

# 6G Technology

October 13, 2021

**In news-** Recently, the Telecom Secretary and Chairman – Digital Communications Commission, Department of Telecommunications asked C-DOT to start work on 6G technologies.

## About 6G technology

- 6G (sixth-generation wireless) is the successor to 5G cellular technology.
- 6G networks will be able to **use higher frequencies than 5G networks** and provide substantially higher capacity and **much lower latency**.
- One of the goals of 6G internet will be to **support one microsecond-latency communication**.
- The 6G technology market is expected to facilitate large **improvements in imaging, presence technology and location awareness**.
- 6G is expected to support data rates of 1 terabyte per second.
- Working in conjunction with artificial intelligence (AI), the computational infrastructure of 6G will autonomously determine the best location for computing to occur; this includes decisions about data storage, processing and sharing.
- It is expected to be commercially launched between 2028-2030.

## Test satellites

- On November 6, 2020, China successfully launched an experimental test satellite with candidates for 6G technology into orbit, using a Long March 6 launch vehicle rocket.
- The satellite is intended to “verify the terahertz (THz) communication technology in space

## 6G vs 5G vs 4G

- Both 5G and 6G take advantage of higher frequencies on the wireless spectrum to transmit more data, faster.
- However, 5G occupies broadband frequencies at sub-6 gigahertz (GHz) and above 24.25 GHz – called low band and high band frequencies respectively.
- 6G will operate at 95 GHz to 3 terahertz (THz).
- As per theoretical calculations, peak data download speed of 5G is pegged at 20 gigabit per second (Gbps).
- 5G technology is expected to deliver ten times better download speed than that of 4G and up to three times greater spectrum efficiency.

Comparison	4G	5G	6G	7G
Introduction year	2010	2019	2020	2025
Technology	CDMA	4G LTE	5G NR	6G NR
Access options	TDMA, CDMA	CDMA	CDMA	CDMA, TDMA
Switching type	Circuit switching for voice and packet switching for data	Packet switching, circuit for all applications	Packet switching	Packet switching
Network capacity	Millions of users	Billions of users	Trillions of users	Quadrillions of users
Bandwidth	20 MHz	100 MHz	100 MHz	100 MHz to 100 GHz
Advantage	Multi-media services (SMS, MMS, internet browsing and other services)	High capacity, international roaming	Speed, high speed, low latency, global roaming	Extremely high speeds, low latency
Applications	Video calls, short messages	Video conferencing, mobile TV, IoT	High speed applications, mobile TV, wearable devices	High resolution video streaming, remote control of vehicles, robotics, and medical applications

## Inauguration of Quantum Communication Lab

- The Telecom Secretary also inaugurated the Quantum Communication Lab at C-DOT, Delhi and unveiled the indigenously developed Quantum Key Distribution (QKD) solution by C-DOT which can support a distance of more than 100 kilometers on standard optical fiber.
- Development of indigenous QKD solutions is essential to address the threat that rapid advancement in Quantum Computing poses to the security of the data being transported by various critical sectors through the current communication networks.
- With the development of QKD solution and the existing suite of wide range of products in Optical Access, Core, Switching & Routing, Wireless, Post Quantum Cryptography Encryptors (PQCE) etc, **C-DOT has become the first organization in India to offer complete portfolio of indigenous Quantum Secure telecom products & solutions** to comprehensively address the requirements of Telecom

Service Providers as well as Strategic and Defense sector in India.

### **Centre for Development of Telematics (C-DOT)**

- C-DOT is a premier telecom research & development organization under Department of Telecommunications, Government of India, is leading the effort in the Quantum Communications vertical of NM-QTA.
- It is a registered 'public funded research institution' with the Department of Scientific and Industrial Research (DSIR), Ministry of Science & Technology
- It was established in August 1984 as an autonomous Telecom R&D centre of DoT, Govt. of India.
- It is a registered society under the Societies Registration Act, 1860.