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Private 5G (CNPNs)
Shaping Bharat's Private 5G Future

Bharat Private 5G Networks Summit, Mumbai

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What is Private 5G (CNPN)

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- Private 5G – dedicated customized cellular network for a specific organisation using dedicated spectrum (licensed or shared)
- Offers high speed, Ultra-low latency& reliability for critical industrial operations with exclusive access and full control over the network
- Deterministic QoS for mission-critical applications
- Is not connected to Public networks – PSTN or PLMN
- Mainly for M2M Communications
- Enhanced security and data privacy
- Customization for specific enterprise needs

CNPN – Captive Non Public Network

Private 5G is ideal for various industries :

- Manufacturing /Healthcare/Logistics and Transportation
- Mining
- Ports/ Railways and Metros
- R & D centres /Startups to develop innovative 5G enabled IoT Solutions
- Campus or Enterprise Use Cases

Why Private 5G is needed

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- Faster automation in manufacturing process
- Transformation of Enterprises to Industry 4.0
- Enterprises need tight SLA based services which is difficult through public networks
- Enterprises need to improve efficiencies and productivity for enhanced global competitiveness
- Will lead to economic growth
- Enhanced safety in Mining

CNPN means : Industrial Competitiveness for India

Private 5G Networks –Global Snapshot

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Country	Spectrum Mechanism	Private 5G Licenses/Deployments	Industrial Use Case Examples
Germany	BNetzA-issued Sub-6 +mmWave (3.7–3.8 GHz) 100 MHz in 3.7-3.8 GHz and 10 MHz in 26 GHz band (24.25-27.5 GHz) reserved for Enterprises	>3,700 licenses (since 2019)	Automotive clusters, factory floor, fire services
China	Provincial & park-level licensing, 5G slicing (700 MHz, 2.6 GHz and 4.9 GHz reserved nation wide)	>40,000 private networks (7,000+ Factories, 691 Mines)	Smart manufacturing, autonomous logistics, mining
USA (CBRS)	Shared PAL + GAA (3550–3700 MHz) (5GHz and 3.5 GHz band and mmWave band patches 24.25-48.25 GHz)	300+ deployments	Airports, campus grids, energy utilities
Japan	4.8–4.9 GHz designated industrial band	~167 licenses	Logistics parks, warehouse automation
South Korea	4.7 GHz reserved spectrum for industries	~100 (19 enterprise-led)	Smart ports, robotics, urban transit systems
France	3.4-3.8 GHz band 3.8-4.0 GHz for certain industrial sectors		Manufacturing, logistics, health and energy

***Sources**: Frost & Sullivan, 5G.net, ITU Tracker, GSMA (2025)*

India still at single digit or very low deployments

Private 5G Networks-Global Examples

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- USA, China , Korea, Japan, Germany, UK, Australia , and France are some of the leading countries promote deployment of Private 5G Networks
- Private 5G Networks being used by leading economies
  - Italy : Livorno Port (Italy) achieved substantial economic benefits and considerable savings in fuel on implementation of a 5G testbed, due to more efficient turnaround of ships at anchor, reduced berthing time, and more efficient operation of ship to shore cranes, forklift cranes, automated guided vehicles, condition monitoring and drone surveillance.
  - France: Charles de Gaulle, Orly and Le Bourget airports , Arcelor Mittal, Airbus, Schneider electric, smart City project (Istres, near Marseille), have private 5G deployments
  - South Korea: Busan Smart Port runs entirely on private 5G, coordinating autonomous cranes, AGVs, and dock logistics.
  - Europe: Automotive clusters in Stuttgart operate real-time robotic arms via dedicated private spectrum.
  - Singapore and Spain: Tuas Port and Port Valencia respectively

More than 45000 Pvt NWs Globally: Device Ecosystem is Available

Private 5G is important 5G use case having 36 Billion USD potential by 2030 globally

https://www.grandviewresearch.com/industry-analysis/private-5g-network-market

Finding of Expert Studies for India

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Report on 'Non-Public 5G Networks in India: Policy, Regulatory and Sector Perspective', by Prof. Rekha Jain, have noted:

Estimations for Indian Ports based on relevant global conditions indicate:

i. Jawaharlal Nehru Port (JNPT) could derive benefits in RoI ranging from 53% - 138%
ii. Chennai Port could derive benefits in RoI to the tune of 31% - 76%.

Private 5G means Gains in Efficiency and Productivity

India's Private 5G(CNPN) – Policy Guidelines

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- June 2022 - Union Cabinet while approving auction of 5G spectrum, also decided to enable the setting up of Private Captive Networks or CNPNs, based on TRAI recommendations of May 2022

- NIA 2022- four options provided
  - TSPs can create CNPN using their network resources
  - TSPs can create CNPN using IMT spectrum owned by them
  - Enterprise can create CNPN by having spectrum on lease from TSPs
  - Enterprise can own spectrum directly from DoT

- Sept 2024 - TRAI recommended a separate authorization framework for Captive Non-Public Network (CNPN) with a light touch licensing regime

- Feb 2025: TRAI recommended CNPN NW Provider Service Authorization

- Sept 2025: DoT framed Draft Rules for CNPNs under Captive Telecom Service Authorisation

Issues for Discussion

- Why Private Wireless Networks has not taken off
  - Is it lack of awareness amongst enterprises
  - Is the costing high for enterprises – lack of ROI
  - Is it not being pushed adequately by TSPs
  - Lack of SI Ecosystem

- Spectrum
  - In the first three methods, Private 5G is based on the spectrum auctioned to the TSPs
  - Action on methodology of direct allocation of spectrum to Enterprises to be finalised soon
  - Spectrum to be administratively assigned to CNPN/Captive Users
  - Nominal price of spectrum on use it or lose it basis. Government must cover regulatory and administrative cost only.

- Allow private 5G to be deployed through SI-led models

- Being a captive network, Single KYC of Enterprise be allowed i.e. KYC norms not to be like commercial networks

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