

TV RAMACHANDRAN

## UNSHACKLING SATCOM: THE POLICY RESET INDIA NEEDS FOR VIKSIT BHARAT

India's connectivity gap demands a regulatory shift that can enable satellite networks to reach regions where terrestrial infrastructure cannot viably operate.



India's digital revolution has transformed the lives of hundreds of millions, reshaping how people communicate, learn, work, trade, and access public services. Over the past two decades, mobile networks and broadband have driven extraordinary gains across governance, fintech, health, education, and commerce. Yet, despite this remarkable progress, a significant proportion of India remains outside the digital mainstream. Nearly 55% of the population still does not have internet access, let alone broadband connectivity.

Border villages, tribal belts, high-altitude areas, forest regions, deserts, river islands, and disaster-prone

zones continue to suffer from unreliable or non-existent broadband coverage. These landscapes are unforgiving, population densities are low, and the cost of laying fibre or building towers is often prohibitive. As a result, the country's digital divide has remained stubbornly high, ranging from 65% to 67% between 2020 and 2025, according to TRAI's Quarterly Performance Indicator Reports.

As India advances toward universal digital access, bridging this divide is not merely desirable; it is essential. Satellite communication, by virtue of its architecture and coverage capability, is uniquely positioned to play a central role in this next phase of digital expansion.

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Satellite connectivity is not a luxury but the final leg of India's digital journey, and empowering it through fair policy is essential to realising Viksit Bharat.



India risks slowing its march toward Viksit Bharat unless policy recognises satellite connectivity as a distinct and indispensable infrastructure layer.

The question is no longer whether satellite-based connectivity is required, but whether regulatory and policy frameworks will allow it to perform the role for which it is technologically suited and so urgently needed.

### UNDERSTANDING THE CORE DISTINCTION

To understand why satellite communication, though indispensable, should not be treated like terrestrial networks, it is important to recognise how satellite systems function. At the heart of the policy debate lies a simple yet often overlooked reality: satellite and terrestrial networks are designed for fundamentally different operational contexts.

Terrestrial networks depend on extensive ground infrastructure such as towers, fibre backhaul, and power systems to deliver services. This infrastructure is viable in regions with high subscriber density and stronger economic activity, thereby ensuring a return on investment. In areas where populations are sparse or terrain presents logistical barriers, the economics shift sharply, driving up costs and reducing feasibility.

Satellite networks function differently. Broadly, two types of satellite systems exist: Geostationary Orbits (GSO) and Non-Geostationary Orbits (NGSO). These networks project coverage across vast, geographically challenging terrains where terrestrial infrastructure would be techno-economically unviable. Satellite communication is not intended to replace terrestrial networks; it is meant to complement them by serving regions where terrestrial systems are unlikely to reach sustainably.

### WHY EQUAL TREATMENT CANNOT WORK

Beyond the structural differences, there is a vast gulf in size and economics between the satellite and terrestrial telecom markets. The annual revenue of India's satellite communication sector is estimated at around Rs 540-600 crore. In contrast, the terrestrial telecom sector generates approximately Rs 3,36,000 crore, reflecting a scale difference of nearly 600 times.

The disparity extends to consumer equipment. A satellite user terminal typically costs around Rs 1,00,000, whereas an average 4G or 5G handset costs roughly



### IN BRIEF

- Satellite networks serve regions where fibre and towers fail, making them essential for closing India's long-standing digital accessibility gaps.
- Treating satellite and terrestrial networks as equals ignores vast differences in cost, scale, terrain suitability, and end-user economics.
- Terrestrial-style spectrum pricing imposes an excessive burden on satellite users, particularly in low-income and remote communities.
- Raising SUC for satcom widens cost asymmetry, threatening affordability and slowing expansion into regions with no viable terrestrial coverage.
- Satcom contributes under 0.5% of national broadband capacity, proving it complements, rather than competes with, India's terrestrial networks.
- Long-term licensing and DBN-backed affordability support are vital if India expects satellite operators to invest and scale for Viksit Bharat.

Misaligned levies on satellite networks suppress adoption in areas where connectivity is most critical, limiting opportunities for digital participation.

Rs 5,000. Worldwide, only about three million satellite terminals are manufactured annually, while India alone sells nearly 150 million mobile handsets each year.

It is important to appreciate that, unlike terrestrial telecom, satellite communication is a specialised, high-impact technology ecosystem designed primarily to serve remote communities where terrestrial networks cannot viably operate. Yet some regulatory proposals have sought to impose identical licensing, spectrum pricing, and levies on both sectors under the guise of “parity”—a principle that applies only when two systems are equivalent. Satellite and terrestrial networks are not equivalent by any measure.

### **THE BURDEN OF MISALIGNED SPECTRUM POLICY**

Despite these distinctions, policy discussions have increasingly raised the idea of imposing similar licensing and spectrum pricing requirements on satellite operators. One of the dominant themes in these debates, primarily driven by terrestrial incumbents, is the call for a “level playing field.” The argument suggests that different service providers should operate under similar economic requirements. However, parity presumes equivalence. Satellite and terrestrial systems differ fundamentally in architecture, market function, cost models, and end-user profiles.

Satellite networks operate under globally coordinated spectrum frameworks set by the International Telecommunication Union. These frameworks ensure coexistence among multiple satellite systems through internationally defined orbital and frequency coordination rules. Terrestrial networks, by contrast, use exclusively licensed, geographically allocated national spectrum. The nature of spectrum governance between the two systems differs completely. Imposing terrestrial-style spectrum pricing structures onto satellite networks disregards this foundational distinction.

The consequences of such policy misalignment are severe. Even at the lowest international entry tariff of around USD 10 per month, the effective annual spectrum burden on a satellite broadband user amounts to roughly Rs 900 per subscriber. Meanwhile, the average spectrum

cost per terrestrial user in India is approximately Rs 271 per year. Satellite users, typically located in low-income and remote regions, already bear more than triple the spectrum burden of urban terrestrial subscribers. Increasing this burden would restrict adoption, slow deployment, and undermine the national goal of extending connectivity to underserved regions.

The spectrum parity debate is therefore rooted in misconceptions and misrepresentations. It deserves the same categorical rejection as the arguments that ignore structural distinctions and economic disparities.

### **A FAIR POLICY REQUIRES DIFFERENTIATION**

A recent proposal from the Department of Telecommunications suggests setting the spectrum-usage charge (SUC) for satellite operators at 5% of adjusted gross revenue. This exceeds even TRAI’s earlier proposal of 4% of AGR plus Rs 500 per subscriber, which itself was 1.8 to 3 times higher than the per-user spectrum cost borne by satellite subscribers relative to terrestrial subscribers. An increase from 4% to 5% further widens this gap, placing satellite operators at an even greater disadvantage.

This escalation pushes satellite operators into a cost structure fundamentally misaligned with the markets they serve. Unlike terrestrial operators who distribute spectrum burdens across hundreds of millions of users, satellite operators serve much smaller, geographically dispersed bases. Even marginal increases in SUC translate into disproportionately high end-user costs, threatening the affordability of broadband services in regions already struggling with limited access.

Satellite communication is a nascent sector intended to connect rural and remote areas, thereby helping bridge the digital divide. It must be encouraged, not penalised, and certainly not subjected to levies significantly higher than those imposed on terrestrial operators. What India requires is not subsidy but smart, differentiated policy. A more appropriate SUC for satcom would be around 1%, aligning it more closely with the per-user burden borne by terrestrial subscribers. There is even a strong argument for setting it below terrestrial levels, because connecting the unconnected should be incentivised

A differentiated satcom framework can unlock coverage for citizens who remain digitally invisible despite decades of terrestrial telecom expansion.

rather than discouraged. This is not a concession; it is recognition of reality.

Regulatory frameworks must reflect the role of satellite communication in bridging connectivity gaps, rather than treating it as an extension of terrestrial telecom infrastructure.

### UNIVERSAL SERVICE FUNDS MUST SERVE PURPOSE

The Digital Bharat Nidhi (formerly USOF) exists precisely to support connectivity in commercially unviable regions. This is precisely where satellite connectivity can operate successfully to connect the unconnected. Supporting satellite terminal affordability through DBN through supply-side subsidy is not to distort competition or the market, but to correct for structural, geographic, and demographic inequities. It aligns with the principle of equitable service provision for all.

### DEBUNKING THE COMPETITION NARRATIVE

A recurring argument from incumbents is that satellite networks could compete with, or displace, terrestrial networks if given favourable regulatory treatment. However, the current capacity landscape makes this claim unsustainable. Satellite broadband capacity available in India today is estimated at around 2.1 terabits per second. In comparison, terrestrial networks provide approximately 450 terabits per second. Satellite capacity accounts for less than 0.5% of national broadband capacity.

Rather than competing with terrestrial infrastructure, satellite connectivity fills coverage gaps that terrestrial systems cannot realistically address. Acknowledging this complementary role is critical because the regulatory environment must allow satellites to do what they are uniquely positioned to do. Contributing less than 0.5% of India's total broadband capacity, satellite communication fills gaps; it does not displace terrestrial networks.

### LICENSING STABILITY BUILDS CONFIDENCE

Investment in satellite infrastructure is capital-intensive and long-term. The current licensing and authorisation framework for satellite communication provides licences of five years, extendable by two. Terrestrial operators,

by contrast, receive licences valid for up to twenty years, with the possibility of a ten-year extension. The shorter cycles for satellite operators introduce greater operational uncertainty and reflect unfair treatment of a nascent sector that has the potential to bridge India's digital divide and contribute significantly to the vision of a Viksit Bharat by 2047.

Satellite systems require long-term capital commitments, yet the current seven-year maximum licence period limits operators' ability to amortise costs over time. This makes service affordability difficult, particularly when the sector's core mission is to serve economically unviable markets that terrestrial operators have not reached, despite receiving subsidies for several years. Greater licensing certainty is essential if India wishes to attract global satellite players, investment, and innovation.

As India enters the next phase of its digital journey, the crucial question is whether policy will enable technologies to close digital gaps or constrain them under misplaced notions of parity. If universal access is the goal, regulation must be guided by functional purpose rather than legacy structures.

### THE ROAD AHEAD FOR INCLUSIVE CONNECTIVITY

India's aspiration to achieve a digitally inclusive society will remain unrealised unless technologies capable of reaching the last citizen are empowered. Satellite communication is indispensable to this mission. A differentiated, forward-looking regulatory architecture—aligned with the realities of satcom economics and geography—is essential.

By enabling satellite networks to proliferate rather than constraining or burdening them, India can ensure that no village, community, or citizen is left behind in the march toward Digital India and Viksit Bharat 2047. 🌐

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