

Regional Policy and Regulatory Webinar Series

“5G Engagement and Experience Sharing”



Regulatory Enablement to 5G rollout – Indian Experience



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16.04.2024

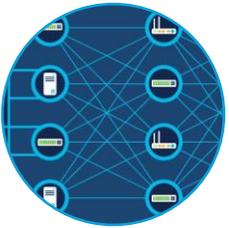
5G



Enables a new kind of network designed to connect virtually everyone and everything



Provides seamless coverage, high data rate, low latency, highly reliable communications



Promises to be the connectivity fabric of the emerging new era of ICT



Transformational force for new economic opportunities and societal benefits

Regulatory Enablers to 5G Roll out

- Making 5G a policy priority
- Making available sufficient access spectrum for 5G
- Making available high capacity backhaul spectrum for 5G
- Enabling network densification for 5G
- Enabling 5G private networks

Making 5G a policy priority



2018:

National Digital Communication Policy (NDCP)-2018

Recognized 5G as an enabler to India's transition to a digitally empowered economy and society



2019:

The Government launched a program '**Building an End-to-End 5G Test Bed**'

- to advance innovation and research in 5G
- Infrastructure for implementing the entire 5G network



2021:

The Government established an enabling framework for **5G technology trials**

All major service providers carried out 5G trials

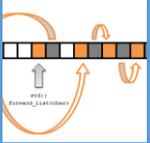
Telecom Reforms of 2021



Reform package to create an enabling environment for investment in 5G:

- **Removed spectrum usage charge (SUC)** for spectrum acquired in future auctions
- **No bank guarantee to secure instalment payments** in future auctions
- **Permitted surrender of spectrum** acquired in future auctions.
- **Removed additional SUC of 0.5%** for spectrum sharing.

Making available sufficient access spectrum for 5G



5G requires access to contiguous spectrum in a variety of bands to support multitude of use cases.

To make **available**
Sufficient amount of
globally harmonized access spectrum
at an **affordable price**



New bands were identified for IMT services in India.

- Sub-1 GHz bands (600 and 700 MHz)
- Mid band (3.5 GHz) and
- mmWave band (24.25 to 27.5 GHz)

Global snapshot of allocated/targeted 5G spectrum

5G is being designed for diverse spectrum types/bands

NEW 5G BAND

— Licensed

— Unlicensed / shared

	<1GHz	3GHz	4GHz	5GHz	6GHz	24-30GHz	37-50GHz	60GHz	>95GHz
	600MHz (2x35MHz) 900MHz (2x3MHz) 2.5/2.6GHz (B41/n41)	3.1-3.45GHz 3.45-3.55GHz 3.55-3.7GHz	3.7-3.98GHz	4.94-4.99GHz	5.9-7.1GHz	24.25-24.45GHz 24.75-25.25GHz 27.5-28.35GHz	37-37.6GHz 37.6-40GHz 42-42.5GHz 47.2-48.2GHz	57-71GHz	>95GHz
	600MHz (2x35MHz)	3.475-3.65 GHz	3.65-4.0GHz		5.9-7.1GHz	26.5-27.5GHz 27.5-28.35GHz	37-37.6GHz 37.6-40GHz	57-71GHz	>95GHz
	700MHz (2x30 MHz)	3.4-3.8GHz			5.9-6.4GHz	24.5-27.5GHz		57-66GHz	
	700MHz (2x30 MHz)	3.4-3.8GHz			5.9-6.4GHz	24.25-27.5 GHz	40.5-43.5 GHz	57-66GHz	
	700MHz (2x30 MHz)	3.4-3.8GHz			5.9-6.4GHz	26GHz		57-66GHz	
	700MHz (2x30 MHz)	3.46-3.8GHz			5.9-6.4GHz	26GHz		57-66GHz	
	700MHz (2x30 MHz)	3.6-3.8GHz			5.9-6.4GHz	26.5-27.5GHz		57-66GHz	
	700MHz 900MHz 2GHz (n1) 2.5/2.6GHz (B41/n41)	3.3-3.6GHz		4.8-5GHz		24.75-27.5GHz	37-43.5GHz		
	700/800MHz	2.3-2.39GHz	3.4-3.7GHz	3.7-4.0GHz	4.72-4.82GHz	5.9-7.1GHz	25.7-26.5GHz 26.5-28.9GHz 28.9-29.5GHz	37GHz	57-64GHz
	700/800MHz	2.3 GHz	3.6-4.1GHz	4.5-4.9GHz	5.9-6.4GHz		27-29.5GHz	57-66GHz	
	600MHz (2x40 MHz) 700MHz (2x30 MHz)		3.3-3.67GHz			24.25-27.5GHz			
		2.3 GHz	3.4-3.7GHz	3.7-4.0GHz		5.9-6.4GHz	24.25-29.5GHz	39GHz	57-66GHz



Recommendations

on

Auction of Spectrum in frequency bands identified for
IMT/5G

April 2022:

TRAI's recommendations on Auction of spectrum in frequency bands identified for IMT/ 5G

Encompassed conditions for auction, **reserve price**, payment plan, spectrum requirements of private 5G networks, and development and proliferation of 5G use cases.



July/ August 2022:

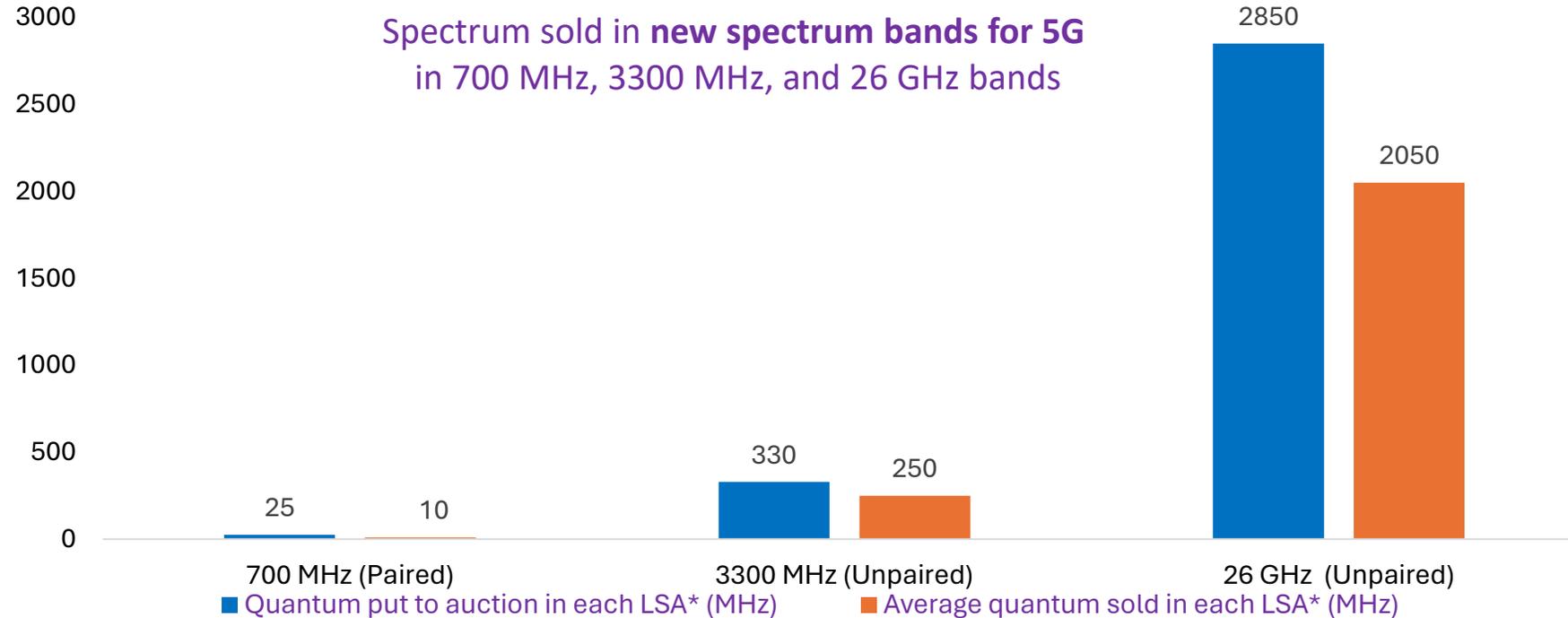
The Government conducted auction of spectrum for IMT/ 5G.



October 2022:

5G Services were launched in the country.

Spectrum auction in India (2022)



Spectrum of 18 Billion USD was sold in the auction.

* Apart from the new bands for 5G, the available spectrum in the existing bands was also sold in the auction.

Making available high capacity backhaul spectrum for 5G



Backhaul from base station to core network is one of the major challenge in the proliferation of 5G.



Optical Fiber is most preferred medium for backhaul - availability of OFC is still inadequate.



Microwave is a cheaper, scalable and reliable option for backhaul which can be deployed quickly.



Need to augment backhaul capacity to cater higher throughput requirements of 5G.

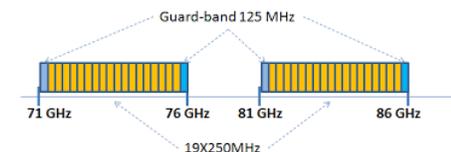


Regulators world over are opening up higher frequency bands, such as E-band (71-76 GHz paired with 81-86 GHz) to satisfy the high-capacity backhaul requirements of 5G.



In 2022, Indian Government opened the E-band spectrum for 5G backhaul.

Mobile service providers can seek upto two carriers of 250 MHz (paired) spectrum in E band.



Enabling network densification for 5G

Enabling Network Densification for 5G

- 5G – a hyper dense network
 - ✓ Macro base stations
 - ✓ Small cells
- Small cells to be deployed at every 200-250 meters on street infrastructure –
 - Electric utility poles,
 - street light poles,
 - bus stands,
 - roof tops, etc.
- Right of way rules need to be liberalized for deployment of small cells.



- **TRAI carried out pilots on use of street furniture for small cells for 5G**
 - Bhopal Smart City,
 - GMR International Airport New Delhi,
 - Deendayal Port Kandla and
 - Namma Metro Bengaluru
- **Government issued guidelines on the deployment of small cells for 5G**
 - ✓ Telecom service providers can use street infrastructure to deploy telecom equipment at a nominal charge of Rs. 150 (~2 USD) per annum in rural areas and Rs. 300 (~4 USD) per annum in urban areas.
 - ✓ No administrative fee charged by Central Government on the land owned/ controlled by them.
 - ✓ No permission required from Government authority for installing telecom infrastructure on private property.
 - ✓ For State/ Union Territories, the administrative fee is limited to Rs. 1,000 (~12 USD) per pole.
- **Government amended right of Way rules for Faster 5G Roll-out**
 - ✓ Online portal based single window clearance system for all telecom right of way (RoW) applications.
 - ✓ Many States/ UTs have implemented deemed approval clause in their RoW Policies ensuring speedy approvals.
 - ✓ **Average time for approval of RoW applications reduced from 435 days in 2019 to 16 days in July, 2022.**

Enabling 5G based private networks

5G networks for Industry 4.0

5G networks can provide high-speed, reliable, and consistent wireless communication on the factory floor.

- Government created an enabling framework to meet spectrum requirement for isolated captive non-public networks (CNPN)



Using a **network slice** from TSP's PLMN network.



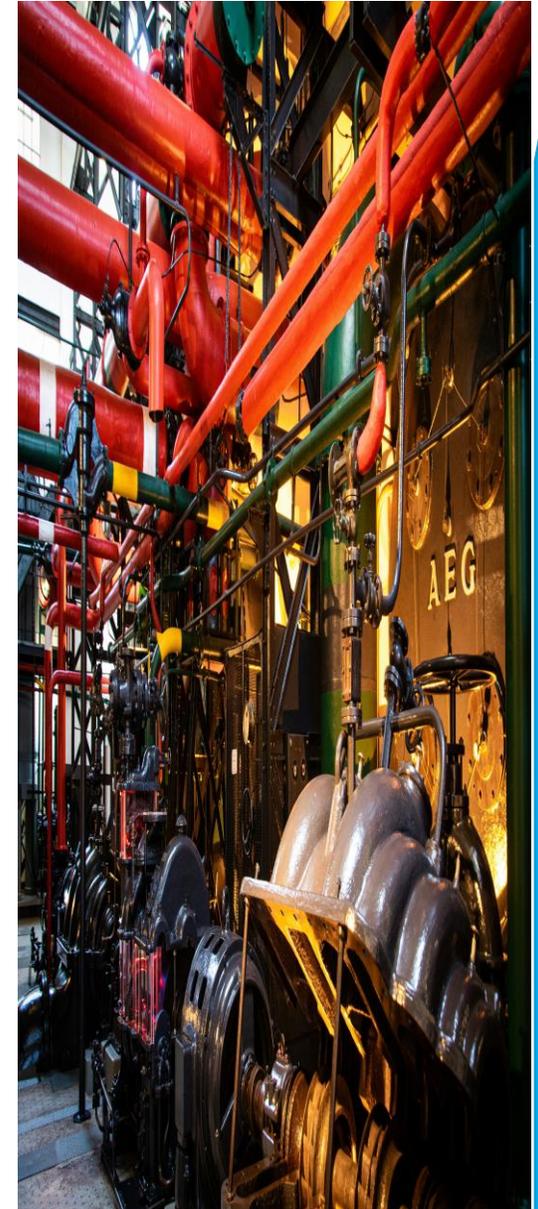
TSP to establish an independent **isolated private network** using TSP's own spectrum.



Enterprise to **obtain spectrum on lease from TSPs** and establish own isolated CNPN.



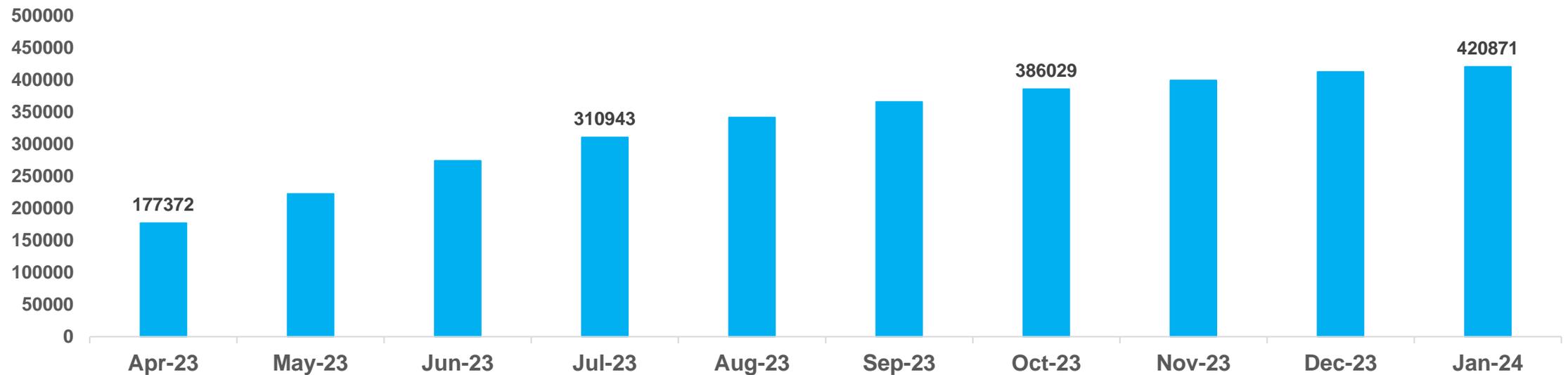
Enterprise to **obtain spectrum directly from Government** and establish own isolated CNPN.



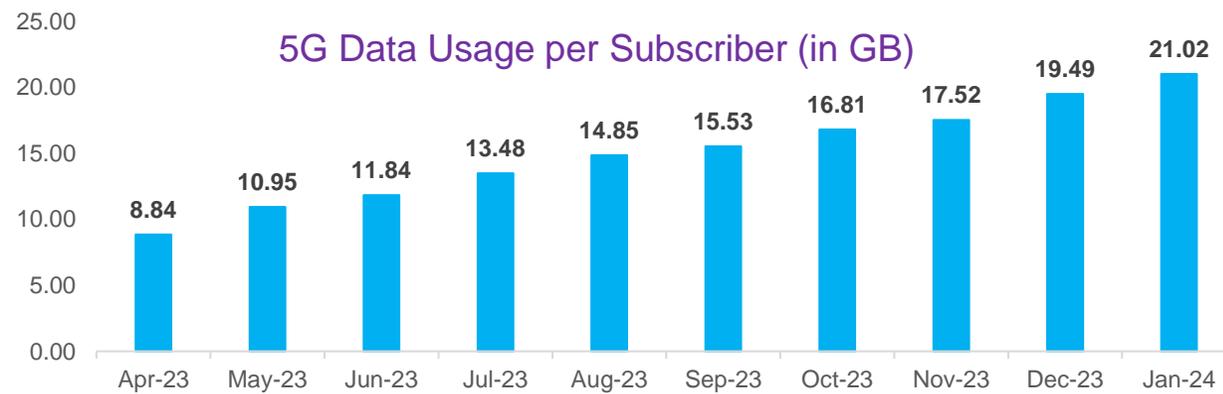
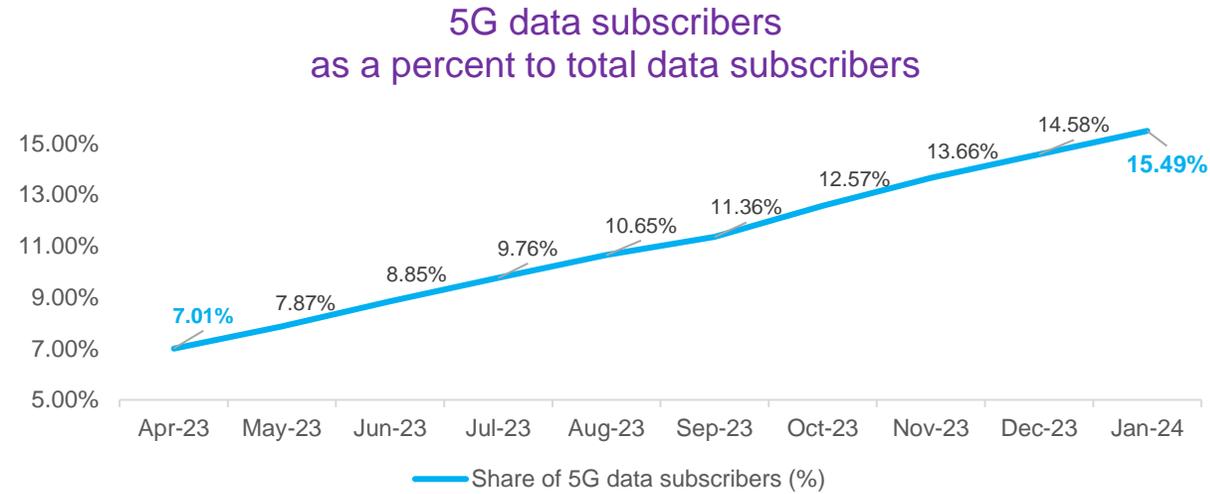
Status of 5G Roll out in India

- ✓ 5G networks - rolled out across all 28 States and 8 Union Territories of India.
- ✓ More than 400 thousand 5G gNode Bs in the country
- ✓ More than 300 gNode Bs of 5G are being deployed per day.
- ✓ One of the fastest 5G deployments across the world

No. of 5G gNode Bs in the country



- About 150 million 5G data subscribers in the country



Thank You

Resources

Telecom Reforms of 2021

<https://pib.gov.in/PressReleasePage.aspx?PRID=1755086>

TRAI's recommendations on Auction of spectrum in frequency bands identified for IMT/ 5G (April, 2022)

https://www.trai.gov.in/sites/default/files/Recommendations_11042022_0.pdf

Guidelines for Captive Non-public Networks (June, 2022)

<https://dms.dot.gov.in/sites/default/files/CNPN%20Guidelines%2027062022.pdf>