

5G to 6G in India

By : D K Agrawal , BSNL

Change Ask from 5G to 6G

Enhanced Mobile Broadband | Capacity Enhancement



Massive IoT

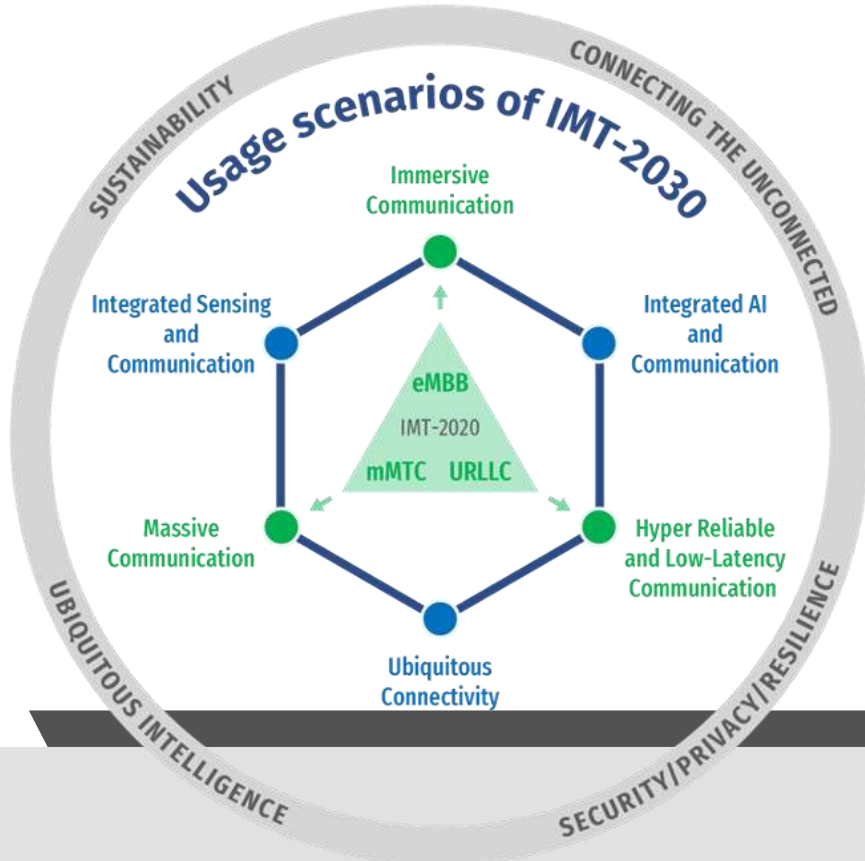
Low Latency

Massive Connectivity

Ultra-high reliability & Low Latency

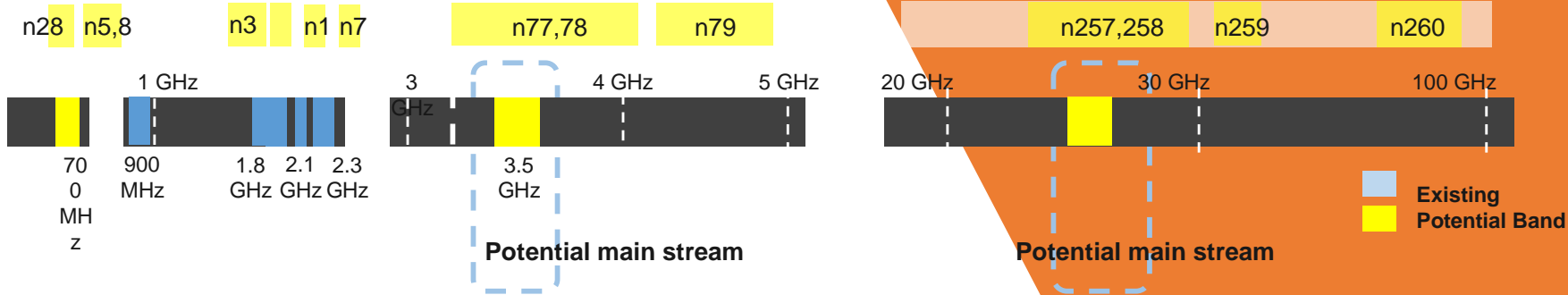


ITU Vision for 6G



India Spectrum Landscape

3GPP Bands



- **Spectrum** : 10–20MHz per Band per operator
- **Peak Rate** : >200–400 Mbps (20 MHz)
- **Coverage** - Existing footprint
- **Use case** - Coverage everywhere

- **Spectrum** : 50–100MHz per Band per operator
- **Peak Rate** : >1 Gbps (>60 MHz)
- **Coverage** - 90% of Existing footprint
- **Use case** - eMBB capacity offload

- **Spectrum** : 500MHz – 1GHz per Band per operator
- **Peak Rate** : >10Gbps (>600 MHz)
- **Coverage** - Small coverage , minimal offload
- **Use case** - Fixed Wireless Access (FWA)

Mid Band 3.3-3.6GHz & High band 24.25-29.25GHz gain most momentum

India 2030 Mobile and Broadband policy objectives

Present Mission	2030 Roadmap	Spectrum Requirements 2030 (5G+ and 6G)	Spectrum Bands to be made available
High speed broadband to citizens, Enterprises, public services. Connect all villages	100 Mbps to every citizen (large coverage of 5G and beginning of 6G)	Likely to double from the current planned spectrum quantities (covering lower, mid, millimeter and Tera Hz bands) Diverse access technologies Mobile, GSO, NGSO, HAPS, HIBS, etc.	<1 GHz Bands Mid Band: up to 10 GHz 6.425-24 GHz Bands Millimetre Bands: 26, 28, 40, 66, 70, 90 GHz, etc. Tera Hz bands
10 Gbps to every GP	500 Gbps to every GP	High speed backhaul to complement Fibre connectivity	Q, V, E, D, W Bands Free Space Optics 6.425-24 GHz Bands Free Space Optics
50% Households with Broadband	90% Households with High-speed Broadband	FWA – Fixed Wireless Access (would be a costeffective option) using 5G and E, V Band links & other access technologies including fibre	Millimeter bands of 37, 50, 66 GHz V Band (57-66 GHz) 6.425-24 GHz Bands Free Space Optics
10 Million public Wi-Fi Hotspots	50 Million public Wi-Fi Hotspots	New License Exempt Spectrum Bands	6 GHz, V-Band, > 95 GHz Tera Hz Bands
5 Billion IoT Devices; Enterprise Digitization (ITS, Urban Management)	25 Billion IoT Devices Smart Enterprises & Factores (Smart Infrastructure Rural and Urban)	New License Exempt Spectrum for M2M connectivity to power smart cities and communities	915-935 MHz V Band 95 GHz bands Thz bands
Personal and Home Connectivity (SRDs)	Connected and Intelligent Living	Extremely low power intelligent devices of all kinds connecting everything around	Hundreds of bands to be identified continuously based on innovation
UAVs with limited action	UAVs in Delivery Services, Logistics, Disaster Management	Defined IMT and unlicensed bands with ultra-reliability and control (application specific)	1 GHz Bands Band: up to and above 10 GHz

Thank you

