

India's 5G Engagement & Experience Sharing

Spectrum Facilitation

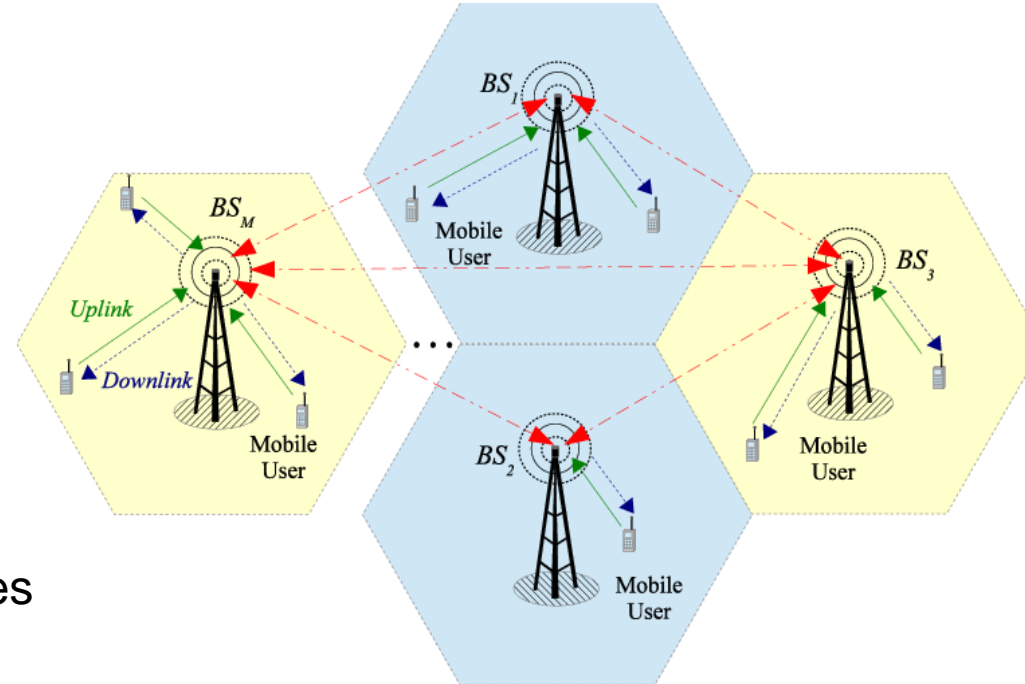
M. Revathi

Joint Wireless Adviser,

Member RRB - ITU

WPC Wing, DoT

Spectrum used by Telecom Service Providers (TSPs)-5G



Access Frequencies

Between Mobile Phones and Base Stations

Assigned through Auction

Mid Band: **3.3-3.67 GHz**
Mm Band: **24.25-27.5 GHz**

Backhaul Frequencies

Between Base Stations and Switching Centers/ Gateways of Mobile Network

Assigned administratively

E-Band (71-76/81-86 GHz)

Enabling Environment for faster 5G Roll Out

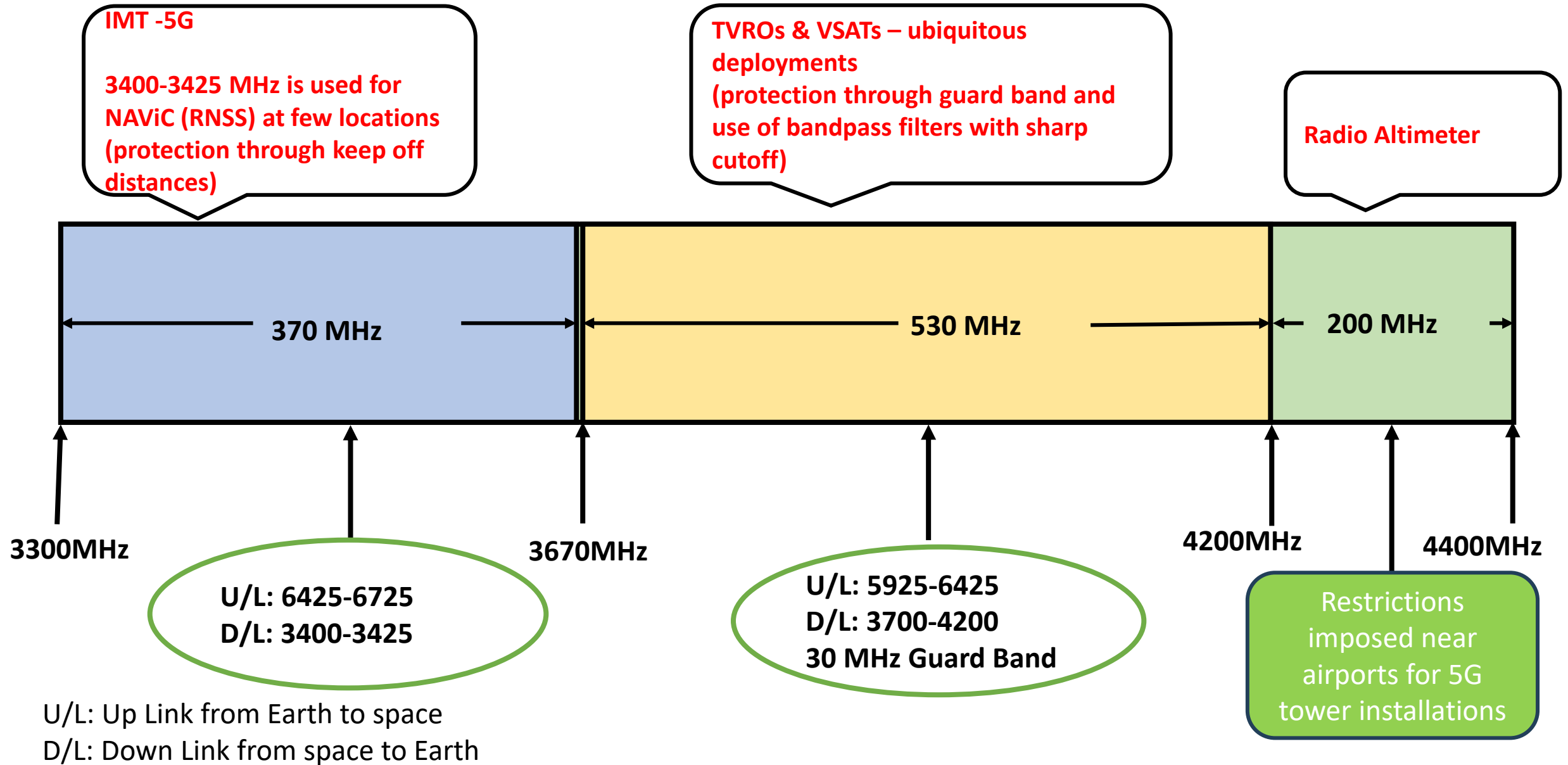
Spectrum Related:

- Simplified spectrum licensing framework to carry out experimentation and technology trials:
 - Permitted 5G technology trials before actual deployment
 - Set up indigenous end-to-end open 5G Test Bed in a distributed architecture model to enable industry to validate their products, prototypes and algorithms
- Coordinated with the existing users of spectrum (especially in mid band) to get it released for 5G
- Access and Backhaul spectrum assigned simultaneously. Assigned on the same day of receiving the bid amount.

Regulatory Clearances:

- Clearance for setting up of telecom towers has been simplified and made on self-declaration basis
- Import clearances are made on self-declaration basis
- For faster 5G roll out on street furniture, clearance has been done away with simple registration

Challenges during deployment of the Mid Band - Solutions



Enabling provisions for roll out of Industry 4.0

- Telecom Service Providers (TSPs) may provide captive 5G network to an enterprise by using **network slicing** over its Mobile Network.
- TSPs may provide **isolated** captive 5G network for the enterprises using their IMT spectrum.
- Enterprises may obtain the **spectrum on lease** from TSPs and establish their own isolated network.

THANKS

Results of Spectrum Auctions - 2022

Name of Telecom Operator	Band	Quantum won (in MHz)
Adani Data Networks Ltd	26(GHz)	400
Bharti Airtel Limited	900(MHz)	12.8
Bharti Airtel Limited	1800(MHz)	25
Bharti Airtel Limited	2100(MHz)	30
Bharti Airtel Limited	3300(MHz)	2200
Bharti Airtel Limited	26(GHz)	17600
Reliance Jio Infocomm Limited	700(MHz)	220
Reliance Jio Infocomm Limited	800(MHz)	20
Reliance Jio Infocomm Limited	1800(MHz)	60
Reliance Jio Infocomm Limited	3300(MHz)	2440
Reliance Jio Infocomm Limited	26(GHz)	22000
Vodafone Idea Limited	1800(MHz)	3.4
Vodafone Idea Limited	2100(MHz)	5
Vodafone Idea Limited	2500(MHz)	20
Vodafone Idea Limited	3300(MHz)	850
Vodafone Idea Limited	26(GHz)	5350

Summary of Spectrum Auctions conducted India

2010

- Quantum put to auction / Quantum of spectrum sold – 1785 MHz / 1785 MHz
- Value realised - \$ 13.2 billion

2012

- Quantum put to auction / Quantum of spectrum sold – 390 MHz / 127.5 MHz
- Value realised - \$ 1.17 billion

2013

- Quantum put to auction / Quantum of spectrum sold – 195 MHz / 30 MHz
- Value realised - \$.5 billion

2014

- Quantum put to auction / Quantum of spectrum sold – 431.2 MHz / 353.2 MHz
- Value realised - \$ 7.6 billion

2015

- Quantum put to auction / Quantum of spectrum sold – 470.75 MHz / 418 MHz
- Value realised - \$ 13.6 billion

2016

- Quantum put to auction / Quantum of spectrum sold – 2354.75 MHz / 964.8 MHz
- Value realised - \$ 8.2 billion

2021

- Quantum put to auction / Quantum of spectrum sold – 2308.8 MHz / 855.6 MHz
- Value realised - \$ 9.7 billion

2022

- Quantum put to auction / Quantum of spectrum sold – 72097.85 MHz / 51236.2 MHz
- Value realised - \$ 18.7 billion

Spectrum Available for Next Auction

Spectrum Details	LSAs	Bands	Quantum in MHz for all LSAs
Spectrum available in existing bands	All LSAs	600 MHz ,700 MHz , 800 MHz ,900 MHz, 1800 MHz ,2100MHz, 2300 MHz ,2500 MHz, 3300 MHz ,26 GHz	11413.25
Spectrum available in new bands	All LSAs	37-37.5 GHz, 37.5 - 40 GHz, 42.5-43.5 GHz	88000
Spectrum due for expiry in 2024	10 LSAs	800 MHz, 900 MHz, 1800 MHz	90.9

Frequency bands opened for IMT Services

Spectrum Band	Band range (MHz)	Spectrum for IMT
600 MHz	663-703 [612-652]	40 MHz
700 MHz	713-748 [773-803]	30 MHz
800 MHz	824 – 844[869 – 889]	20 MHz
900 MHz	890 – 915 [935 – 960]	25 MHz
1800 MHz	1710-1765[1805-1860]	55 MHz
2100 MHz	1939-1979[2129-2169]	40 MHz
2300 MHz	2300-2380	80 MHz
2500 MHz	2535-2555 & 2635-2655	40 MHz
3300 MHz	3300-3670	370 MHz
26 GHz	24250-27500	3250 MHz

Backhaul Frequency Bands

