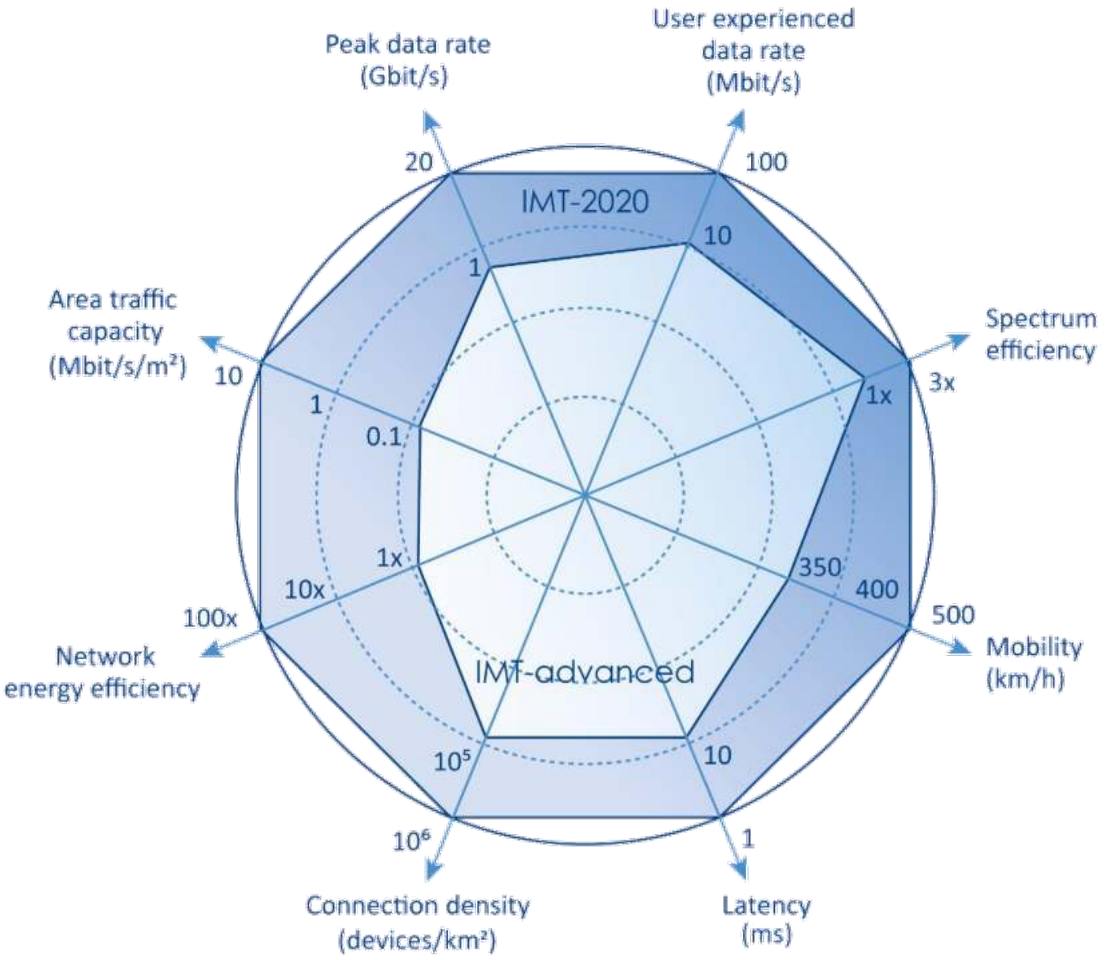
5G Rollout in India: Opportunities, Challenges, and Way forward

- Dr. R.S. Sharma, Former Chairperson TRAI

The fifth generation of wireless technology i.e. 5G represents the changing face of radio access technologies. Over a period of last four decades, radio access technologies have evolved from voice only communication technologies to all forms of communications. 5G is designed to connect virtually everyone and everything together including machines, objects, and devices.

5G wireless technology is meant to deliver higher multi-Gbps peak data speeds, ultra-low latency, more reliability, massive network capacity, increased availability, and a more uniform user experience to more users. According to ITU (International Telecommunication Union), a comparison of key capabilities of IMT-2020 (5th generation) with IMT-Advanced (4th generation) is depicted below:

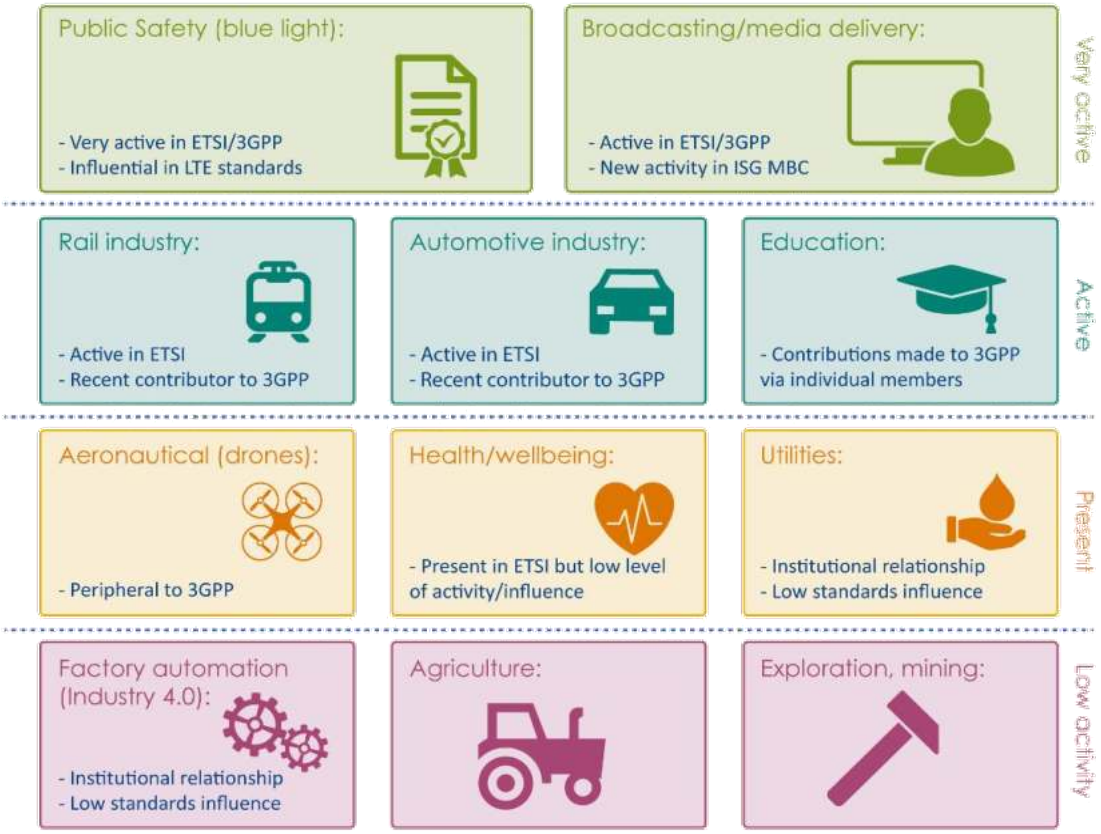


Source: ETSI

As 5G promises so much more than its predecessor standards, questions are often raised as to whether 5G is just an evolution from the 4G/LTE standard or a path-breaking revolution demonstrating a significant break from the past model of serving primarily the mass consumer market. Broadly speaking, 5G is used across three main types of connected services, including enhanced mobile broadband, mission-critical ultra-reliable and low Latency communications, and the massive machine-type communications for the IoT.

- Enhanced Mobile Broadband (eMBB) to deal with hugely increased data rates, high user density and very high traffic capacity for hotspot scenarios as well as seamless coverage and high mobility scenarios with still improved used data rates.
- Massive Machine-type Communications (mMTC) for the IoT, requiring low power consumption and low data rates for very large numbers of connected devices.
- Ultra-reliable and Low Latency Communications (URLLC) to cater for safety-critical and mission critical applications.

5G will impact every industry, making safer transportation, remote healthcare, precision agriculture, digitized logistics — and more — a reality. This impact is much greater than previous network generations. From the evolution of the IoT to revolutionary advances in how AI is used in the real world, many of tomorrow's most exciting technological advances will depend on 5G connectivity. 5G offers network operators the potential to offer new services to new categories of users. In a way, 5G is transforming the telecommunication sector from a vertical to horizontal sector which would drive socio-economic growth across the sectors. Some of the new category of users already identified by ETSI are as follows:



Source: ETSI

Keeping in view the international developments happening on this front and on specific reference from the Government, for enabling the timely rollout of 5G networks and services in the country, TRAI issued its recommendations to the Government for auction of spectrum in various frequency bands including the mid-band spectrum in 3300 – 3600 MHz range in August 2018 itself. However, the Government in its own wisdom decided not to include the mid-band spectrum, which is crucial for rollout of 5G networks and services in the country, in March 2021 round of spectrum auction.

Now, after extensive planning and studies at various levels such as 5G High Level Forum constituted by the Government, Parliamentary Standing Committee on Information Technology etc. and a fresh reference from the Government to TRAI for recommending the reserve prices for various frequency bands of spectrum suitable for 5G, the telecom sector in India is bracing up for the deployment 5G networks and adoption of 5G services. However, before we actually witness a 5G launch in India, the government, telecom regulator, and service providers need to overcome several hurdles.

In all likelihood, if the Government receives the 5G spectrum reserve price recommendations in first half of this year, then the 5G spectrum auction may take place in second half of the calendar year. If this happens successfully, then one can expect the initial

rollout of 5G services by the end of 2022; however, this could only be limited to a small consumer segment of few cities.

The large-scale network infrastructure required for 5G launch across India and is still inadequate. To have ubiquitous 5G network connectivity in India, it is important to enable use of street infrastructure for hoisting small cells, deployment of in-buildings solutions, fiberisation of towers, and smooth implementation of 'Right of Way' policy.

Further, as noted earlier, 5G is capable of providing very high capacity and ultra-reliability with low latency, which enables its use for industrial automation. It is being projected as a catalyst for 4th Industrial Revolution i.e. Industry 4.0. Due to the business necessities and security considerations, it is expected that most of the industry 4.0 implementations using 5G would be captive in nature. A captive 5G network is basically a Wireless Local Area Network (WLAN) that uses 5G technologies to create a dedicated network with unified connectivity, optimised services, and a secure means of communication within a specific geographic area. For implementation of Industry 4.0 use cases, a decision on assignment of spectrum for captive use and notification of a light-touch regulatory framework for captive 5G networks is still awaited. 5G will potentially be used in all the economic verticals; however, initial demand for private networks is likely to arise from the Automotive, Industries, Ports, Mines, Aerospace etc. The requirement of private networks could be catered in multiple ways such as TSPs could provide them services using network slicing, TSPs could be permitted to lease the spectrum to industries to build their own private network, some spectrum could be set aside for private networks etc. Globally, different models are being adopted.

For captive 5G networks, DoT has requested TRAI to provide recommendations on quantum of spectrum/band, if any, to be earmarked for private captive/ isolated 5G networks, competitive/ transparent method of allocation, and pricing, for meeting the spectrum requirements for captive 5G applications of industries for machine/plant automation purposes/M2M in premises. However, the details of any reference to TRAI for regulatory framework for captive 5G networks is not reported till now.

Based on this analysis it could be concluded that while a significant progress is likely on issues relating to assignment of spectrum for 5G networks. However, the Government is required to move fast on other issues like street infrastructure, in-buildings solutions, fiberisation of towers, 'Right of Way', and regulatory framework for captive 5G networks.

In this regard, I understand that a quick decision on TRAI recommendations on 'Enhancement of Scope of Infrastructure Providers Category-I (IP-I) Registration' and 'In-Building Access by Telecom Service Providers' could address issues like street infrastructure, in-buildings solutions, and fiberisation of towers to a large extent. Further, recently, TRAI issued its recommendation on 'Roadmap to Promote Broadband Connectivity and Enhanced Broadband Speed' wherein the issues relating to infrastructure creation and 'Right of Way' have been dealt at length. Vide these recommendations, TRAI has recommended certain

institutional mechanisms to address the RoW issues. The Government need to form a view on accepting of these recommendations so that hurdles in infrastructure creation are addressed timely. A light-touch regulatory framework for captive 5G networks is also required to be formulated in time so that the manufacturing sector – a priority sector for the government – can reap the real benefits of 5G technology through industrial automation.