TRAI releases White Paper on 'Enabling 5G in India'

written by Kulin Dave | February 25, 2019

On 22nd February 2019, The Telecom Regulatory Authority of India (TRAI) has released a White Paper on 'Enabling 5G in India' vide Press Release No. 16/2019. Globally, full scale deployment of 5G networks is expected to start by late 2019 or early 2020 for which pilots have already commenced. The India's 5G High Level Forum envisages 5G to be deployed in India by 2020 along with the rest of the world. In order to create an enabling environment for timely rollout of 5G in India, TRAI has come up with a White Paper. This White Paper highlights the specifications of the 5G technology, discusses the potential use cases and architecture of 5G network, deliberates those areas that will require investment for 5G deployment, covers the spectrum requirements for 5G networks, and tries to identify regulatory challenges that need to be addressed for the deployment of 5G in India.

5G is the latest iteration of cellular technology that will provide seamless coverage, high data rate, low latency, and highly reliable communications. It will increase energy efficiency, spectrum efficiency, network efficiency as well as efficiency of other systems. Besides providing faster & reliable access, it will act as an information duct built to connect billions of Internet of Things (IoT) devices. New capabilities of mobile communication networks enabled by 5G technology will allow higher quality video services with mobility at high speed, business automation delivered through billions of connected devices, delivery of critical services such as tele-surgery and autonomous cars assured by low latency and ultra-reliable networks, and improved productivity assisted by high quality, real time data analytics. Unlike existing mobile communication networks, 5G networks will allow tailoring of requirements for each of these different use cases within the same network.

The commercial deployment of 5G was earlier expected in 2020. However, the completion of the first 5G New Radio (5G NR) standard for a Non-Standalone (NSA) solution in December 2017 and for Stand Alone (SA) standard in June 2018 has set the stage for the global mobile industry to start full-scale development of 5G NR for large-scale trials and commercial deployments as early as in 2019.

A 5G High Level Forum (5G HLF) was set up by the Government in September 2017 to articulate the vision for 5G in India and to recommend policy initiatives & action plans to realize this vision. The 5G HLF has released a report[1] in

August 2018 titled
“Making India 5G ready” suggesting measures in the area of Spectrum Policy, Regulatory Policy, Education and Awareness Promotion Program, Application & Use Case Labs, Development of Application Layer Standards, Major Trials and Technology Demonstration and Participation in International Standards. The Government has launched a program titled ‘Building an End-to-End 5G Test Bed’ to advance innovation and research in 5G. Ericsson has installed the first public access 5G test bed at IIT Delhi in July 2018 for developing applications
in the broadband and low latency areas and has provided access to the industry
and institutions to work on India specific usage scenarios and applications. According to 5G HLF7, 5G is expected to be launched in India by 2020 and is predicted to create a cumulative economic impact of USD 1 trillion in India by
2035. As per Ericsson, 5G enabled digitalization revenue potential in India will be above USD 27 billion by 2026. GSMAi projects that after initially launching in 2020, 5G connections in India will grow to almost 70 million by 2025, equivalent to around 5% of total connections (excluding cellular IoT). The
National Digital Communication Policy-2018 (NDCP-2018), released on 26th September 2018, envisions supporting India’s transition to a digitally empowered economy and society by fulfilling the information and communications
needs of citizens and enterprises by establishment of a ubiquitous, resilient and affordable Digital Communications Infrastructure and Services. With respect
to the rollout of 5G services, NDCP-2018 envisages the following-
“2.2 …(d) Enabling
Hi-speed internet, Internet of Things and M2M by rollout of 5G technologies:
i. Implementing an
action plan for rollout of 5G applications and services
ii. Enhancing the
backhaul capacity to support the development of next generation networks like 5G
iii. Ensuring
availability of spectrum for 5G in 6 GHz bands
iv. Reviewing industry
practices with respect to traffic prioritization to provide 5Genabled applications and services
v. Developing framework
for accelerated deployment of M2M services while safeguarding security and interception for M2M devices
vi. Defining policy for
EMF radiation for M2M devices, with accompanying institutional framework to coordinate government-funded and India specific research in this regard”
5G
is a system designed to meet the requirements of IMT-2020 set by the International Telecommunication Union (ITU-R) specification M.2083. IMT-2020 (5G) is intended to provide far more enhanced capabilities than those provided

by IMT Advanced (4G). It is expected to make available much greater throughput,
much lower latency, ultra-high reliability, much higher connectivity density, and higher mobility range. The 5G networks are envisioned to provide a flexible, scalable, agile, and programmable network platform over which different services with varying requirements can be provisioned and managed within strict performance bounds. The key performance requirements related to the minimum technical performance of IMT-2020 (5G) as defined by ITU10 in Report ITU-R. 5G use cases can be categorized into three different use case classes namely- enhanced Mobile Broadband (eMBB), massive Machine-Type Communication
(mMTC), and Ultra-Reliable Low-Latency Communications (UR-LLC). The requirements for the use case classes and the use cases within each class vary
significantly.

1. eMBB: It addresses the human-centric data driven
use cases for access to multi-media content, services and data. This usage scenario comes with new application areas such as virtual reality, video monitoring, mobile cloud computing, 360o Ultra-High-Definition (UHD) video streaming, real-time gaming, etc and new requirements such as hotspot, wide area coverage, etc. in addition to existing Mobile Broadband applications.
2. UR-LLC: This use case has stringent requirements for
capabilities such as throughput, latency and availability. It will support the delivery of critical communications. Some examples include wireless control of industrial manufacturing or production processes, remote medical surgery, distribution automation in a smart grid, transportation safety, autonomous cars etc.
3. mMTC: This use case is characterized by a very
large number of connected devices typically transmitting a relatively low volume of non-delay-sensitive data. Devices are required to be low cost and have a very long battery life. This use case covers IoT applications. Some examples include health monitoring wearables, smart cities with smart grids, smart transport systems and smart homes, etc.
4. Healthcare:Remote patient monitoring and communication
with sign measuring devices such as blood pressure, ECG, temperature etc, which is possible with immediate, automatic or semi-automatic responses. Remote surgery applications that can provide control and feedback communication technique for surgeons from ambulance, remote areas etc, which requires low latency and highly reliable networks.
5. Smart cities: Consistent user experience, hotspot broadband
access in highly dense areas, urban city centres etc. Access to broadband in public transport system such as high-speed trains by providing communication link and high-quality internet for entertainment or work. Can control real and virtual objects like autonomous cars, which requires real time reaction. Support safety applications to mitigate road accidents, traffic efficiency etc, which requires ultra-low latency for warning signals and high data rates.
6. Industrial IoT: Integrate and enable automation process which
will be useful for many industries like oil and gas, chemicals and water. Communication transfers will enable time critical factory automation

across wide range of factories such as metals, pharmaceuticals etc.

7. Emergency, disaster
and public safety: Highly efficient
communication during natural disasters such as earthquakes, floods etc. Provides real time accurate location and communication for better safety.

The Government, among the initiatives through the National Digital Communication Policy (NDCP) 2018, seeks to spur the socioeconomic development up to the bottom of the pyramid by ensuring voice, video and data connectivity for all. It seeks to provide reliable and secured connectivity with assured quality of service, facilitate development of infrastructure and services for new technologies including 5G and IoT, encourage innovation and manufacturing, and develop a large pool of digitally skilled man-power, by aligning regulatory and licensing frameworks impacting the telecom sector. The Government has inter-alia envisioned that the major themes of the policy will be regulatory and licensing framework impacting the telecom sector, connectivity-for-all, quality of services, ease of doing business, and absorption of new technologies including 5G and IoT.

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[1] http://dot.gov.in/whatsnew/national-digital-communications-policy-2018

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