



BIF POSITION PAPER
ON
CAPTIVE PRIVATE 5G NETWORKS

BROADBAND INDIA FORUM
Think Tank for Digital Transformation

BIF Position Paper on Captive Private 5G Networks for holistic progress of Digital India

Broadband India Forum, on the basis of its core principle, is a technology neutral and service agnostic entity, with no bias or inclination towards any organisation/service/technology/vertical. Our diverse membership base includes Academia and Research Institutions, Startups and MSMEs, Satellite and Wi-Fi players, Telecom and Internet Service Providers, Infrastructure Partners, Content and Broadcast Service Providers, and Social Media entities, besides leading Technology Organisations and Innovators. As an independent policy forum and credible think-tank, all our position papers, recommendations and submissions are solely focused towards promoting, supporting and enhancing all policy, regulatory and standards initiatives in the country for the proliferation of high-quality broadband, to empower consumers with efficient and economical digital services. Keeping these ethos of the Forum in mind, we submit the following on the vital aspect of Captive Private 5G Networks:

1. **5G goes beyond telecom:** Unlike its earlier generations, the applicability of 5G transcends the domain of traditional telecom and would cater to the benefit of several other non-telecom verticals, which can help derive higher efficiencies and output to drive up the country's economic and technological prowess. 5G is not the preserve of the telecom sector alone, and should be treated with the broader view of the greater benefits to all industries, and the nation.
2. **India needs Private 5G to accelerate Digital Transformation, Atmanirbharta and Industry 4.0:** India needs higher efficiencies in verticals like Manufacturing, Healthcare, Education, Agriculture, Financial Inclusion and many others to accelerate the process of digital transformation, which is a National Priority. This can best be achieved only through use of Private 5G Networks. With our aspiration to become a global manufacturing and supply chain hub, and building resilience and self-sufficiency in manufacturing to achieve 'Atmanirbharta', Private 5G would be crucial for the enterprises to augment efficiencies, enhance productivity and march towards Industry 4.0. Due to the digitalization of all sectors made possible through private 5G networks for enterprises, India can make massive gains in GDP and in the quality of living for the common man.
3. **Private Networks are Non-Public Networks (NPNs):** Private 5G Networks are not about Public Data and Voice networks working inside private/captive campuses as is being alluded to and misunderstood in certain quarters. It is about deployment of high speed, enhanced data capacity and ultra-low latency applications inside a closed manufacturing unit, hospital, airport, shipping port, etc. *Since none of these applications are working in India at present, claims to be able to deliver these features through public networks are unsubstantiated.*
4. **Private 5G Networks are best setup by enterprises themselves as they are the best qualified to do so:** Only the enterprise knows best its requirements of very high SLA and thus design networks to meet these. They would be best equipped to design and set up their own networks. For example, a Maruti or an Apollo would know its system and requirements far better than anyone else, and therefore, would be able to customise and design the network and applications accordingly. Even today, OEMs setup the traditional telecom networks on behalf of the telcos. So they could definitely deploy and operate their own 5G NPNs. The enterprises can also go directly to the vendors for their private networks and not require to

have a middle man involved that reduces efficiency and increases cost. In fact, the enterprises would benefit significantly in terms of cost, quality and speed of implementation. Therefore, the enterprises themselves should have the option to set up their private networks themselves, or choose the best possible Service Provider to do so for them.

5. Public Networks can't deliver the levels of efficiencies and the required SLAs that are expected from Private Networks:

- a. A Public Telecom Network set up by a telecom licensee would necessarily have to be one which optimises the various needs of the masses. It would not be in a position to meet specific enterprise higher and specific SLAs that are characteristic of specific industry verticals. A one-size-fits-all model, as used in public networks, will not fulfill the requirements of private 5G networks.
- b. For example, the needs and requirements a Maruti-Suzuki automotive factory would be quite different from that of an Apollo Hospital or an IIT Delhi campus, and so on. In fact, these may even vary within the same vertical. For example, the specific needs of a Honda factory may be different from that of a Toyota.
- c. This customisation can be achieved only through dedicated captive private 5G networks. Whether it be the precision required for a Robotic Surgery in healthcare, where any lapse in the network quality could impact a life; or the latency requirements to efficiently manage Intelligent Traffic Management or Transport Systems for public usability; the demands for these networks would be significantly and understandably much higher, and need to be delivered accordingly.

6. Revenues of the Government are protected:

- a. Most of the revenues of the Telcos are external and that remains completely untouched and hence they remain protected as does Government revenues. The Non-Public Networks or Private Networks constitute additional revenue streams for the Telcos and the Government. This revenue stream has not yet been tapped.
- b. There would be no revenue loss to the Government on account of direct spectrum allocation for Private 5G Networks to Enterprises, as **they shall purchase the spectrum at a price to be fixed by the Government and allocated administratively.** Enterprises who will be permitted to set up Private Networks would have to acquire a Special CPWN License (Ref: TRAI Recommendations of 11th April 2022) and would be required to pay License Fee. So, under no count does the Government stand to lose revenues, as is being apprehended in some quarters.

7. Additional source of revenue to the Government exchequer:

- a. *Government revenues accrue from the public usage of spectrum. Private Networks are Non-Public Networks. They would provide an additional source of revenue for the Government.*
- b. This spectrum should be given through separate allocation mechanism than that being given for Public Networks which is through auction. ***This is because this is being utilised by only one user in a given local area, unlike the case of public networks.*** Hence it needs to be given directly to the enterprises at a rational and reasonable price through a suitable administrative mechanism.
- c. This is based on best practices by other countries all over the world.

8. **Revenue aspect for Telecom Service Providers (TSPs):**

- a. It is a misconception that Private 5G Networks would lead to revenue losses for the Telcos, as expressed by certain entities. *In actuality, in the present scenario, majority of the enterprise revenues of TSPs would be through external network services which comprise of voice and data communications. Captive usage in the current situation would only contribute a minor share in processes/applications like robotics, automation, etc., due to challenges in delivering the required SLAs through public networks.* Therefore, the speculated loss in revenues for telcos via enterprise services is a misplaced one.
- b. It must be understood that Indoor Private Campus Networks do not truncate legitimate revenue of the TSP but help to enhance productivity and efficiency.
- c. In fact, a more efficient captive network through Private 5G would lead to increased productivity for the enterprise, which would help grow business activities/external communications, thereby driving better revenues for the TSPs. E.g. a 5G NPN in P&G would drive business efficiencies, whereby activities would be enhanced, and more co-ordinations would lead to enhanced traffic to be carried by TSPs through the external network. New enhanced revenue streams could flow to the telcos.
- d. TSPs have also been provided the option of leasing part of their spectrum to Enterprises at an affordable cost. This is in line with global best practices as the option of spectrum leasing has been opened in many leading economies such as Australia, Denmark, Finland, France, Germany, Malaysia, UK, USA, etc.
- e. **Moreover, if such nature of concerns were to be decisive in such major policy decisions, then perhaps the liberalisation of Indian telecom would not have happened at all, in order to safeguard the revenues of the incumbent government operators back in 1999 (viz. BSNL, MTNL and VSNL). Private mobile telephony, with the incumbents today as new entrants at that time, would not have had the chance to enter the market.**
- f. *Keeping in line with India's focus towards a Policy and Regulatory regime which encourages liberalisation, enhanced competition, and facilitates entry of new players and innovation, the progress of Indian Industry should not be compromised to protect the revenue interests of a specific business segment, albeit hypothetically (since there are no revenue losses as explained above).*

9. **Aspect of security requirements for lawful interception and monitoring:** It has been erroneously claimed that Private 5G Networks could be exploited by anti-social elements to bypass interception and monitoring of messages which would be detrimental to national security. *It needs to be understood clearly that Private 5G Networks are not connected to external public networks - there is no connectivity to PSTN or any other PLMN/ISP, and the Spectrum is majorly needed for IoT, Machine-to-Machine (M2M), Robotics, Logistics, etc. Hence it is not permissible for external communications and the need for lawful monitoring, interceptions and the possibility of threats to national security do not arise at all.*

10. **Spectrum Requirement for Private 5G:**

- a. Spectrum Requirement for Private Networks or Non-Public Networks is limited to a local area and has only one potential user in that given area. Hence it should be sold at a rationally and reasonably fixed price in an administrative manner as no public service or revenues are involved here. Moreover, Private Networks or Non-Public Networks are

- a. National Requirement and a pre-requisite for industrialisation, automation, Manufacturing 4.0 and Atmanirbhar Bharat.
- b. It needs to be clearly understood that Private Networks would not be addressing the retail market and they would need the dedicated spectrum within the local campus only and the same spectrum, if required, can be reused elsewhere. Only a limited amount of spectrum (about 100 MHz, depending on the specific spectrum bands) would be required and is to be used/deployed within the geographical boundaries of the premises (with specific lat-longs) and not in the entire LSA/Circle.
- c. To ensure high degree of efficiency, optimal utilisation of resources and higher levels of productivity, captive enterprise networks need dedicated spectrum and not shared spectrum as would be the case if Telcos were asked to build Private Networks. This would not only impose additional burden on the Telcos, but is also likely to negatively impact the QoS of the public 5G services, which is not desirable.

11. Allocation of Spectrum for Private 5G:

- a. TRAI, after significant deliberations, has considered that Captive Wireless Private Networks are not Public Networks, have no market customers, and are limited to a specific location. There is no revenue generated from the public from the use of this spectrum, which is exclusively for internal usage by a single entity.
- b. Since these entities (the enterprises) are not bidding for Circle-wide or State-wide public land-mobile service and require spectrum only for captive internal usage for specialist applications within the narrow and limited confines of a campus or enterprise, it is irrational to envisage an auction for this which would be a meaningless exercise – as there is only one potential user, i.e. the enterprise itself.
- c. Thus, TRAI has most appropriately recommended that the spectrum is to be assigned administratively, in line with global practices. The Authority has also stated that it would recommend pricing keeping in mind transparency, geographical aspects, factoring of market price, etc. for the Private Networks.
- d. A certain amount of exclusive spectrum (non-public 5G) has been recommended by TRAI to be earmarked for private 5G networks. This will provide an improvement over the average SLAs of Public Networks, besides complete lack of interference between them. This will, in turn, accelerate Digital Transformation of Enterprises to Industry 4.0, and boost both 'Atmanirbharta' & 'Make in India'. It will also create a platform for a new wave of start-ups to focus on 5G enabled IoT solutions.

12. Misinterpretation of Hon'ble SC guidelines on Spectrum Allocation:

- a. It is often misrepresented by certain quarters that the Hon'ble Supreme Court of India had mandated auction as the only means for assignment of Spectrum, as per its ruling on the 2G Spectrum case on 2nd February 2012.
- b. In actuality, there was a Presidential Reference No.1 of 2012, wherein the Supreme Court, opined, in its advisory jurisdiction, that "Auction, as a method of disposal of natural resources, cannot be declared to be a Constitutional mandate under Article 14 of the Constitution of India."
- c. The SC further stated that "Auction may be the best way of maximising revenue, but revenue maximisation may not always be the best way to serve public good."

- d. Hence, the perception that Spectrum can be assigned only through auction is grossly inaccurate and misleading.

13. Holistic view for all stakeholders of the ecosystem:

- a. TRAI recommendations on Private 5G Networks address the interests of all the stakeholders - the TSPs, the enterprises, as well as the public, since more private networks would lead to more employment opportunities and business, translating into greater economic gains.
- b. An enabling framework consisting of 2 distinct processes has been recommended by TRAI - establishment of private networks for enterprises by TSPs through their assigned spectrum, and through enterprises directly obtaining spectrum from the Government in an administrative manner. Therefore, Private 5G Networks can be set up and operated by TSPs, Equipment Providers, Infra players or Enterprises – A Win-Win for All!!
- c. It is to be noted that if telcos can provide a viable and competitive offer of leased 5G spectrum, it could be acceptable for the enterprises. *The right to choose the best Service Provider for their customized network requirements should lie with the customer (i.e. the enterprise).* This forms the core principle of a democratic nation like ours.
- d. *It would be unfair and against the global best practices to exclusively reserve the rights of spectrum for private networks for a specific group of incumbents, making the enterprises dependant solely on whatever quality/cost is to be offered to them for their services, besides the timeliness of the networks reaching the enterprises, especially in non-urban areas.*

14. Opportunity for India to make up for lost time in 5G adoption:

- a. In all practicality, it needs to be acknowledged that many leading economies have already implemented and are running operational 5G networks for nearly 2 years now. Our learnings from the past deployments of 3G/4G indicate that it is likely to take a few years for a significant country-wide public 5G network to be operationalised effectually in India, due to the extensive preparation work required for network architecture and optimisation, fiber laying – both to towers and intra-city, streamlining of RoW procedures, street furniture readiness, etc. In the meanwhile, **we cannot afford to stay behind and Private 5G Networks provide India an excellent opportunity to catch up with the world and showcase early adoption of 5G** across several different verticals - be it healthcare, education, manufacturing, or more, and extracting its manifold benefits therein.
- b. India would not need to wait for pan-India rollout of public networks to enjoy the benefits of 5G. In fact, learnings from the use of Private 5G Networks can be used to build competence and significant expertise, and further be leveraged for wider deployment of our nation-wide Public network.
- c. In fact, an aggressive and facilitating approach may be taken by the Government in regard to enabling Private 5G Networks, so that the industry can make up for the lost time, and keep progressing technologically in order to stay aligned with the rest of the world, especially the digitally advanced nations.
- d. *If this critical need is not catered to, the industry, the economy and the nation would lose out in the advancement to Industry 4.0, advanced Health care, improved Agriculture and to more*

efficient Logistics & Transportation services. We will lose out in the ambition to become a global manufacturing hub or a global R&D hub and fail to clinch the geopolitical advantage that lies before us now in these areas.

15. Rural Development and socio-economic progress:

- a. The utility and applicability of 5G would be equal or perhaps even more in non-urban/semi-urban/rural locations because of its need for improving efficiencies in verticals like agriculture, manufacturing, healthcare and other segments, for yielding better outputs in a more cost-efficient manner.
- b. It has been observed globally, as also stated by ITU, that the initial deployment of 5G public networks will increase the digital divide, as the roll-outs by TSPs would be focused on the metros and urban areas, where the revenues would be expected from.
- c. However, in that case, 5G would not reach the needy and poorly served sectors of manufacturing, agriculture, healthcare, etc. in the semi urban and rural/remote areas. The only way these areas can advance would be through the digitalization offered by setting up private 5G networks by concerned enterprises.
- d. Therefore, Private 5G Networks must be set up concurrently, so that they don't miss the bus in wait. For e.g. a state-of-the-art manufacturing facility in a lesser known place like Haldwani or Malda could achieve high efficiencies and productivity through Private 5G. This would also lead to generation of employment opportunities in the regions, translating to better incomes and improved quality of living for the locals.
- e. *The non-urban areas and populace of the country should not be deprived of the opportunity to gain through the benefits of 5G through private networks, as it would block the rightful development of all sectors, the progress of the rural economy, and stifle the national goal of 'Sabka Saath, Sabka Vikas'.*

16. Use Cases Examples: Various models of 5G Private Networks or non-Public Networks (NPN) deployment are possible. An automotive manufacturing plant (Honda/Maruti) or a hospital (AIIMS), an academic/research institution (IITs), ports like JNPT/Chennai Port, manufacturing facilities, or a transportation/logistics enterprise can set up a private network for improving productivity inside a factory, or for healthcare, or for efficiency in a logistics hub, advanced R&D, etc.

- a. Manufacturing: Private 5G Networks can help optimize connectivity to industrial control equipment, enable real time control of robotic equipment as well as AR applications that provide support for critical industrial processes. In healthcare too, 5G private networks would enable a wide variety of applications, including use of technologically advanced medical procedures like robotic surgeries, developing modernised healthcare facilities, efficient digitization systems, etc.
- b. Ports: Although India has a huge coastline, our ports are not the most utilized in global shipping/logistics business. With implementation of 5G NPNs and the resultant increase in efficiencies in the harbour operations, Indian ports could become highly competitive globally, bringing in significantly higher business/revenues and adding to the national economy and growth. Ports can gain through substantial economic gains and fuel savings owing to increased efficiency and productivity, as established by case studies of 5G test beds/innovation labs in ports like Hamburg, Livorno, etc.

- c. Healthcare: 5G private networks would enable a wide variety of applications, including use of technologically advanced medical procedures like robotic surgeries, developing modernised healthcare facilities, efficient digitization systems, etc.
17. **Demonstrated gains in efficiency and output**: Case studies provided in a Report on '[Non Public 5G Networks in India: Policy, Regulatory and Sector Perspective](#)', authored by Prof. Rekha Jain, a noted academician, Visiting Professor at ICRIER and former Chair of the IIM-A TCOE, have noted:
- a. 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.
 - b. Similar estimations for Indian Ports based on relevant 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%.
 - c. Similar examples are provided for Manufacturing facilities in India also.
18. **BIF recommendations**: In view of the aforementioned points, we urge the Government of India to:
- a. **Earmark a certain amount of exclusive spectrum for Non-Public/Private 5G networks in each type of spectrum band, as recommended by TRAI.**
 - b. **Allow direct allocation of Spectrum to Enterprises/Organisations at nominal administrative fee, as per global best practices.**
 - c. **Facilitate a light-touch online portal based paperless regime for acquiring permission/license for 'Captive Wireless Private Network (CWPN)' within 30 days of application, (as recommended by TRAI) to enable ease of doing business (EoDB).**

We trust the Union Cabinet, led by the Hon'ble Prime Minister of India – who has presented a highly progressive vision and an extremely forward-looking approach towards use and advancement of technology to fulfil India's digital ambitions - will decide accordingly, keeping in mind the overall growth and advancement of the nation, the vital aspects of consumer benefits, adoption of technology, and continued reforms, for the benefit of all stakeholders, eventually leading to greater economic as well as socio-economic gains for the country.