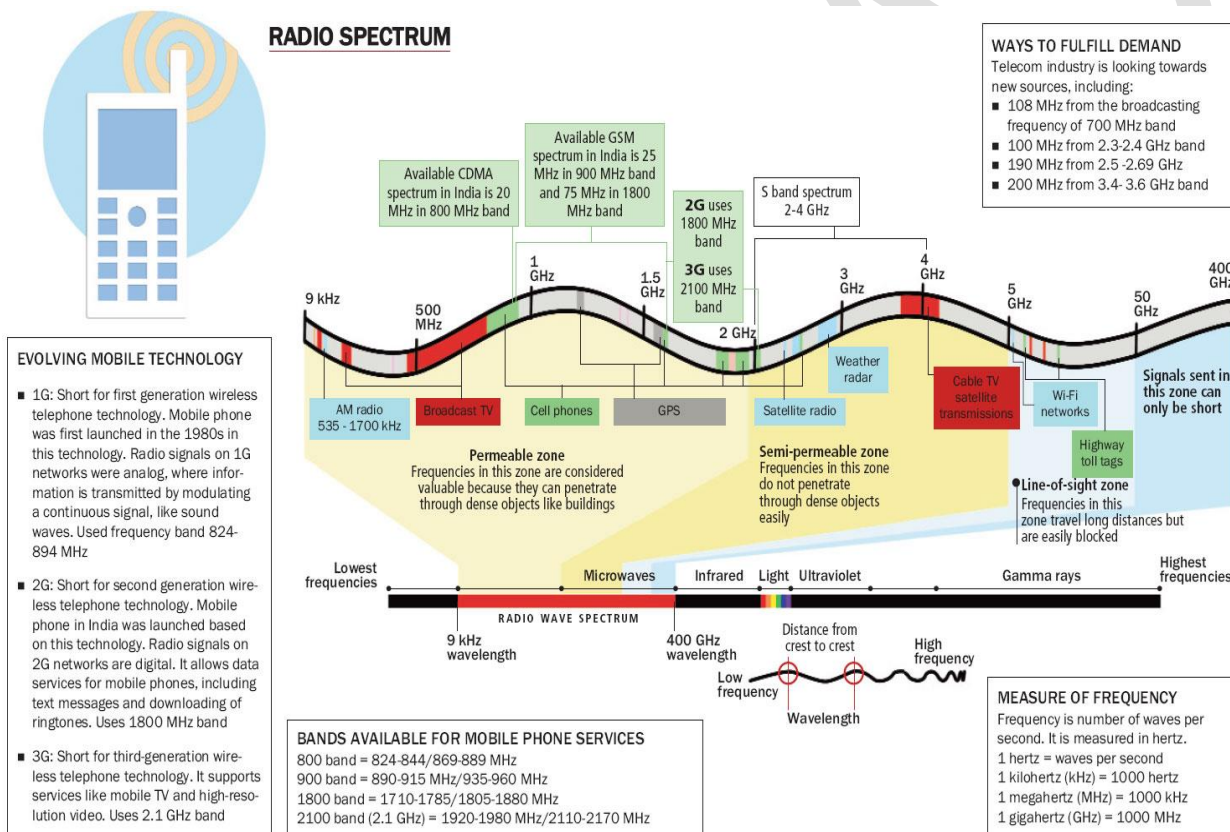


# SATELLITE SPECTRUM

### Context:

UNION COMMUNICATIONS Minister Jyotiraditya Scindia clarified last week that spectrum for satellite communication (satcom) would be allocated “administratively”, rather than through an auction of airwaves, which was proposed by Reliance Jio earlier this month.



### About Satellite spectrum:

- Satellite spectrum refers to the range of radio frequencies used by satellites to communicate with ground stations, other satellites, and various devices on Earth.
- These frequencies are part of the electromagnetic spectrum, specifically the radio waves, and are allocated for different satellite services, such as communication,

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broadcasting, navigation, and Earth observation

## Spectrum allocation in India

- Spectrum for sitcom is part of the **first schedule of The Telecommunications Act, 2023** (“Assignment of spectrum through administrative process”).
- **Under Section 4(4)** of the Act, telecom spectrum shall be assigned through auction “except for entries listed in the First Schedule for which assignment shall be done by administrative process”.
- **“Administrative process”** under the Act “means assignment of spectrum without holding an auction”, and “‘auction’ means a bid process for assignment of spectrum”.
- The Department of Telecommunication (DoT) had asked the Telecom Regulatory Authority of India (Trai) to come up with a methodology to assign the spectrum.

### Spectrum Regulation:

- Due to this international character, satellite spectrum is coordinated and managed **by the International Telecommunication Union (ITU)**, a **specialized agency of the United Nations (UN)**.
- Unlike terrestrial spectrum, which is used for mobile communication, satellite spectrum has no national territorial limits

## Satellite Frequency Bands

- **L-band** (1-2 GHz): Used for GPS and mobile satellite services.
- **S-band** (2-4 GHz): Used for weather radar, air traffic control, and mobile satellite services.
- **C-band** (4-8 GHz): Commonly used for satellite TV broadcasting and data communications.
- **X-band** (8-12 GHz): Used primarily by the military for radar and communication.
- **Ku-band** (12-18 GHz) and **Ka-band** (26-40 GHz): Used for satellite television, internet, and high-throughput data transmission

## Satcom & its benefits

- Satcom services use an array of satellites in orbit to provide connectivity on the ground.
- They do not require wires to transmit data, and are an alternative to ground based communication, called **terrestrial networks**, such as cable, fibre, or digital subscriber line (DSL).
- For end-users such as homes and businesses, satellite-based communication and broadband services **offer two key benefits: *Wider coverage, and a more resilient network.***

- Even though the latency of sitcom services can at times be higher than terrestrial broadband networks, they can cover vast areas without needing to install much physical equipment.
- The use of satellites allows communication networks to reach remote locations that mobile telephony cannot access.
- It is generally understood that when satcom services become more mainstream, low lying and rural areas, and areas prone to natural disasters, will benefit from constant connectivity.
- Satellite-based Internet is also believed to be more resilient than terrestrial-based services, since they have comparatively fewer components on the ground.
- The equipment for satellite communication is, therefore, less likely to sustain damage due to extreme weather events.

## Size of setcom sector

- Consulting firm KPMG in India has estimated in a recent report that the country's sitcom sector, which currently stands at \$2.3 billion a year, will reach \$20 billion by 2028.
- **India is ranked fourth** in terms of investments in the sector globally.
- 4 million households in India are untapped with broadband, which present a strong market opportunity for satellite operators.

## Auction vs allocation

### The key difference between spectrum for terrestrial networks and satellite communication:

- For terrestrial mobile services, spectrum is exclusive, and is managed only by a single mobile operator in a given geographical area; therefore, this cannot be shared between or amongst operators.
- In the case of satellites, the same spectrum is non-exclusive in nature—and can be used by multiple satellite operators to serve the same geographical area.
- The general trend, therefore, is to allocate satellite spectrum administratively.

## Auction experiment

- A few countries such as **the United States, Brazil, and Saudi Arabia**, have held auctions for frequency spectrum in the past.
- The US and Brazil conducted an auction of satellite spectrum along with orbital slots.
- Both countries have since reverted to administrative assignment after finding the auction process infeasible.
- **The US last** conducted an auction for satellite spectrum in 2004 for three domestic orbital slots for broadcasting services.

- The annual regulatory fee for **VSAT and equivalent C-Band** antennas operating in the **12 GHz and 14GHz frequencies** is **\$595 per licence or authorisation**.
- Brazil amended its regulatory framework in 2020 to replace satellite auctions with administrative licensing.
- Though satellite landing rights are assigned through bidding in the country, the spectrum to be used for satellite services is not auctioned separately.
- **Saudi Arabia** recently conducted a spectrum auction in the S-band, which ranges from **2GHz to 4GHz** and is used for mobile satellite services (MSS) as well as weather and air traffic control applications.
- The technical characteristics of the **S-band** are such that it is assigned on an exclusive basis for MSS; auction can, therefore, be conducted in a manner similar to the spectrum auction for terrestrial mobile services

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