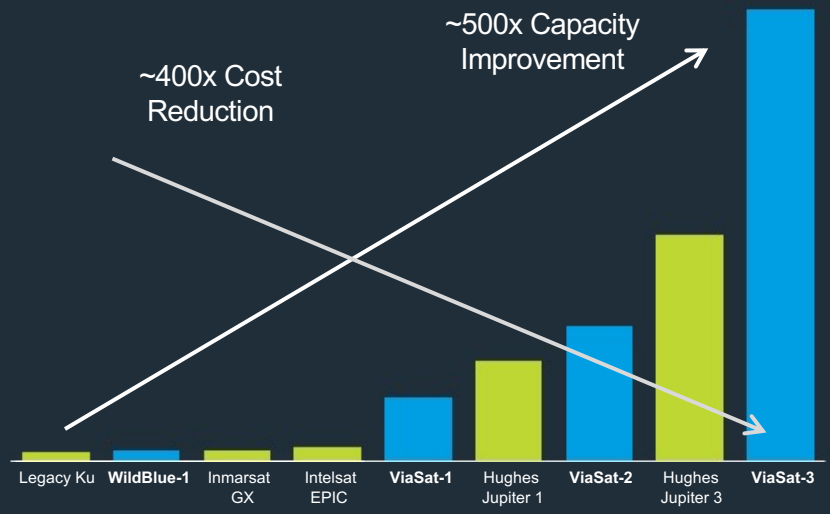


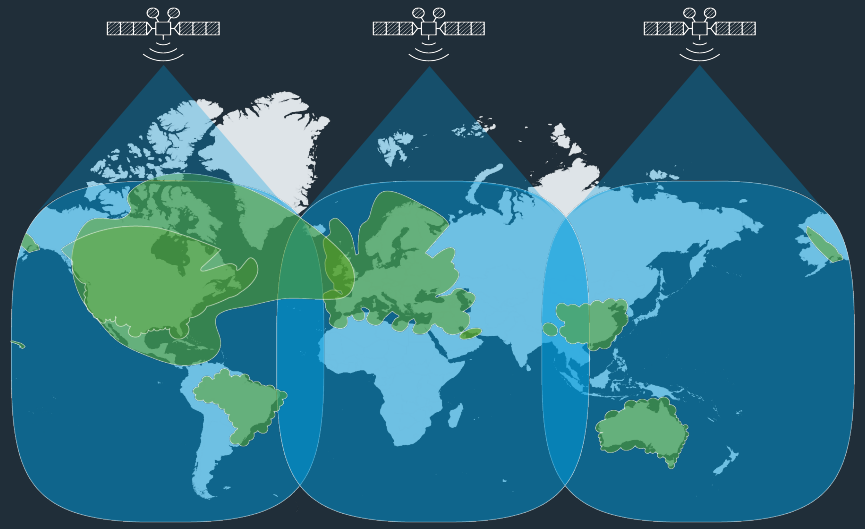
1000Gbps

100Gbps

10Gbps

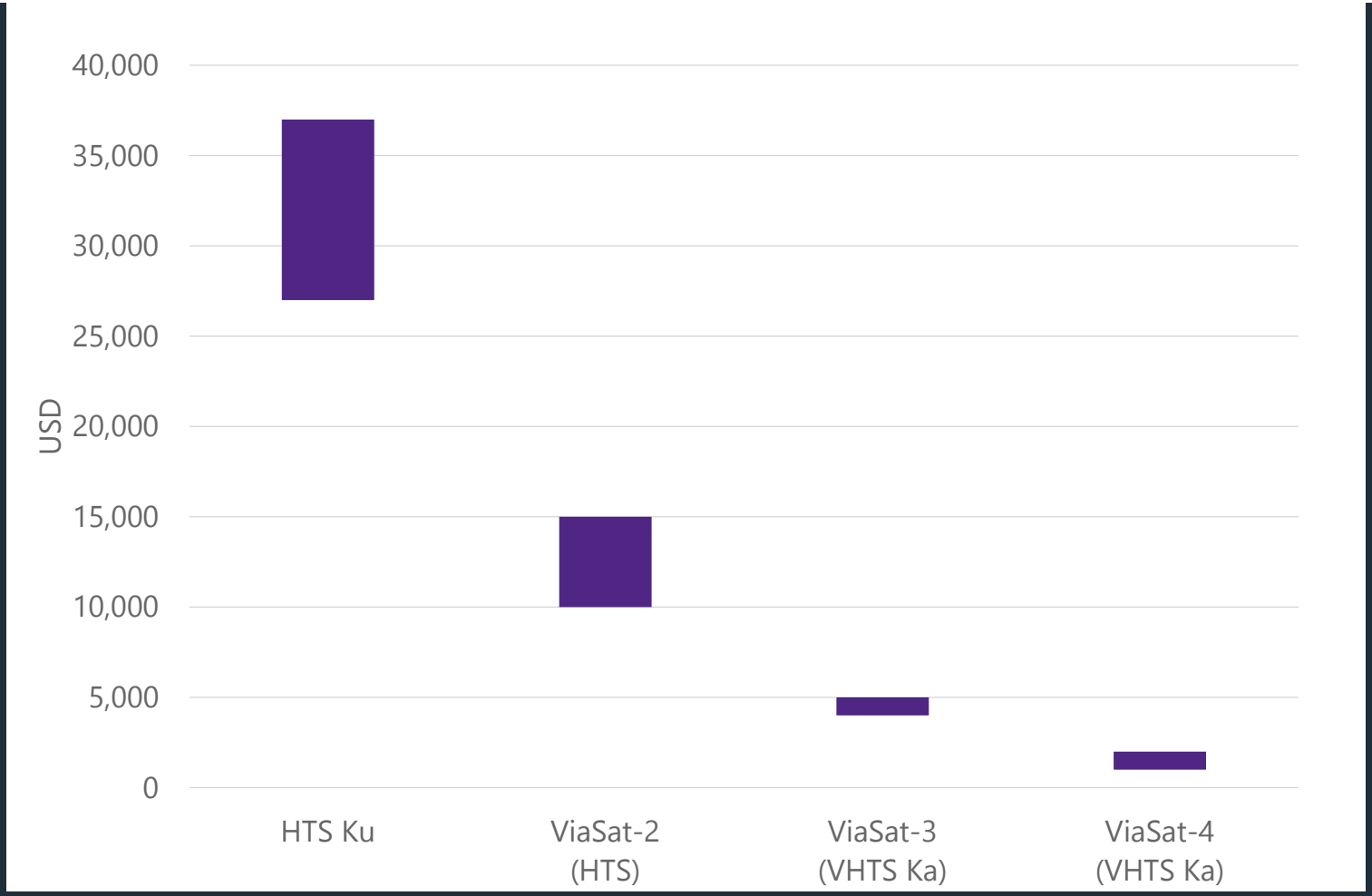
1 Gbps





2022+

Economics of next-generation Ultra High Throughput Satellite systems (cost per Gbps per month)



Source: Morgan Stanley research, 2020

Bridging the digital divide: importance of Ultra-High Throughput Satellites

Coverage + Ultra-High Speeds

Large rural populations

Large geographical areas

High population density

Growing need for critical infrastructure

63% rural population

Untapped economic benefits

Need Broadband for all: Ubiquity

National broadband coverage is not feasible with terrestrial infrastructure only (example, 4G & 5G mobile)

Broadband in mobility: **ESIM** railways and inter-regional transport, maritime routes, airports, aviation, government uses will benefit from nationwide & ubiquitous satellite broadband

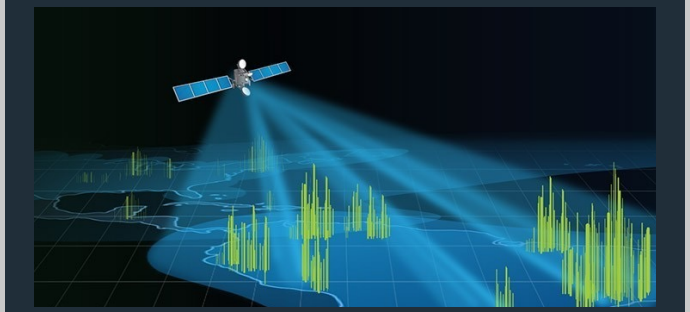
Solution: UHTS broadband

ViaSat-3: flexible broadband for fixed & mobile access, rural and urban

Fiber-like capacity & 5G-like speeds

300 Mbps – 1 Gbps speeds

Cost efficient, national coverage



How to achieve coverage, speed & capacity? Mix of technologies

Regulatory/Policy Requirements

Authorize globally available satellite capacity to serve India

Market is opening, promising discussions

India is set to be one of the largest digital economies in the world. Will require a mix of technologies

Satellite broadband in 28 GHz band will accelerate digital policy goals

The licensing of NGSO LEO mega-constellations needs to be carefully considered for India to have future-proof access to LEO

Spectrum Requirements

Ultra-High Throughput Satellites for both Fixed Satellite and ESIM (mobile) require the full 28 GHz band (27.5 – 29.5 GHz)

Terrestrial 5G in mmWave is nascent - investment risk in 26 GHz IMT will depend on global uptake

28 GHz high-speed satellite broadband already a global investment

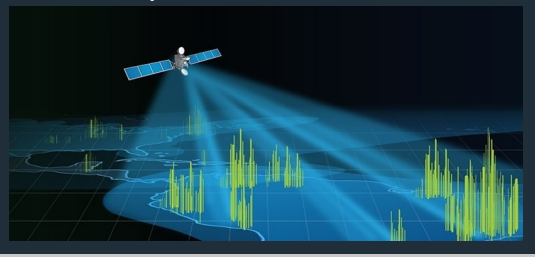
Maximum benefit for the use of 28 GHz: ensuring full use by satellite; IMT in the 26 GHz band is supported

Way Forward in mmWave

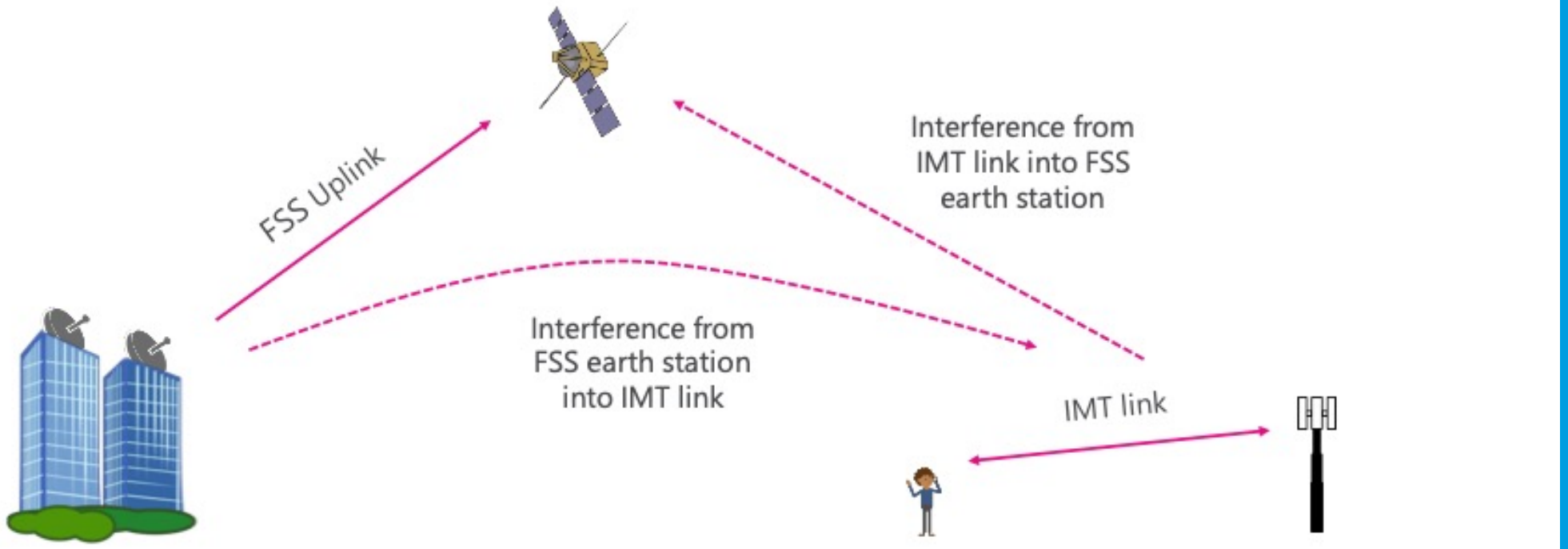
26 GHz: IMT 5G use, outcome of WRC-19 (17+ GHz of identified spectrum including 26 GHz)

28 GHz: sole satellite use, Ka UHTS Fixed Satellite & ESIM (pier-to-pier; gate-to-gate)

IMT 5G is incompatible with satellite use of 28 GHz - best use for 28 GHz is national coverage with satellite high-speed broadband



28 GHz: IMT is technically incompatible for use in the same band



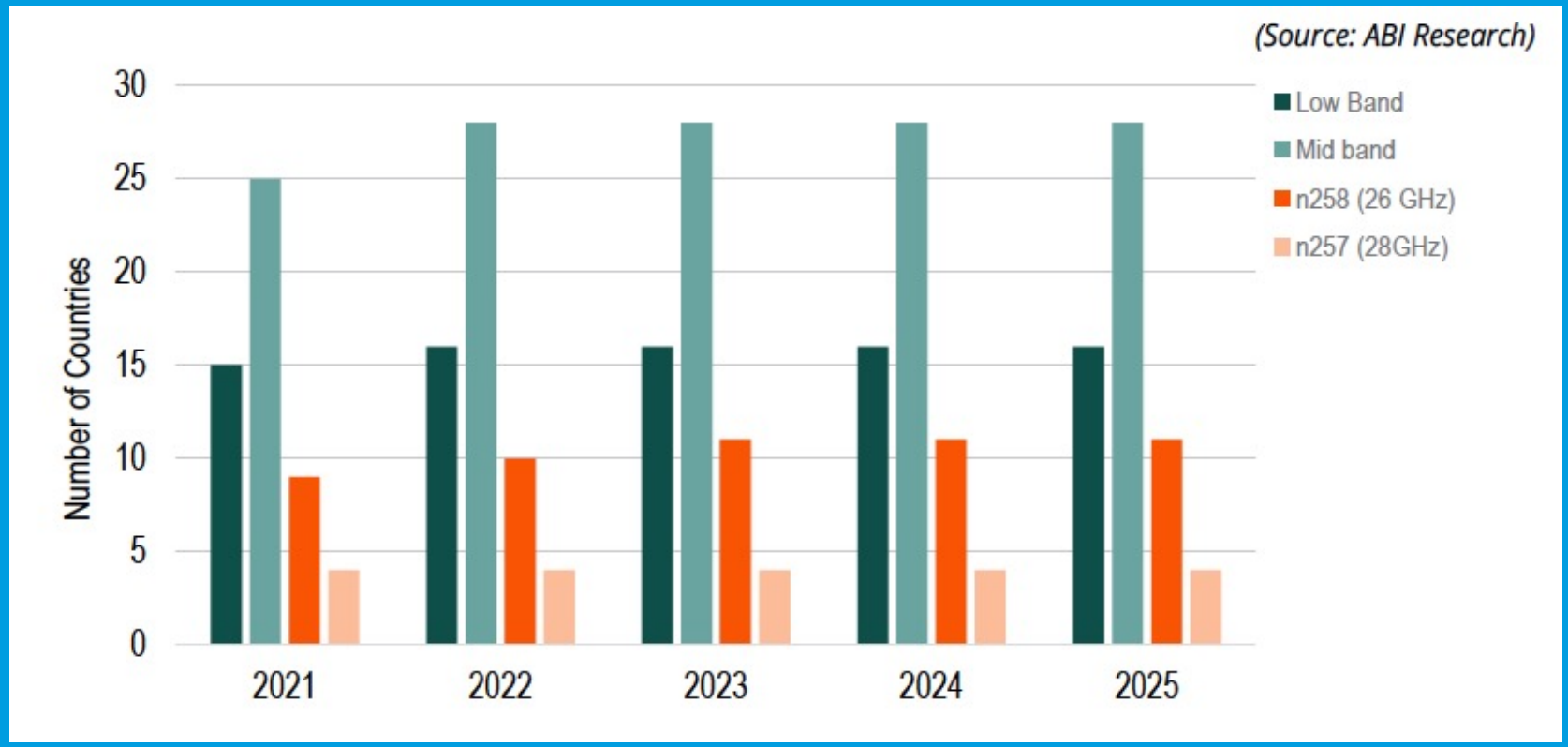
Potential interference paths include, for example, interference between earth stations (operating in FSS feeder/service links) and IMT receivers (base stations and user terminals assuming TDD operation) and IMT transmitters interfering with FSS satellite receivers. In cases of ubiquitous services provided by FSS ESIM and IMT

28 GHz: IMT is technically incompatible for use in the same band: ITU-R TG 5/1 studies

There were four studies that addressed the case of IMT receivers and FSS earth stations, but not with ESIM. It was concluded that “The results of studies showed separation distances of less than 100 m up to about 10 km between the FSS earth station and IMT stations” would be necessary.

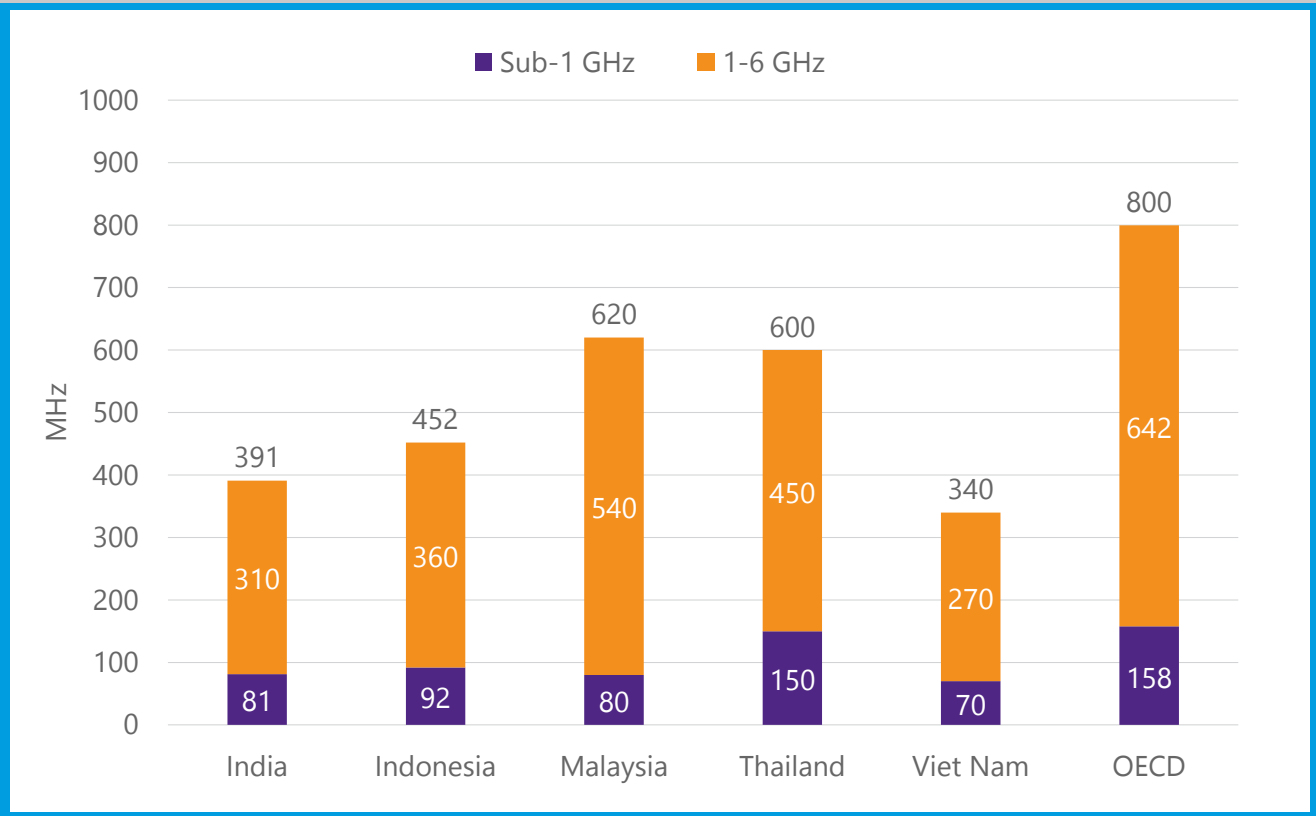
In addition it was also noted that: “in case of deployment of small FSS earth stations at unspecified locations and IMT stations in the same geographical area the separation distance between FSS and IMT stations cannot be ensured. Therefore, sharing may not be feasible and could be dealt with on a case-by-case basis.

Spectrum for broadband: Ecosystem developments and economics



Current and expected spectrum allocation for terrestrial 5G in emerging markets, 2021-2025 (Source: ABI research, 2021)

Spectrum: Ecosystem developments and economics



India yet to licence:

- 700 MHz
- 3.5 GHz

Mobile spectrum supply below 6 GHz

Economic impact of 28 GHz UHT satellite broadband in India

- Unserved: 28.7m pop (5.7m households)
- Underserved: 869m pop (172m households)

Impact of 28 GHz satellite broadband

Estimated increase in broadband connections: 13.6 per 100 households, 2.7 per 100 pop

Economic value

Estimated additional GDP p.a. of up to USD184.6 billion by 2030

Estimated economic benefits of allocating the full 28 GHz band (27.5 – 29.5 GHz) for satellite broadband in India (Source: Plum Consulting research, 2021)

Government policy enablers to bridge the digital divide: Spectrum access for satellite broadband

Recommendations:

- India can accommodate the 5G mobile in a separate spectrum in 26 GHz (right spectrum, harmonized by ITU WRC-19)
- Allow advanced satellite systems to use the 28 GHz band (right amount, 27.5 – 29.5 GHz). Spectrum globally used by FSS and ESIM
- Avoid costly and complex arrangements in the 28 GHz band. IMT systems are incompatible, particularly considering 28 GHz global use by ubiquitous land, sea and air ESIM (right conditions)

• We propose:

Good outcome would be: '3Rs'

- ✓ **Right spectrum**
- ✓ **Right amount**
- ✓ **Right conditions of use**