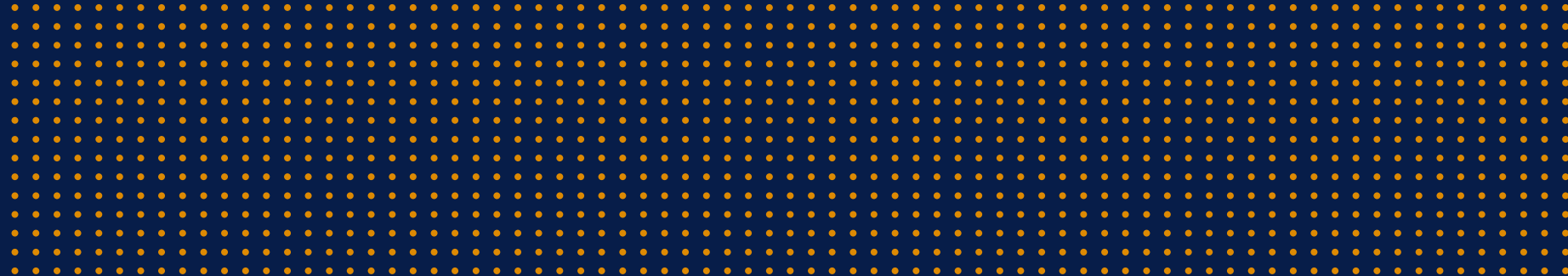


UK SPF Cluster 4: WRC-23 Agenda Item 10

Dr Mohaned Juwad
Director Spectrum Policy
Intelsat



Connecting People for Nearly 60 Years



We pioneered the satellite market, and today we are the driver for innovations



52

Satellites



62

Teleports
& POPs



1,500

Daily TB of
Carrier-grade
Traffic



100,000+

Fiber Miles



10M +

Terminals



We're the largest
satellite capacity
provider to the
U.S. government



We provide
inflight internet
to 21 commercial
Airline Partners
and nearly 3,000
Aircraft



We are the
leading provider
of satellite
bandwidth to the
maritime industry

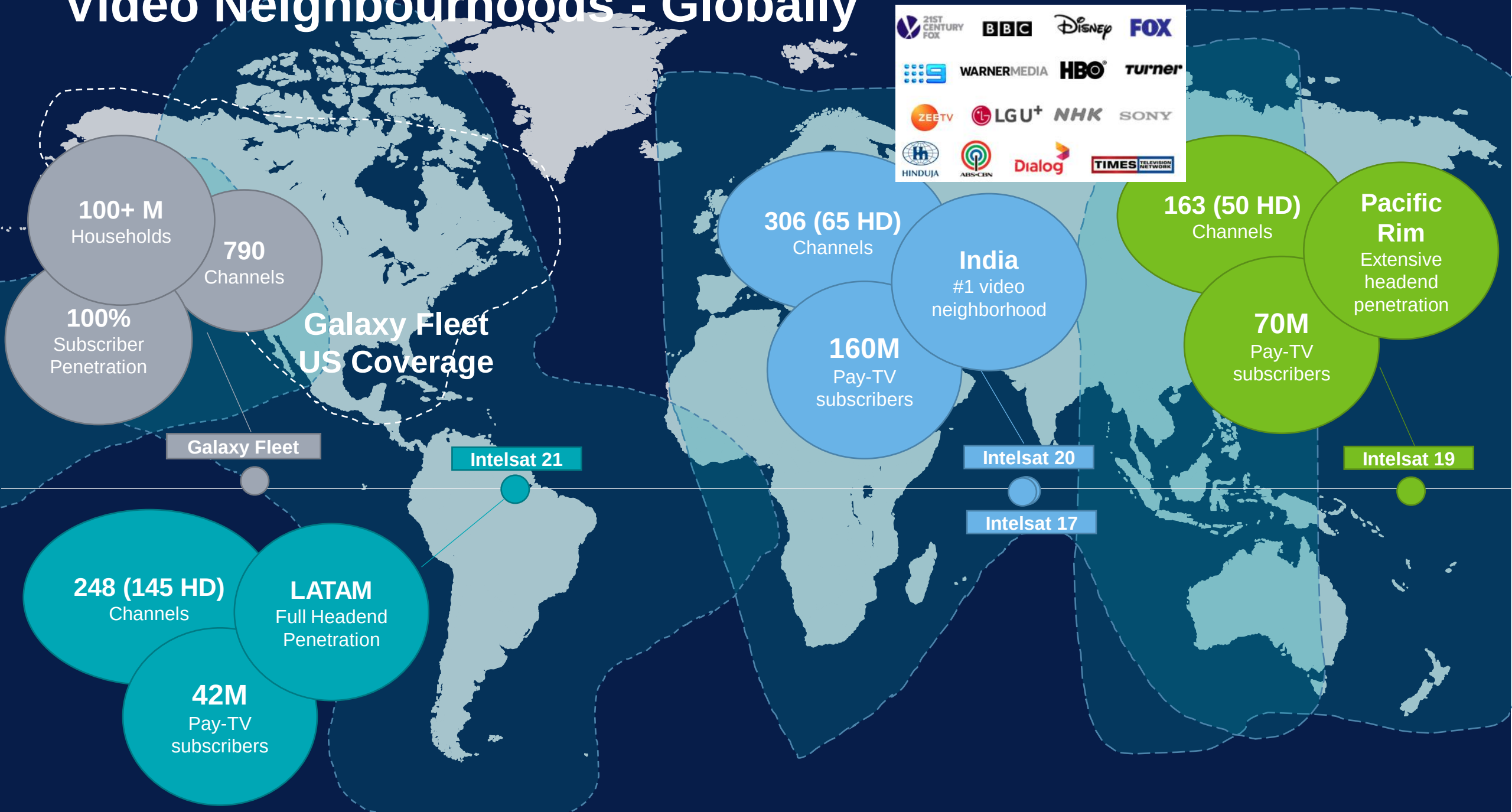


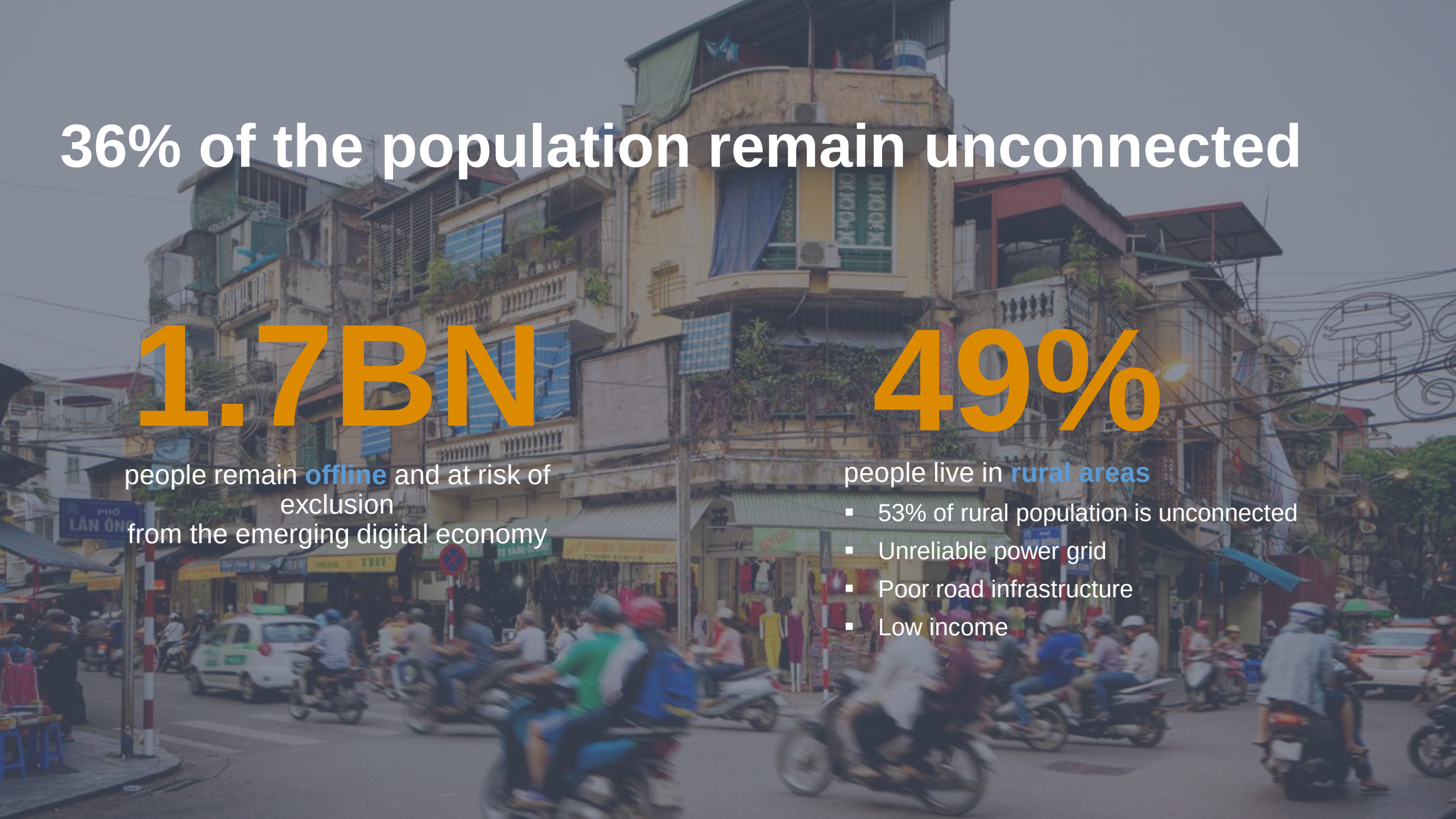
We deliver TV
and radio content
to more than 2
billion people
worldwide



We serve 7 of the
world's top 10
Mobile Network
Operators

Video Neighbourhoods - Globally





36% of the population remain unconnected

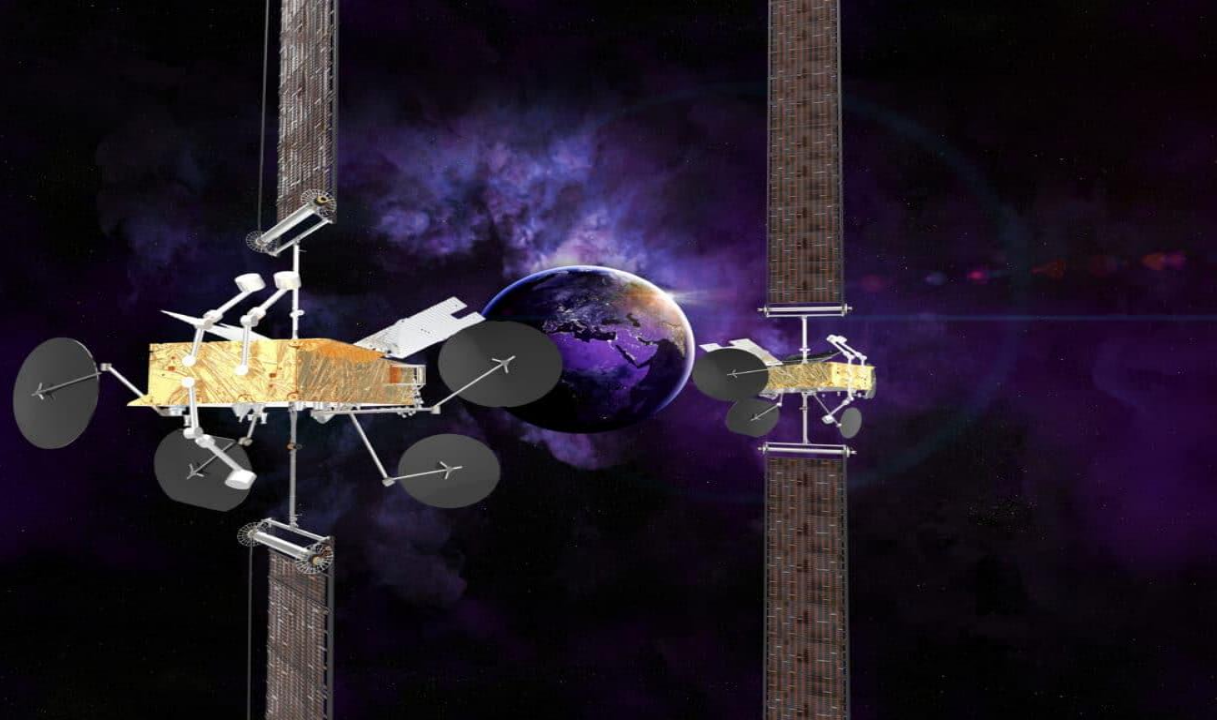
1.7BN

people remain **offline** and at risk of
exclusion
from the emerging digital economy

49%

people live in **rural areas**

- 53% of rural population is unconnected
- Unreliable power grid
- Poor road infrastructure
- Low income



Four New Software-Defined Satellites

Contracted two new software-defined satellites, IS-42 and IS-43, operating in multiple frequency bands for Intelsat's next-generation 5G software-defined network, which will be delivered in 2023.



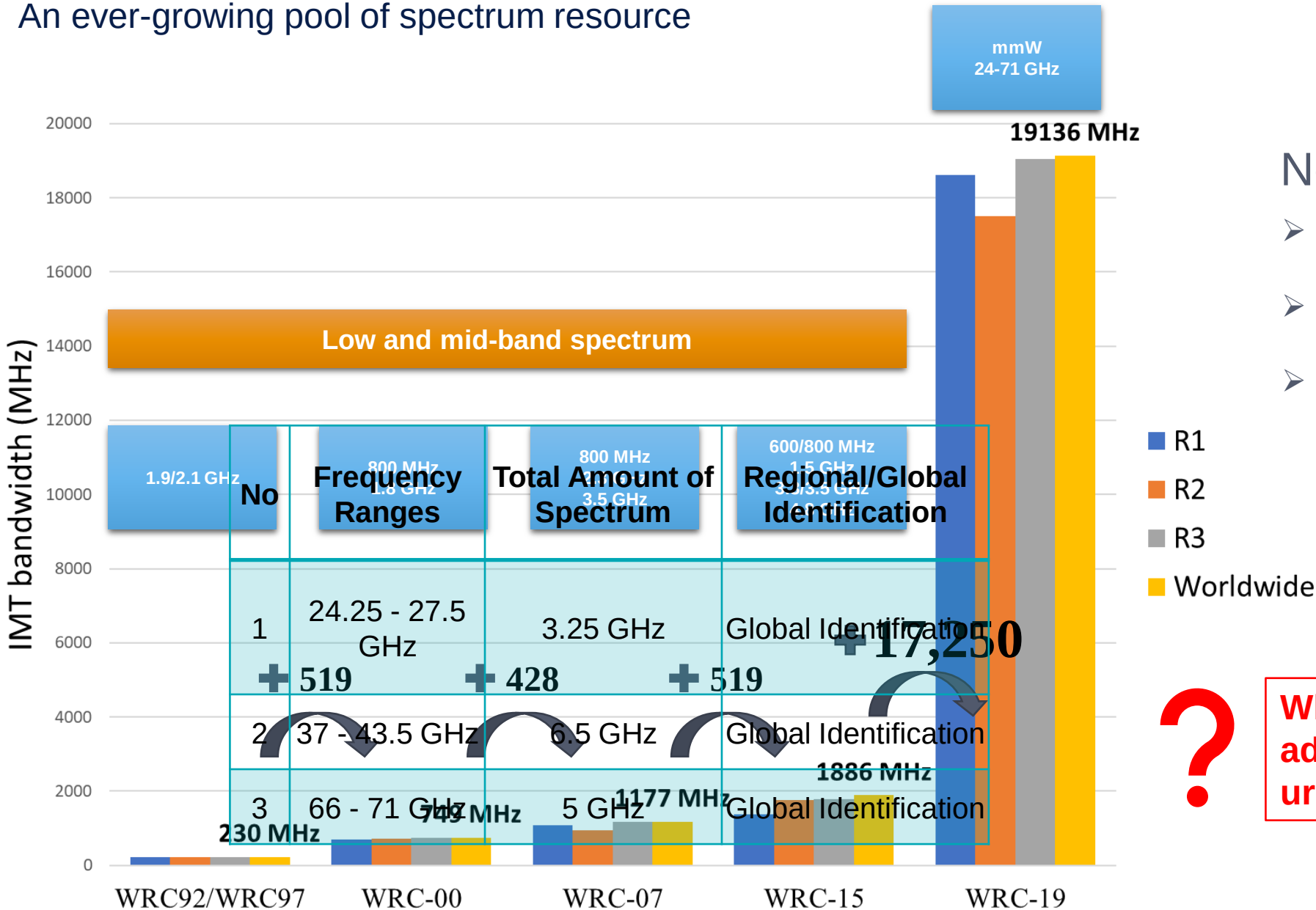
Continues investment in global 5G and contracted another two software-defined satellites, IS-41 (66°E) and IS-44 (166°E), which will be delivered in 2026.





Overview of IMT spectrum growth

An ever-growing pool of spectrum resource



Notes

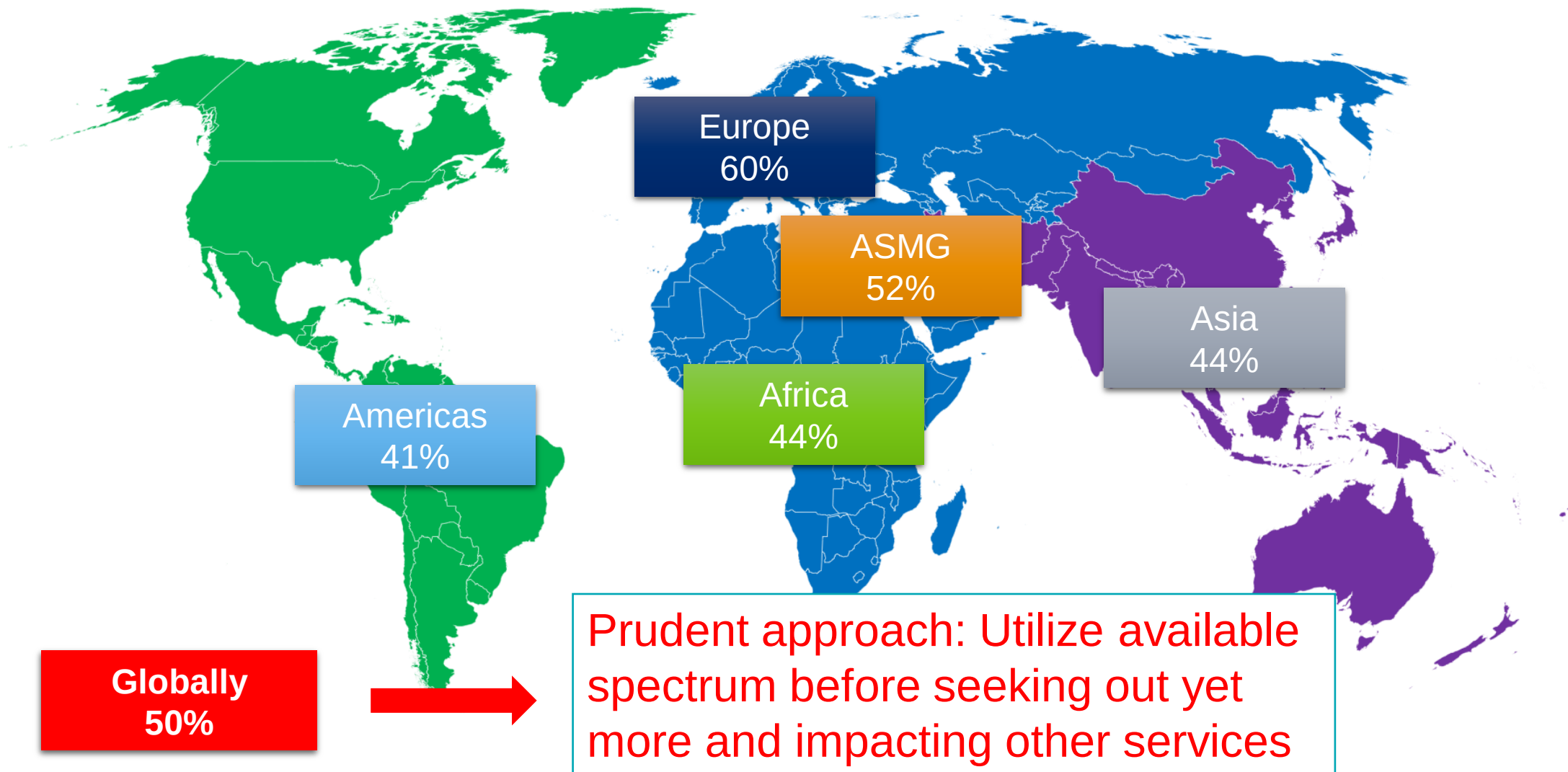
- Bands < 1 GHz suitable for coverage applications
- Bands > 1GHz suitable for capacity in urban areas.
- More than 18 GHz spectrum identified for small cell IMT. So far, this spectrum is mostly unused.



What is the justification for additional IMT spectrum for urban applications?

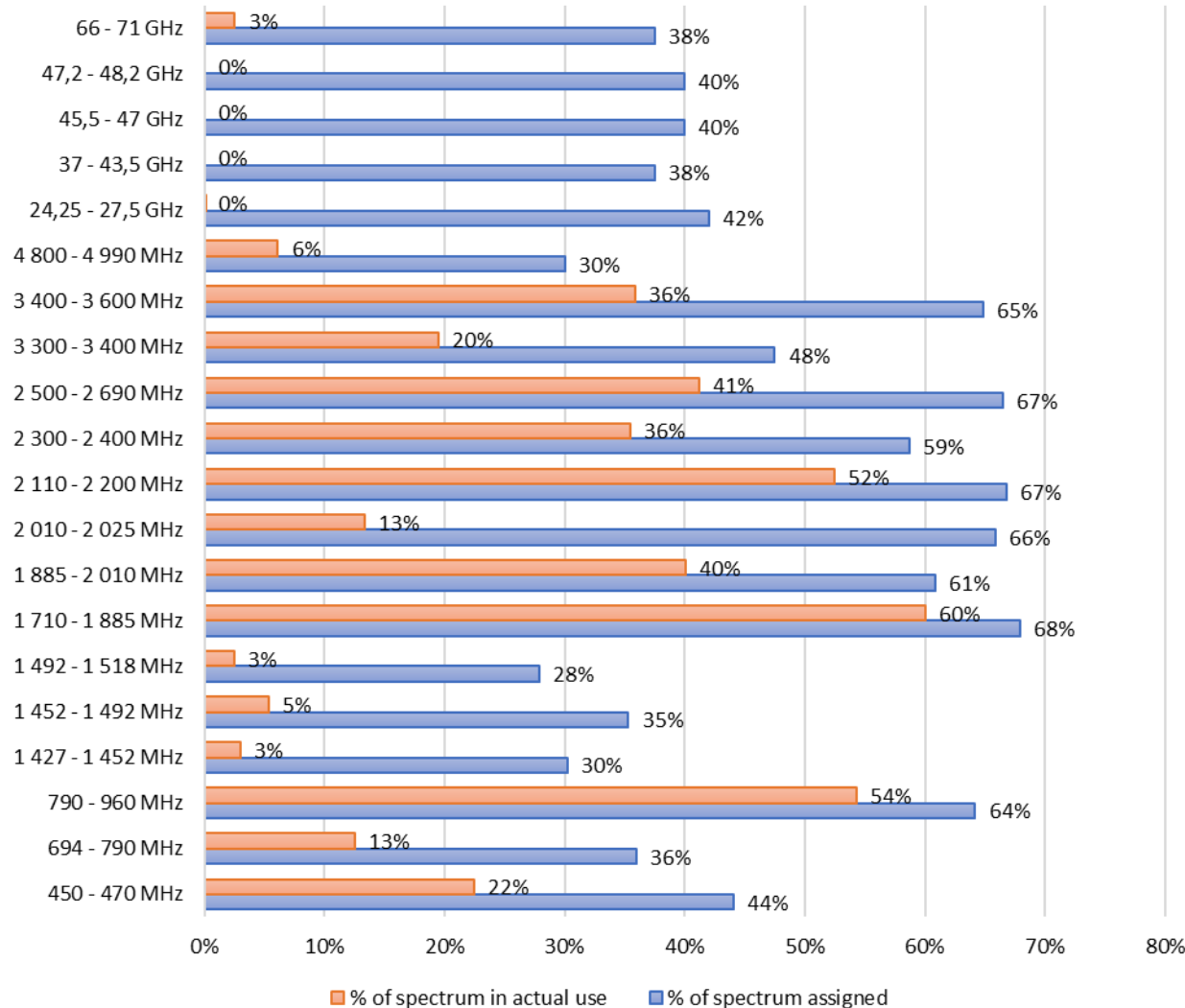
Available vs licensed spectrum

On average globally, only 50% spectrum available below 5GHz (low&mid band) is licensed

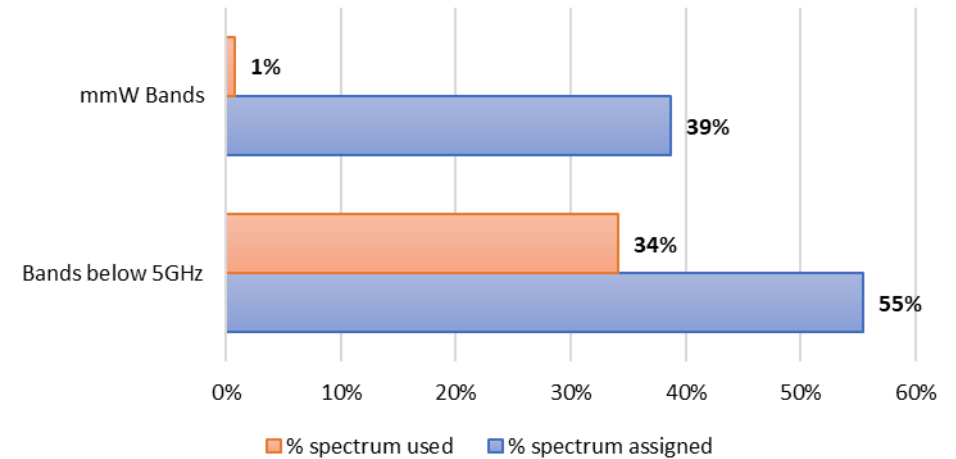


Overview of IMT spectrum usage in ATU

Average spectrum use for IMT in ATU per band



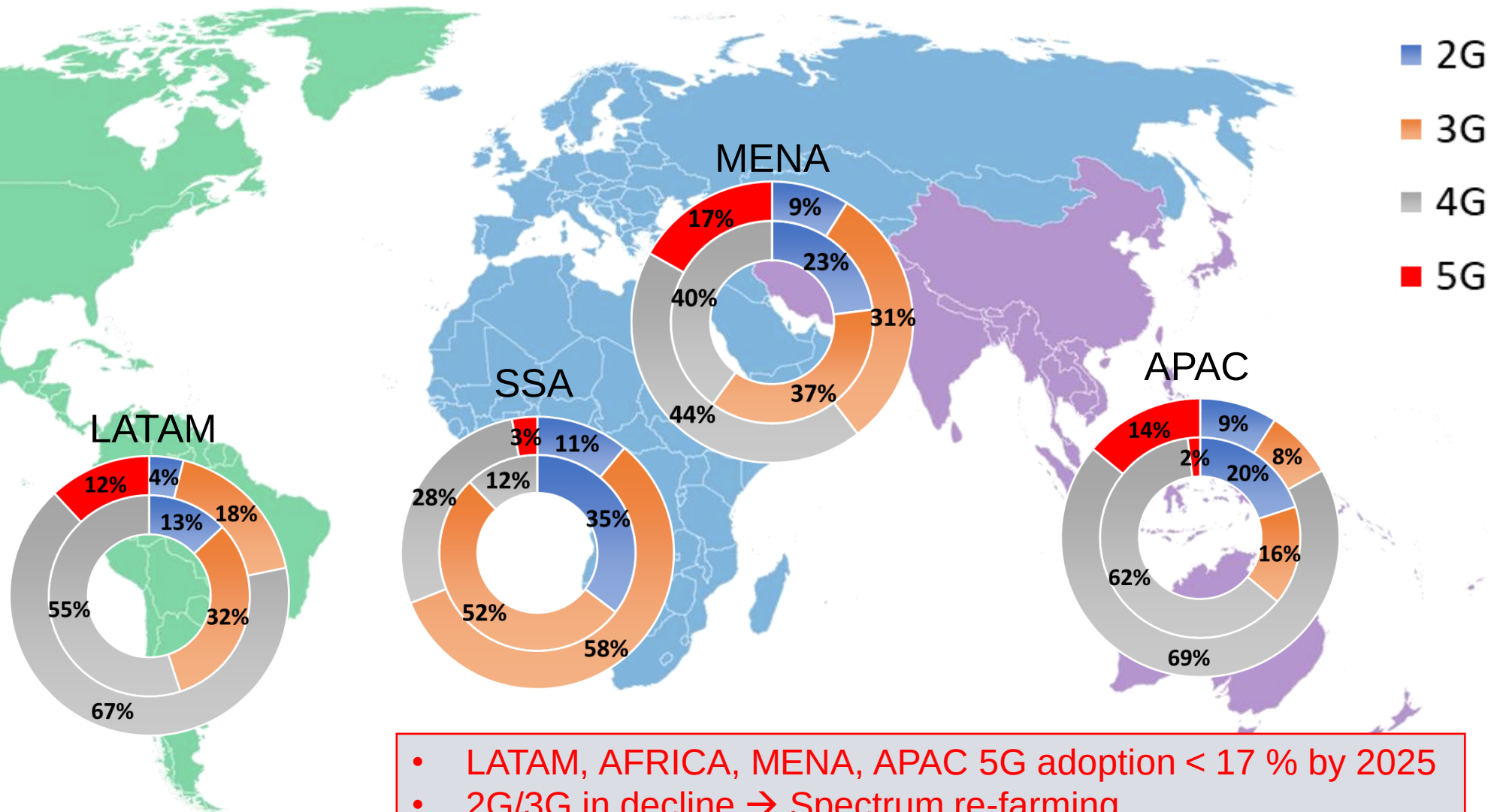
Average spectrum use for IMT in ATU



1. On average only 55% of IMT spectrum below 5GHz is assigned and only a third (34%) of available spectrum is used.
2. Although some countries have assigned the mmW spectrum in their countries, close to none of that spectrum is actually used.
3. The 3.3-3.4 GHz and 3.4-3.6 GHz still remain vastly unused with only 20% and 36% of spectrum used respectively.

Adoption rate of IMT technology

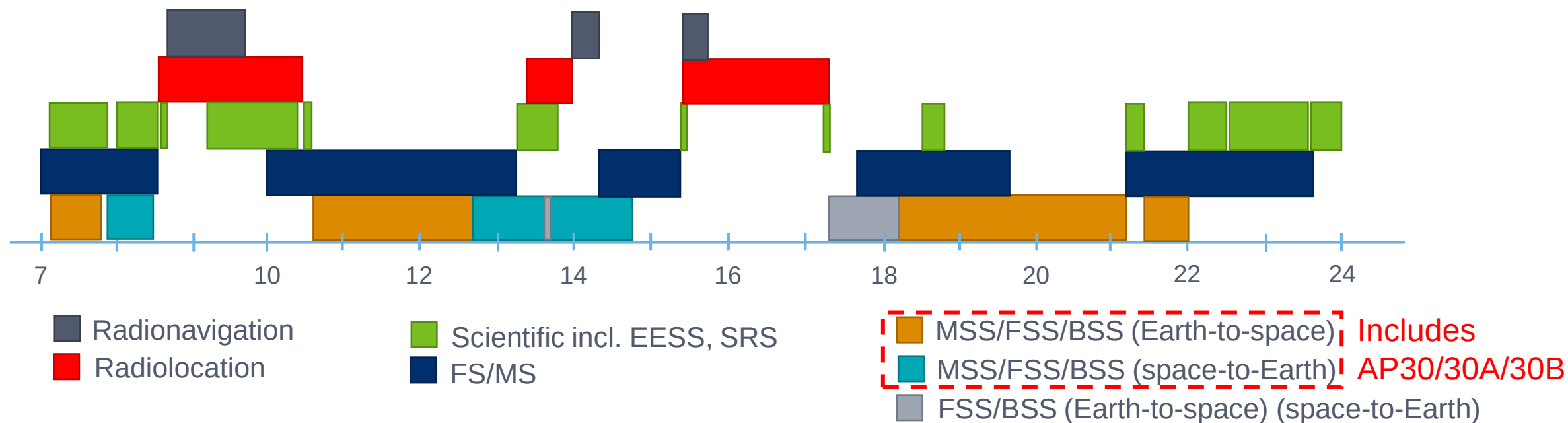
2020 (inner circle) → 2025 (outward circle)



- LATAM, AFRICA, MENA, APAC 5G adoption < 17 % by 2025
- 2G/3G in decline → Spectrum re-farming

7-24 GHz

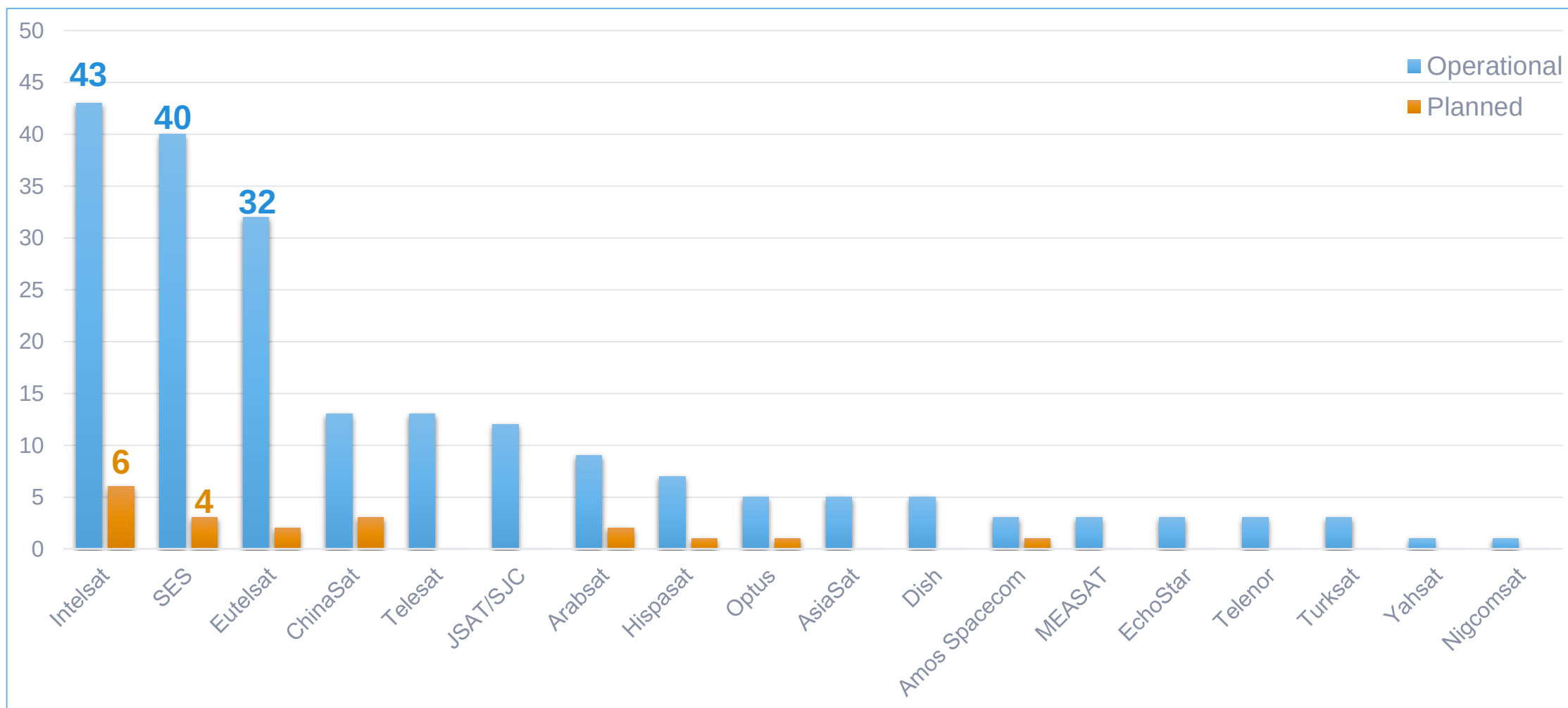
Overview of the spectrum usage



Spectrum in the 7-24 GHz range is congested with critical applications

GSO satellites operating in the Ku-band

Intelsat has the largest fleet of GSO satellites using Ku-band



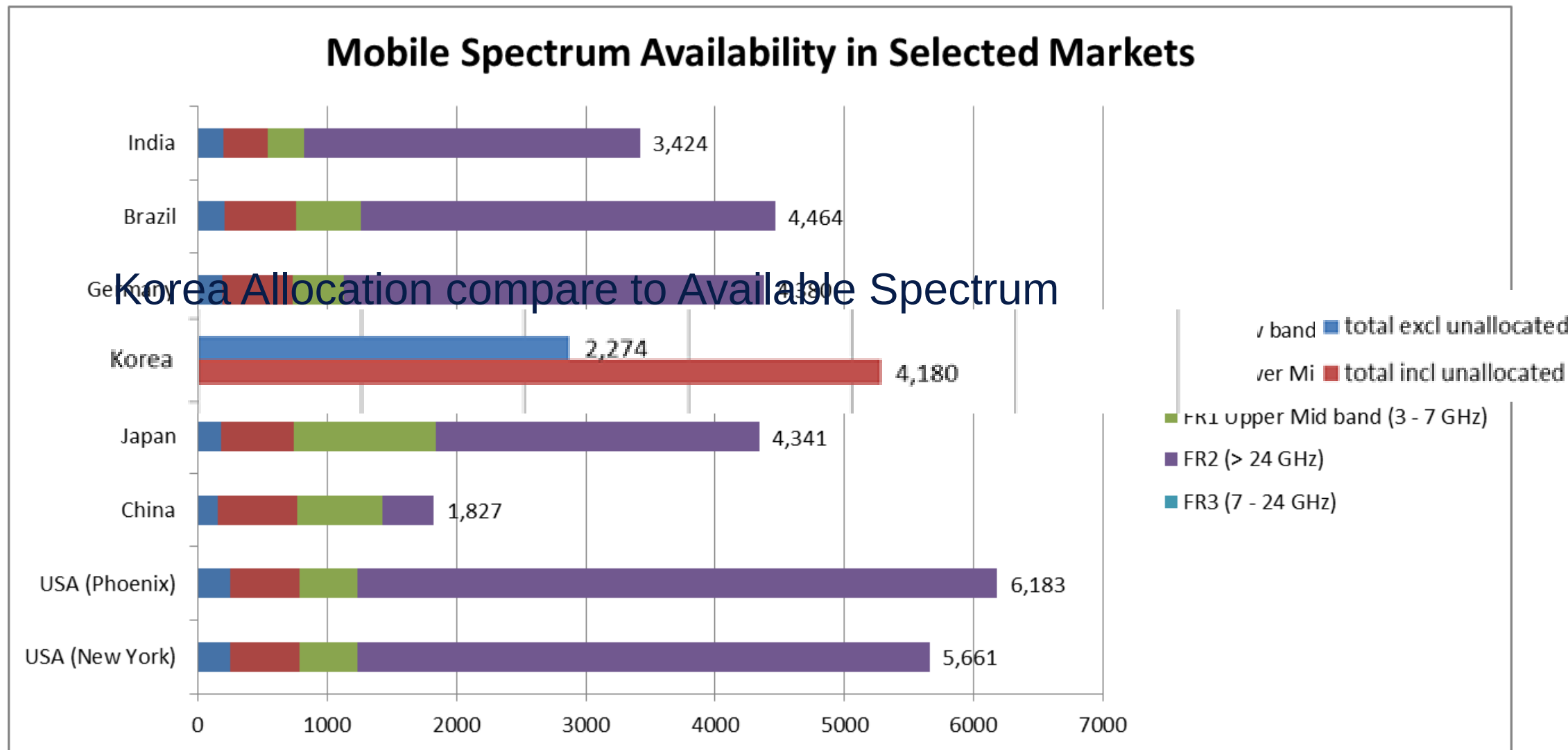
7-24 GHz

Ku-band satellite use is widely harmonized within CEPT and often exempt from individual licensing

ECC Decision Title	ECC DEC Number	Frequency Range	% CEPT admins
VSATs	<u>ECC/DEC/(03)04</u>	14.25-14.50 GHz (E-2-s) / 10.70-11.70 GHz (s-2-E)	70%
High e.i.r.p. Satellite Terminals	<u>ECC/DEC/(06)03</u>	14-14.25 GHz (E-2-s) / 10.70-12.75GHz (s-2-E)	78%
Low e.i.r.p. Satellite Terminals	<u>ECC/DEC/(06)02</u>	14-14.25 GHz (E-2-s) / 10.70-12.75 GHz (s-2-E)	76%
GSO ESIM (maritime)	<u>ECC/DEC/(05)10</u>	14.0-14.5 GHz (E-2-s) / 10.7-11.7, 12.5-12.75 GHz (s-2-E)	85%
GSO ESIM (aero)	<u>ECC/DEC/(05)11</u>	14.0-14.5 GHz (E-2-s) / 10.7-11.7, 12.5-12.75 GHz (s-2-E)	98%
GSO ESIM (land)	<u>ECC/DEC/(18)04</u>	14.0-14.5 GHz (E-2-s) / 10.7-12.75 GHz (s-2-E)	48%
non-GSO ESIM (maritime, aero, land)	<u>ECC/DEC/(18)05</u>	14.0-14.5 GHz (E-2-s) / 10.7-12.75 GHz (s-2-E)	48%
GSO and non-GSO ESIM (aero)	<u>ECC/DEC/(19)04</u>	12.75-13.25 GHz (E-2-s) / 10.7-12.75 GHz (s-2-E)	30%



Total Mobile Spectrum Availability



NTN within IMT2030

ITU WP5D finalized the Recommendation IMT-2030 and beyond. This document sets out the vision for 6G and also highlights the integration and interworking of NTN with

- ⇒ **Interworking:** IMT-2030 is expected to support service continuity and provide flexibility to users via close interworking with **non-terrestrial network implementations**, existing IMT systems and other non-IMT access systems. (Section 2.1)
- ⇒ The interworking of IMT-2030 TN **with its NTN, including satellite communications**, HBS, and UASs, is expected to enhance achieving the “anytime, anywhere connectivity” objective. (Section 2.3.3)
- ⇒ **Ubiquitous connectivity:** This usage scenario is intended to enhance connectivity with the aim to bridge the digital divide. Connectivity could be enhanced, *inter alia*, through interworking with other systems. (Section 3)
- ⇒ **Relationship between IMT-2030 and other access systems **such as NTN**** (Section 5.1.2)

Is there Justification for considering 7-24 GHz?

Is the need for more mobile spectrum at the cost of other services really justified?

➤ **A lot of spectrum available not being used :**

- Low/Mid band: 50% still available in <5 GHz (≈550 MHz)
- mmW band: Use extremely scarce and only used in a few countries worldwide

➤ **Looking for yet more spectrum for densely populated areas is not warranted**

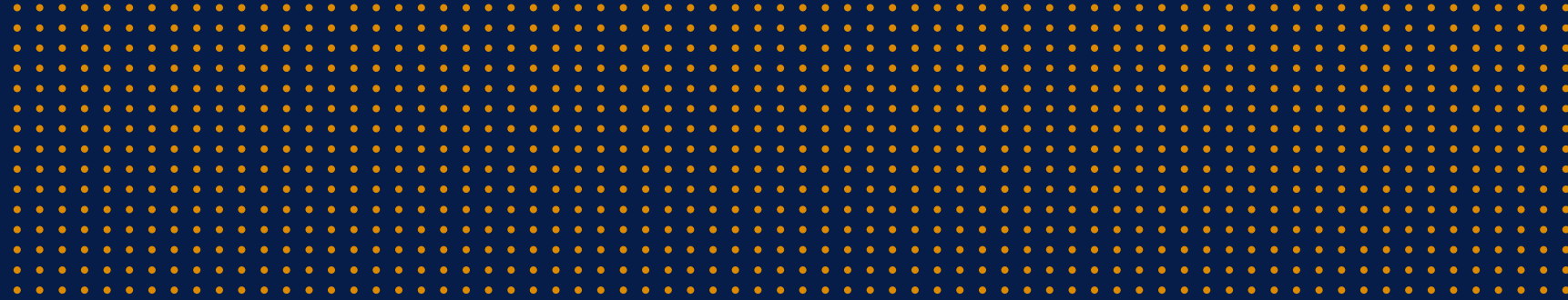
- Especially when IMT2030 could be accommodated in bands >100 GHz
- Risk to incumbents:
 - FS (trunking services, microwave),
 - **FSS** (AP30B, VSAT, DTH, SNG, ESV, AES, HEST, LEST, SIT/SUT...),
 - RAS, EECS (scientific, earth observation),
 - ARNS (civil aviation).

➤ **IMT requires exclusive access to spectrum, hence removal of other services from the band. This is welfare destroying of existing eco-systems.**

- In some cases, this spectrum is even reserved and remains unused leading to spectrum warehousing

➤ **Need to have a more pragmatic and balanced approach**

- start using/refarming what is available before asking for more spectrum.
- To focus any studies to specific bands that are outside FSS, BSS cores frequencies



Thank you
Any questions?