5G Spectrum Auction

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What's in News?

India's biggest ever spectrum auction (5G Spectrum Auction) ended , with bids upwards of Rs 1.5 lakh crore.

Evolution of wireless Technology 1G to 5G:

1G –

Launched in the late 1970s in Japan, 1G was the first generation of mobile telecommunication technology that offered voice calls only.

But it came **with low sound quality, low coverage, and without any roaming support**.

2G –

In 1991, 2G was introduced.

The analog signals of 1G became completely digital in the second generation.

Apart from introducing the CDMA and the GSM concepts, it allowed **users to roam and offered small data services like SMS and MMS at a maximum speed of around 50 kbps**.

While the focus was still on voice calling, data support was introduced.

(CDMA stands for "Code Division Multiple Access." – Handset Specific

GSM stands for "Global System for Mobiles."- SIM specific)

3G –

3G services were introduced in 2001.

It promised **four times faster data transmission with access to mobile Internet**.

This is the generation that brought **emails, navigational maps, video calling, web browsing and music to mobile phones.**

4G –

High speed, high quality, high capacity voice and data services – that's the promise that 4G, the network most of us use today, brought with it around 2010.

Standard 4G came with **five to seven times faster speeds than 3G**.

Compared to 3G, a phone on a 4G network got quicker response to its requests (lower latency).

Latency is the amount of time data takes to travel between its source and destination.

This is what made our phones more like hand-held computing devices.

5G –

5G promises latency (the delay users face as data make a round trip) of **just one millisecond compared to 50 milliseconds of a 4G network.**

The devices will have low power requirement **that will boost the battery life of devices multiple times**.

With increase in cellular bandwidth, blazing speed and low latency, it promises to **boost the 'Internet of Things'** by making it easy for several devices to connect to each other to communicate and to be controlled remotely.

Advantages and Uses of 5G in India:

With 5G technology, consumers will be able to download data heavy content such as 8K movies and games with better graphics in just a few seconds.

But once 5G becomes commercial, users will be required to change their current devices in favour of 5G-enabled ones.

5G is expected to form the backbone of emerging technologies such as the Internet of Things (IoT) and machine to machine communications, thereby supporting a much larger range of applications and services, including driverless vehicles, tele-surgery and real time data analytics.

One of the primary applications of 5G will be implementation of sensor-embedded network that will allow real time relay of information across fields such as manufacturing, consumer durables and agriculture.

With the enhanced mobile broadband feature of 5G, the full potential of digital education can be unleashed, thereby 5G will also provide a major impetus to digital universities

Economic Impact of 5G:

5G is expected to create a cumulative economic impact of $1 trillion in India by 2035.

5G-enabled digitalisation revenue potential in India will be above $27 billion by 2026.

It is expected that India will have about 70 million 5G connections by 2025.

Challenges in adopting 5G:

Last-mile Connectivity:

Catering to last-mile broadband connectivity in Tier-II, Tier-III cities and rural homes are challenging since India lacks optical fiber infrastructure and Greenfield deployment which has immensely affected last-mile connectivity.

Under BharatNet Project of the Union government, the plan is to connect all 2.5 lakh gram panchayats across the country to broadband internet.

However, as of February 2022, only about 1.72 lakh of the initially targeted 2.5 lakh gram panchayats had been connected to the central grid under the project.

Affordable Devices:

On the consumer front, even if 5G network connectivity comes in, affordable 5G devices are yet to take their place in the market.

And also, mitigating existing 4G and 3G users to 5G networks and devices will pose a great challenge in front of industry veterans.

The biggest roadblock in the India 5G electronics manufacturing industry is that it lacks the world-class ‘semiconductor fabricating unit’ (FAB) which is the notable denominator for device affordability.

Lack of Regulatory bodies in India’s Telecom sector:

From the past two decades, the telecom sector has missed a good chance in formulating a uniform broadband strategy for the advancement of broadband and 5G adaptability in India.

Network operators, solution providers, and policymakers find it hard to find the common ground which is greatly affected by the procedural delays and their multiple regulatory issues.

Companies who faced loss in 2G spectrum scam have clearly left a lesson for other telecom companies to pull out their investment in India for any future projects.

5G implementation in India will not be a reality until there is a dedicated regulatory body which will develop the roadmap for 5G in India.

Network Security and privacy:

Even in the early 80’s era, 1G networks saw wireless channels for illegal cloning and masquerading.

As networks and applications evolve further, Threats such as semantic information (information which is in some sense meaningful to the user’s system) attacks often target the location data of users.

On the other hand, data collection is another major concern for 5G users as practically all mobile applications demand user’s personal information during or before installation.

Key Highlights of the News:

India's first-ever auction for 5G spectrum concluded, with spectrum worth ?1,50,173 crore being sold.

Reliance Jio emerged as the top bidder

India is expected to rollout of 5G – which government says can provide data speeds about 10 times faster than 4G – by October 2022.

Spectrum Auction:

Devices such as cellphones and wireline telephones require signals to connect from one end to another.

These signals are carried on airwaves, which must be sent at designated frequencies to avoid any kind of interference.

The Union government owns all the publicly available assets within the geographical boundaries of the country, which also include airwaves.

With the expansion in the number of cellphone, wireline telephone and internet users, the need to provide more space for the signals arises from time to time.

To sell these assets to companies willing to set up the required infrastructure to transport these waves from one end to another, the central government through the Department of Telecommunication auctions these airwaves from time to time.

These airwaves are called spectrum, which is subdivided into bands which have varying frequencies.

All these airwaves are sold for a certain period of time, after which their validity lapses, which is generally set at 20 years.

Other facts related to 5G:

South Korea launched the world's first nationwide 5G mobile networks in 2019

In 2020, India, Japan finalise text of cybersecurity pact agreement that will promote cooperation in key areas such as 5G and AI