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Attention: Shri Syed Tausif Abbas
Advisor (Networks, Spectrum and Licensing)
Telecommunications Regulatory Authority of India
New Delhi
Email: advmn@trai.gov.in

Counter-comments: consultation paper on Auction of Spectrum in frequency bands identified for IMT/5G (No. 8/2021)

Respected Sir,

Viasat appreciates the opportunity to provide counter-comments on the *Consultation Paper on Auction of Spectrum in frequency bands identified for IMT/5G*. Our comments address questions related to the proposed identification of the band **27.5-28.5 GHz** as part of the auction plans.

Sincerely,

Cristian Gomez
Senior Director
Government & Regulatory APAC

Viasat's counter-comments

Viasat commends TRAI for seeking inputs from industry on this process. Viasat believes industry input is key in supporting the vision and objectives of the Government of India for digital transformation. Viasat looks forward to further strengthening our close collaboration in India in support of deploying affordable broadband connectivity across India, where connecting everyone and everything – everywhere - in a cost-effective way is so essential.

Mobile industry divides in India guarantee a bigger digital divide for India

A recent survey by Learning Spiral of India revealed that more than 50% of Indian students in **both urban and rural areas** of India do not have access to the internet[1]. Covid-19 has affected these students even more. Lack of internet access is undermining the education and growth of students in India and calls for reflection. This is only one example of the many unconnected lives being affected, along with those of entrepreneurs, businesses, and people that hope to improve their quality of life all throughout India.

One unavoidable reflection relates to the inability of cellular licensees to achieve effective and ubiquitous national coverage and their unwillingness to invest in connecting everyone everywhere. Cellular licensees have enjoyed exclusive spectrum rights for decades to rollout services while excluding other market entrants from providing services. The exclusive spectrum rights cellular licensees enjoy are *monetisable assets in their balance sheet*[2] and a strategic asset to limit competition. Beyond the accumulation of assets and the curtailing of competition from spectrum use, one question remains unanswered: *how much longer do the students of India need to wait for broadband to reach them and improve their lives?*

"Only 27% of Indian households have access to the internet while only 47% of the households that have any access to the internet own a computing device (including a smartphone)"

Source: India Today

The satellite industry, while their spectrum use is non-exclusive with others in the industry and shared globally, is a supportive and active participant in the evolution of the 5G and 6G ecosystems. In that spirit, Viasat supports the deployment of 5G in India in the spectrum bands internationally harmonised for terrestrial

[1] Learning Spiral survey, internet access for students in India: https://www.indiatoday.in/education-today/latest-studies/story/more-than-50-of-indian-students-in-rural-and-urban-areas-don-t-have-access-to-internet-survey-1770308-2021-02-17.

[2] RIL annual report 2019-20: https://www.ril.com/getattachment/5afeebf6-f47f-4a9b-903b-a18785fb470c/Annual-Report-for-the-year-2019-20.aspx.

IMT/5G by the ITU[3], for example, the 24.25-27.5 GHz (26 GHz) band. Viasat notes that in order for India to have a resilient national broadband infrastructure, it must incentivize deployment of multiple technologies: with the necessary mix of terrestrial and space-based connectivity. Viasat believes that the huge number of unconnected citizens in India can be alleviated by encouraging investment in cost-effective technologies, such as satellite broadband in the critical 27.5-29.5 GHz (28 GHz) band. To the unconnected students of India, terrestrial 5G in mmWave bands is unlikely to reach their homes and their lives any time soon. Investments in High Throughput Satellite (HTS) networks that can provide cost-effective broadband throughout India have already been made, and these are ready to cover India using the entire 28 GHz band, bringing a transformational resource to everyone and everywhere.

Viasat notes the difficult position some cellular licensees have imposed on TRAI and DoT, because of the cellular licensees' misaligned choices and views about spectrum for 5G, and unwillingness to help India in achieving multiple technological options for broadband connectivity to bridge the digital divide. While the Government of India is well positioned to expand broadband initiatives, such as PM WANI and BharatNet, and having undertaken major reforms to propel the telecommunications sector and improve connectivity, lack of cohesion and investment amongst the cellular sector continues to impose undue barriers for improving connectivity in India. For example:

a) **There is a divide across cellular licensees on the allocation of spectrum for terrestrial IMT/5G in mmWave**. Two cellular licensees claim that the 28 GHz band is necessary for India to develop a terrestrial IMT/5G ecosystem (*See* Jio, page 4-g, VIL, pages 4, 15). Another cellular licensee (*See* Airtel, page 12) disagrees and, instead, proposes a pragmatic and more balanced approach, recognizing the benefits of satellite broadband for India in the critical 28 GHz band. Further, Airtel's recommendation is in line with the global trend for India to consider the ITU harmonized 26 GHz band, limited to 24.25-27.5 GHz for terrestrial IMT/5G and the entire 28 GHz band for existing and future satellite broadband (this is consistent with the entire European Union, Australia, China, Russia, Nigeria, Kenya, Mexico and over 100 other countries).

Given there is no consensus amongst cellular licensees on the approach to the 28 GHz band, the views provided by the cellular associations COAI (page 6, 2) and GSMA (Q.7) lack any agreement on behalf of their Indian members on the issue of auctioning the 28 GHz band for to terrestrial cellular providers. Despite COAI and GSMA not having unified membership support on the cellular industry position on the 28 GHz band, these associations have expressed a view that is inconsistent with their membership's individual positions in this consultation and these associations comments cannot, therefore, represent all their members. Therefore, Viasat respectfully suggests that the views of COAI and GSMA should not be considered as industry views in this consultation.

Likewise, the views of the ITU-APT Foundation of India (IAFI) on the issue of auctioning the 28 GHz band to cellular providers is not unified either. As stated on IAFI's submission (page 6, Q.8, ii), IAFI is not able to submit a single view on behalf of all its members. It is noted that IAFI does not represent the views of legally recognized International Organisations, such as the ITU and its members (*i.e.*, Member States, Sector

[3] *See* ITU Press Release, *WRC-19 identifies additional frequency bands for 5G*, (22 Nov. 2020) (those bands include the following: 24.25-27.5 GHz, 37-43.5 GHz, 45.5-47 GHz, 47.2-48.2 and 66-71 GHz), https://news.itu.int/wrc-19-agrees-to-identify-new-frequency-bands-for-5g/.

Members and others), nor the views of APT and its members (*i.e.*, Member States, Affiliate Members and others). In fact, if IAFI did represent the positions of the ITU, it would reflect the fact that the entire 28 GHz band has been rejected as a band for terrestrial IMT/5G at the ITU World Radio Conference (WRC) 2015 and again at WRC-19. In fact, WRC-15 and WRC-19 expanded the entire 28 GHz band for satellite broadband use and WRC-23 will consider increasing the use of the 28 GHz band for satellite broadband with NGSO systems and also for satellite-to-satellite links in space.

b) **There is a divide across cellular licensees on the real cost-effectiveness and practical ability for 5G in mmWave bands (26 & 28 GHz) to deliver its commercial promise in India**. For example, VIL (page 21, Q.21, 2) proposes no rollout obligations for terrestrial IMT/5G licensees in the mmWave bands. On the other hand, RJIL (page 22, Q.21, 1&2) proposes that rollout obligations should apply to terrestrial IMT/5G licensees in the mmWave bands. These diverging views denote a sense of high risk for the Government of India in proposing the auction of the 28 GHz band for terrestrial IMT/5G: cellular licensees have different views and are uncertain about their ability to successfully utilise mmWave bands (and ultimately achieve ROI from the use of mmWave)

As stated by RJIL (page 39, Q.53, 1&2):

"1. The mmWave band is quite unlike any of the bands auctioned so far in India and we may be required to go purely by international benchmarks for its valuation. This spectrum will be used majorly to provide high speed data capacities in dense locations and ***is unlikely to be used to provide uniform coverage owing to limited coverage by mmWave radio which is limited to 50-100 meters and requires lot many radios in a small cluster to provide hotspot coverage****"*

"2. Further, ***the mmWave Radio cost is high because*** *of: (1) High Frequency Front End (2) waveguide connection between RF front and antenna.* ***Thus, even if we consider, hotspot deployment, the cost of laying such a network will be 100s multiple of current spectrum bands deployed in the country****"*

(Statements by Reliance Jio, consultation submission)

As stated in Reliance Jio's submitted comments in this consultation, terrestrial IMT/5G networks in mmWave have substantial technical impediments to providing broadband coverage, while being 100 times more expensive to deploy than networks in lower bands. This makes terrestrial IMT/5G in the mmWave bands a poor option for prioritising spectrum for terrestrial IMT/5G in India. Cellular licensees are unlikely to meet national broadband objectives using this spectrum, by their own candid admissions. International research confirms that the mmWave band is not an option being prioritised globally for terrestrial IMT/5G services:

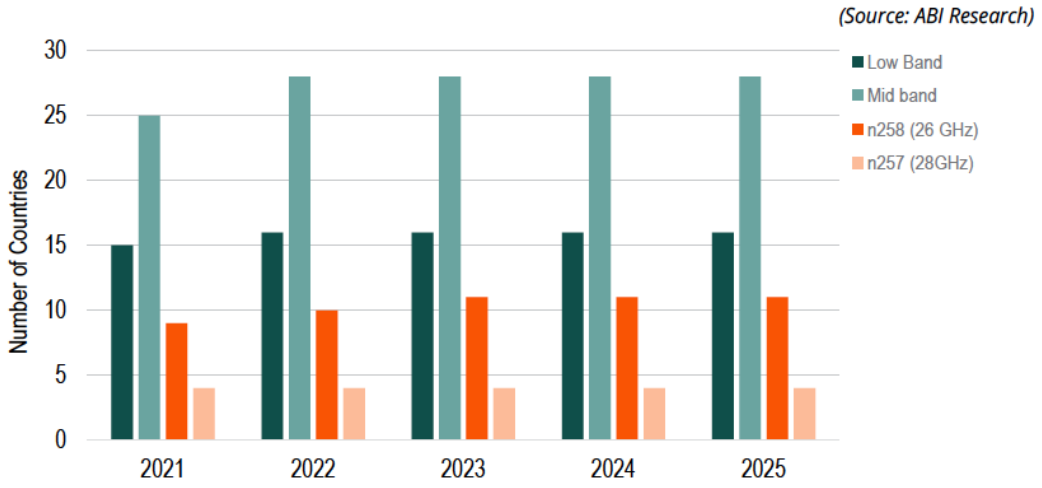

Fig.1 ABI Research: *Emerging Markets Broadband Objectives: Spectrum Requirements (ABI, 2021)* https://go.abiresearch.com/lp-emerging-markets-broadband-objectives-spectrum-requirements.

Furthermore, the cost-benefit of licensing the 28 GHz band for terrestrial IMT/5G is significantly lower in comparison to the cost-benefit of utilising the spectrum for nationwide satellite-powered broadband:

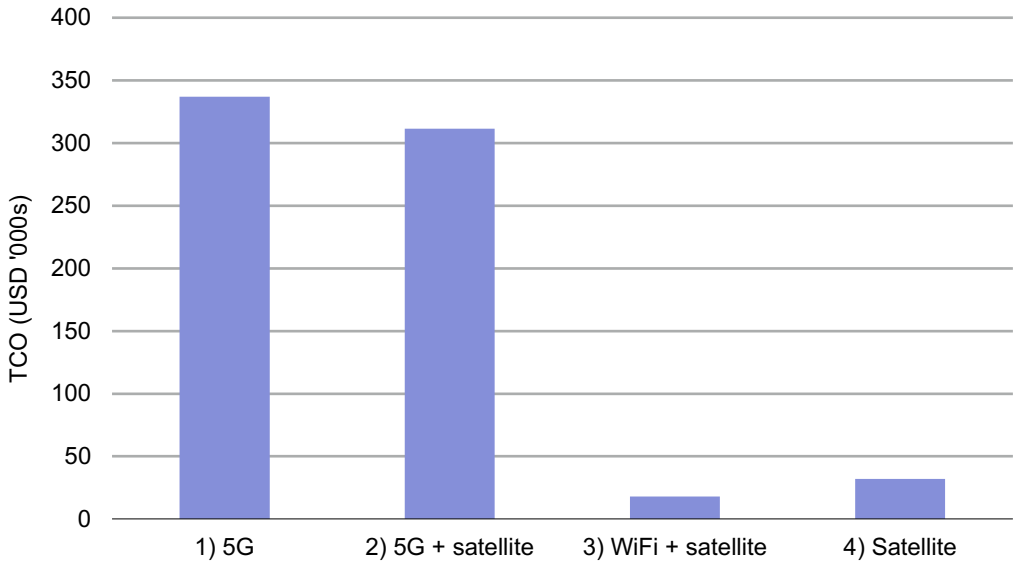

Fig.2 Comparative Total cost of Ownership (TCO) between 5G broadband in 28 GHz and satellite-powered broadband in 28 GHz: satellite-powered broadband is significantly more cost effective than terrestrial 5G[4].

[4] Study on cost effectiveness of 5G in mmWave and satellite broadband in 28 GHz: http://www.strategies.nzl.com/industry-comment/dedicating-28ghz-spectrum-band-to-satellite-services/.

Further, the economic benefits estimated for India (USD184.6 billion per annum[5]) and the cost advantages available from the 28 GHz band for satellite broadband are only possible if the entire 28 GHz band (*i.e.*, 27.5 – 29.5 GHz) is fully allocated to satellite services in India. India will be particularly vulnerable to demand constraints and higher costs if portions of the 28 GHz band are allocated to terrestrial 5G/IMT, because terrestrial 5G/IMT is being prioritised globally in spectrum below 6 GHz.

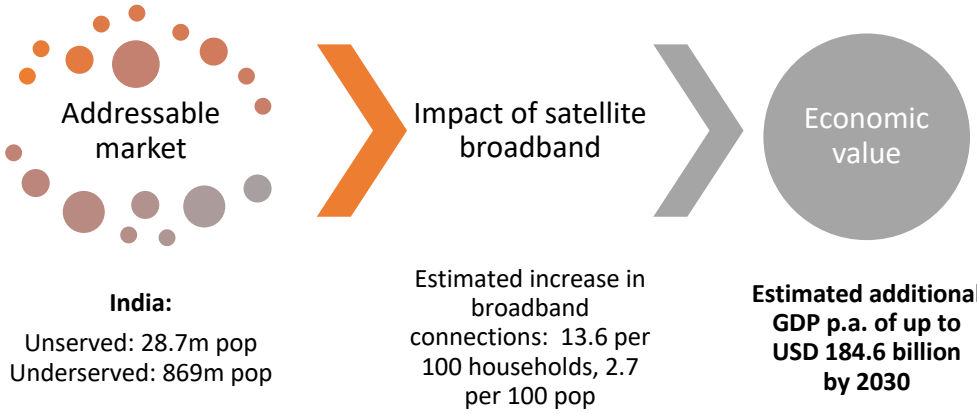

Fig.3 Estimated economic benefits of allocating the full 28 GHz band (27.5 – 29.5 GHz) for satellite broadband in India (Source: Plum Consulting, 2021).

c) **There is a divide across cellular licensees on how exclusive spectrum use should be assigned and valued fairly in mmWave and other bands**. RJIL (page 31, Q.41) submits that valuations from "past exercises remain relevant" and should observe "contingent factors like international benchmarking". VIL (page 36, Q.41) proposes that pricing should be looked at considering "DCF of incremental cash flow", while COAI (page 15, Q.41, No 1) states "spectrum pricing requires a comprehensive re-look". GSMA provides no answer to Q.41 and instead directs this matter to Q.34 where it only provides a list of different methodologies. Once again, there is no consensus within the terrestrial cellular operator community on the approach that the Government of India should take to ***fair value for exclusive spectrum use***. Lack of consensus within the cellular industry on the methodology or approach to pricing indicates **there is no clarity amongst cellular licensees on the fair value for exclusive spectrum rights**.

Viasat urges TRAI/DoT to carefully scrutinize the input being provided by the fragmented cellular industry on fair value for exclusive spectrum use and the related issue of expanding exclusive spectrum rights for 5G/IMT to the detriment of the limited and globally shared spectrum allocated for satellite services. It is likely that cellular licensees' *balance sheets*[6] *(assets)* are driving their

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5 Plum Consulting study: *Expanding digital connectivity through satellite broadband in the 28 GHz band, 2021:* *https://plumconsulting.co.uk/expanding-digital-connectivity-through-satellite-broadband-in-the-28-ghz-band/.*

6 RJIL annual report 2019-2020: https://www.ril.com/getattachment/5afeebf6-f47f-4a9b-903b-a18785fb470c/Annual-Report-for-the-year-2019-20.aspx.

comments in this consultation instead of attempting to sincerely assist TRAI/DoT in determining a ***fair price for exclusive use of spectrum***.

d) **Risks of anticompetitive behaviour and the jurisdiction of the Competition Commission of India (CCI) and the Competition Act 2002**. RJIL (page 49, Q.72, 3) advocates that *"spectrum allocation in any spectrum band that can be used to deploy and provide communication services, irrespective of the entity desiring to use the spectrum or the technology deployed, or type of services offered, should be allocated only through a transparent and open auction process*". It also cites "*same service, same rules*" (page 52, 11) and that spectrum in the band 24.25-29.5 GHz should be auctioned (page 51, 5). These three propositions are outside the scope of the consultation and the auction process.

Nevertheless, there would be a number of legal hurdles for these propositions to be considered, and these would likely be subject to review under the Competition Act 2002. Most importantly, Reliance Jio's proposal on replacing the administrative licensing regime for shared spectrum uses (an international practice for satellite services) and replacing it for auctions is technically and economically flawed.

It is technically flawed because, amongst other considerations, hundreds of satellite systems are visible from the geostationary arc (GSO) and NGSO satellite systems would add hundreds of thousands more. All these systems reuse and share the same spectrum.

It is economically flawed from a public policy perspective because spectrum auctions are a mechanism to assign spectrum rights on exclusive basis to a limited number of mobile operators to solve excess demand. In addition, significant costs would be imposed on India from the loss of the shared satellite capacity that India requires in present and future terms, and those costs would greatly surpass by many times any fees collected. Therefore, it is unclear what problem Reliance Jio is aiming to address. TRAI would need to consider: *What are the additional complexities and costs? What are the costs to the Government and the wider economy?*

It is noted that the CCI has debunked the argument[7] of "same service, same rules" and legal precedent exists that not all communication services in India are considered "same services". The CCI also states that "*spectrum ownership creates a competitive advantage for operators providing wireless access services*". Hence, CCI's **links exclusive spectrum ownership to market competition**. Spectrum ownership, as a practice, concerns the exclusive tenure (spectrum rights) of spectrum by mobile operators within the jurisdiction of India. Contrary to the exclusive spectrum rights that are enjoyed by terrestrial cellular operators for decades, space-based communications reuse the same spectrum over and over again to service multiple countries from the same satellites (*i.e.*, dozens of satellite operators can use the same spectrum on a non-exclusive basis with international ITU coordination and spectrum reuse requirements) from both the GEO arc and from non-GEO systems.

[7] CCI report, Telecom Sector in India: https://www.cci.gov.in/sites/default/files/whats_newdocument/Market-Study-on-the-Telecom-Sector-In-India.pdf.

Conclusions

1. **India's ability to incentivize multiple technologies for broadband connectivity is at risk:** Both terrestrial and space-based broadband are necessary to cover the whole of India and bridge the digital divide. There is no substitute band for the critical 28 GHz band to enable affordable High Throughput Satellite (HTS) networks. In contrast, terrestrial IMT/5G have many 10s of gigahertz of separate spectrum in which they can operate. India is set to enjoy the benefits of satellite-powered broadband by connecting millions to the global digital economy but only if the entire 28 GHz band (27.5-29.5 GHz) is available for satellite services, unconstrained by terrestrial IMT/5G.

2. **India needs to carefully consider whether it is the right time to auction mmWave spectrum for terrestrial IMT/5G services:** Terrestrial IMT/5G demand studies reveal the low level of global priority for terrestrial IMT/5G in the mmWave bands --- especially the 28 GHz band --- a finding that is consistent with the concerns stated by cellular licensees in India about mmWave deployment and the very limited coverage of 50-100 metres at a very high cost, on the order of 100 times more expensive than cellular networks in other bands.

3. **The potential of a successful auction:** No consensus exists among cellular licensees in India that the mmWave spectrum in the 28 GHz band is the solution for India to kick-start terrestrial IMT/5G. In addition, there are material investment risks for cellular licensees given the poor coverage and high cost of terrestrial IMT/5G in the mmWave bands. These facts are likely to affect the success of auctioning mmWave spectrum. The likely outcome is that the spectrum will not be used at all or underutilised and that it is simply being used at the moment to attempt to restrain the introduction of new and innovative broadband services by satellite operators that want to serve India and help affordably bridge the digital divide.

4. **TRAI/ DoT need to carefully plan the upcoming terrestrial IMT/5G auction:** While there is a perceived requirement to meet an uncertain terrestrial IMT/5G demand, providing India with multiple technologies, including satellite broadband, to bridge the digital divide is clearly necessary to connect the whole of India. 28 GHz satellite-powered broadband is a key tool for India to bridge its digital divide in a cost-efficient way across land, sea, and air.

Satellite broadband is vital to achieve key policy goals for India. Viasat is committed to the use of 28GHz to assist in the delivery of these important aims. We will do this via joint ventures with leading Indian companies which will assist India to develop world-leading capabilities in space and communications technology.

Only with satellite technology can people in every part of India connect to broadband services. The best way to do this, as international regulators agree, is to allocate the entire 28 GHz spectrum for satellite (27.5-29.5 GHz). That will ensure the vision of all-India broadband can be achieved cost-effectively and quickly.

Prime Minister Modi has outlined his priorities for India as:

- Ease of Doing Business
- Ease of Living (the push to digital India)
- Empowering Youth With Opportunities
- Health For All
- Infra for Growth
- Mobility for Middle Class
- Nari Shakti for New India
- Prosperous Farmers for Prosperous India
- Putting India First
- Renewed Focus on North East
- Social Empowerment
- Taking Development to the Poorest
- Transformative Economic Growth
- And the fight against coronavirus.

By safeguarding the 28GHz spectrum, TRAI/DoT will contribute significantly to the achievement of every single one of these goals. For example, only satellite broadband can connect those in remote areas, including many of India's poorest people. For those far from doctors, satellite broadband offers telemedicine. For the unconnected students of India, satellite-powered broadband offers a doorway to information and knowledge.

Viasat is committed to helping India achieve goals like these: we share your vision and want to play our part.

28GHz offers the safest, future-proof, fast, proven and cost-effective path for satellite broadband. Above all, creating the infrastructure for growth and the push to digital India requires 28GHz to be safeguarded for satellite.

Recommendation: TRAI/DoT are more likely to achieve a successful auction of mmWave spectrum once there is a more defined market outlook for terrestrial IMT/5G in the mmWave bands, especially the 28 GHz band. Despite its lack of success and minimal global deployment, the 26 GHz (*i.e.*, 24.25-27.5 GHz) band enjoys a global identification and harmonization by the ITU for terrestrial IMT/5G that provides a vast amount of spectrum (3.25 GHz) the cellular licensees in India. The 28 GHz band (27.5-29.5 GHz) should be assigned for satellite-powered broadband in India to enable ubiquitous broadband connectivity (FSS and ubiquitous ESIM), maritime and aeronautical connectivity, in line with international adoption across Europe, China, Russia, Australia and over 100 other countries globally.

About Viasat

Viasat is a global communications company that believes everyone and everything in the world can be connected. Founded in 1986 and based in Carlsbad, California; with 5800+ employees globally, that includes our engineering solutions team based in Chennai, India. Viasat currently powers hundreds of millions of internet connections annually on land, in the air, and at sea, with reliable networking and advanced cybersecurity. Viasat is recognized for quality satellite broadband solutions, for example, by U.S. News & World Report as one of the top internet service providers (ISPs) in the United States, by Fortune for advancing a commercial connectivity solution that has a measurable social impact, by CNET as the best satellite provider for rural connectivity in the United States, and by Fast Company's World Changing Ideas list for using satellite-connected Wi-Fi hot spots to provide broadband service where wireless infrastructure is too costly to install.

Viasat will start launching our next generation satellite broadband network, known as the ViaSat-3 constellation, next year followed by the ViaSat-4 network. These satellite networks are designed and built to operate across the entire 27.5-31 GHz band, including the critical 27.5-29.5 GHz (28 GHz) band (Earth-to-space) and the 17.7-21.2 GHz band (space-to-Earth). Today, these are the most effective spectrum bands for advanced, cost-effective satellite broadband services. Each of three ViaSat-3 global satellites will provide over one Terabit per second of throughput. ViaSat-4 will materially increase this throughput to 5-7 Terabits per second. Through technical advancements, Viasat has **been able to reduce satellite broadband capacity costs by a factor of 400 and increase capacity by a factor of 500**, when compared with legacy satellite networks. These advances result in much higher speeds, and more bandwidth, at affordable costs for consumers and government uses in India, on land, in the air, and at sea.