



# BIF

**BROADBAND INDIA FORUM**

"Think Tank for Digital Transformation"



# BROADBAND

# Bits & Bytes

**A BIF Communiqué**



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**Mr. P K Garg**  
Principal Adviser,  
Broadband India Forum

# Foreword

The 5G (5th generation telecom services) has been discussed globally for quite some time. In ITU (International Telecommunication Union, Geneva – the UN body for global ICT issues) parlance, 5G is known as IMT-2020 (International Mobile Telephony 2020) and these have terrestrial as well as satellite components.. With fast developments, ITU is now looking at ‘IMT for 2020 and beyond’.

5G is data-centric and even voice would go as data. IoT (Internet of Things) is another main component of 5G services. The number of devices connected to 5G networks are expected to touch 50 Billion within foreseeable future. Looking at fast developments in IoT, it would not be surprising if this number is reached by 2030. A recent study\* has projected total number of connected devices to exceed 30 Billion by 2023 itself (CAGR of 11% or more from 2018 to 2023). It is quite natural that amount of data transmitted over 5G networks would also undergo an exponential increase. As per one CISCO study\*\*, the global IP data may exceed 396 EB (ExaBytes) per month in 2022 (more than 3 times from the level of 122 EB per month in 2017).

To make 5G services available to all people & areas, with such large amount of data, it would require a judicious mix of different media – terrestrial and satellite based – OFC (Optical Fiber Cable), terrestrial wireless media like cellular, Point-to-Point/Point-to-MultiPoint (PMP), as well as satellites. Developments are taking place in all fields.

In a large country like India, with variety of terrain and demography, there is need as well as scope for all modes of communication systems. Satellite services are needed, not only for remote, islands and difficult areas, but also for early connectivity of many rural and sub-urban areas, where OFC has yet to reach.

Substantial developments have taken place in satellite services during last two decades, leading to HTS (High Throughput Satellites) and now VHTS (Very High Throughput Satellites). These have improved the efficiency of spectrum usage as well as reduced the cost of satellite services/connectivity. With the use of Ka band around 28/30 GHz band, it is possible to deliver 100 Gbps throughput with a single GSO (Geo Stationary Orbit)satellite, with cost of data services comparable to terrestrial wireless services, especially for rural and remote areas.

ITU has identified number of frequency bands, for 5G services. These include frequency bands below 1 GHz, mid band (1 to 6 GHz) and high frequency bands (above 6 GHz). The ITU WRC-15 (World Radiocommunication Conference, 2015) had also identified number of frequency bands for sharing studies between terrestrial mobile services and other radiocommunication services, to which those frequency bands are allocated.

Terrestrial cellular services have capability and advantage of very high frequency reuse. Various other developments, which are in offing, should make it possible to meet the spectrum requirements of 5G services (terrestrial as well as satellites), without unduly constraining each other or development of other radiocommunication services.



**THE GLOBAL IP DATA  
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\*Ericsson Mobility Report June 2018

\*\*Cisco Visual Networking Index: Forecast and Trends, 2017–2022 White Paper (updated 27 Feb 2019)



**TV Ramachandran**  
President,  
Broadband India Forum

## From the President's Desk

*Dear Readers,*

Welcome to the Third Edition of our Quarterly Newsletter for FY19 – Broadband Bits & Bytes on trends and perspectives related to Broadband sector in India. The Newsletter focusses on all the key areas such as 5G, spectrum and licensing, content and applications, SatCom, infrastructure, security, new technologies and innovations, which could lead to proliferation of Broadband in India.

BIF is dedicated to enhance the potential of the entire ecosystem to deliver broadband across the whole of India. BIF's mission is to support and enhance all policy, regulatory & standards initiatives for the proliferation of high quality broadband in the country in a technology-neutral and all-inclusive manner. We have, in a very short time-frame, contributed to several regulatory and policy consultations and been working closely with all concerned Government agencies providing credible inputs on Broadband to assist and facilitate the process of policy making.

The Newsletter is divided into several sections. In the “Spotlight” section, the focus for this Edition is Spectrum for 5G. 5G needs a completely new mindset towards spectrum since it has the potential to enable fundamentally new bandwidth-critical applications and use that require extremely high data rates, massive connectivity and ultra-reliable low-latency. We discuss the various spectrum issues related to 5G and other bands. We have views on, “How can spectrum management be improved to ensure expeditious 5G roll-out?” in the “Industry Speak” section, and I would like to thank the industry experts personally for sharing their valuable thoughts. In our “Newsflash” section, we have summarized the significant happenings in the Broadband sector over the last quarter. In the “Events” section, we give you a glimpse of the past and proposed BIF Events.

In an effort to make this newsletter more useful to you, we would appreciate your comments and suggestions that you may have on this issue as well as topics that you would like us to feature in the forthcoming issues.

Happy reading!

A handwritten signature in black ink, appearing to read 'Ramachandran'.



**5G NEEDS A  
COMPLETELY NEW  
MINDSET TOWARDS  
SPECTRUM**

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## SPOTLIGHT:

**There is tremendous surge in data traffic but enough spectrum is not available at affordable prices, so the operators are struggling to manage quality and capacity.**

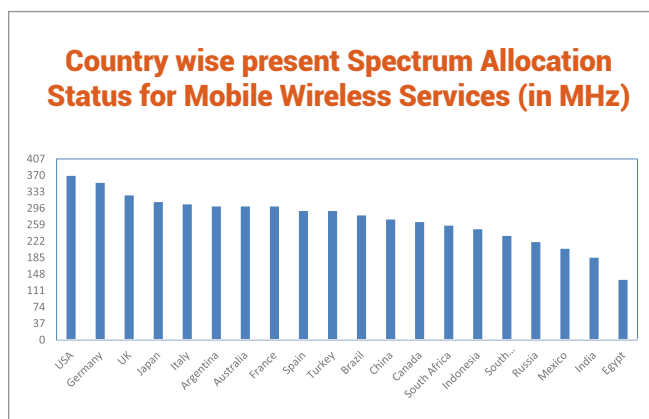
By TV Ramachandran

Thanks to the unfortunate spectrum experiences of around 2008, it is now well known in India, even to the common man, that radiofrequency spectrum is a precious but finite resource that can be a powerful engine of socio-economic growth and innovation in many spheres. Other nations have released large amounts of spectrum to their mobile operators but are continuously exploring ways and means of locating and releasing more spectrum for commercial use. Obviously, the rationale is that, with more and more new spectrum-based services coming into the market every day, one cannot ever have enough of this valuable resource for promoting economic good and public welfare.

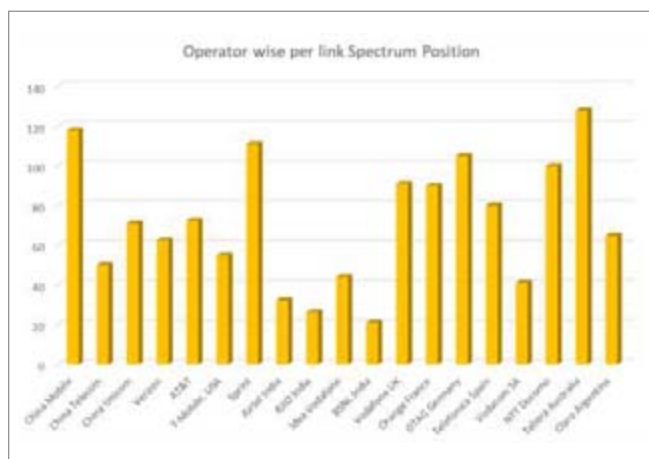
Against the above scenario, in India, however, we seem to be slipping into a dangerous state of complacency, with some stakeholders declaring publicly that they have enough spectrum and there is therefore little urgency for more spectrum allocations. Nothing could be further from the truth. In fact, such thinking is likely to only increase the digital divide between us and other comparable nations.

*Despite several auctions over the last eight years, spectrum allocation for commercial services in India continues to be very low when compared to other nations. For example, India has 185 MHz of spectrum allocated to industry for mobile use, far behind 369 MHz in the United States and 271 MHz in China. For a country with a large population and rapidly growing data usage (in fact, the highest in the world now!), this is indeed a very formidable constraint on country's ability to offer new innovative solutions and next generation technologies.*

Operator-wise allocation is also amongst the lowest, so much so that the largest operator in India, Idea Vodafone Ltd., formed recently after the merger, has about 40% lower spectrum as compared to global average of about 70 MHz.



Source: Broadband India Forum Research; \*Spectrum quantum calculated on FDD basis; \*\*Spectrum bands in the range of 700 MHz to 3500 MHz considered. 5G bands (above 3500 MHz) not considered; \*\*\*Data above represents total spectrum allocated for Mobile use in the country to Service Providers.



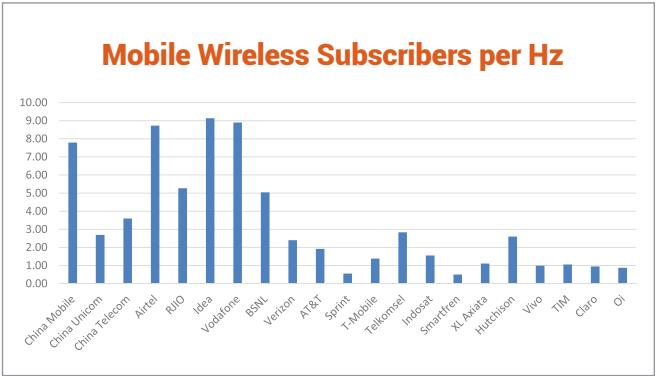
Source: Broadband India Forum Research; \*Spectrum quantum calculated on FDD basis; \*\*Spectrum bands in the range of 700 MHz to 3500 MHz considered. 5G bands (above 3500 MHz) not considered

The above situation of inadequate allocation leads to extremely intense spectrum utilisation in India, with subscribers per MHz of spectrum being one of the highest in the world. Indian operators have one of the highest numbers of subscribers per Hz. One can well imagine the adverse impact on quality of service and all are aware of the state of our mobile call quality these days.

Moreover, while data is growing explosively, it is not that voice is diminishing or disappearing in India. The well-known strong propensity of Indians to talk generously is continuing



to grow apace, spurred by free VoLTE calling. Thus, the spectrum demand due to this aspect has not reduced. This is only compounding the quality problem.



Source: Broadband India Forum Research; \*Spectrum quantum calculated on FDD basis; \*\*Spectrum bands in the range of 700 MHz to 3500 MHz considered. 5G bands (above 3500 MHz) not considered

Musey of Summit Bridge Capital points out that “global mobile data traffic, and thus spectrum demand, is growing at an explosive rate (63% up in 2016 and by a similar amount in 2017). Video downloading represented 69% of consumer internet traffic in 2017 and , over 78% of the world’s mobile data traffic will be video by 2021”, leading to a humungous spectrum crunch for operators. The situation would be intensified in India with its high mobile growth. As per Ericsson, 4G mobile handsets are expected to grow 4 times to ~700 million constituting ~80% of the handsets in use by 2020. High speed data is both becoming ubiquitous and mass affordable. As per Deloitte’s Global Analysis, India has crossed the inflexion point for hyper Data Usage which happens when smartphone penetration crosses 25–30 percent. There is tremendous growth in data traffic but enough spectrum is not available at affordable prices, so the operators are struggling to manage quality and capacity. This will surely not suffice for the Digital India of our dreams.

The above scenario would be exacerbated by the advent of 5G, to which India is fully committed. 5G needs a completely new mindset towards spectrum since it has the potential to enable fundamentally new bandwidth-critical applications and use cases in eHealth, autonomous vehicles, smart cities and IoT, etc. that require extremely high data rates, massive connectivity and ultra-reliable low-latency.

But, how are we preparing for 5G? TRAI has recommended spectrum quantum and reserve price for the next round of auctions across bands. The amount of 5G spectrum at 175 MHz is less than one-third of US. The reserve price has been fixed at Rs 492 crore per MHz. For a pan- India minimum block of 20 MHz, operators will have to shell out nearly Rs 10,000 crore, which is exorbitant considering both other countries’ values as well as the low earnings per customer (ARPU) in India. It can be seen that India’s TRAI-recommended 5G price is about 7 times that of other countries whereas India’s mobile ARPU level is about 10 times lower! This will clearly not be a sustainable situation and needs to be urgently reviewed.

### 5G Pricing in Various Countries

Country	Date	Cost		ARPU
		Crores/MHz	USD/MHz (Million)	USD
India	TRAI Recommended Price	492.0	70.2	1.96
UK	11.06.2018	71.6	10.6	17.44
South Korea	19.06.2018	73.2	11.0	27.51
Spain	26.07.2018	17.7	2.6	16.54
Finland	01.10.2018	2.0	0.3	17.78
Italy	03.10.2018	204.8	27.8	13.67

\*Source: 5G Auction Data - Country Regulator Websites; Price of highest bidder in each country; ARPU Data – Analysys Mason for CY2018e

Some stakeholders’ argument that unsold spectrum means satiated demand and that Indian operators have adequate spectrum is a highly flawed understanding-optimum spectrum pricing is the need of the hour. If there is nil or inadequate price movement in an auction, then there has been no discovery of the market price and the set reserve price has obviously been too high. In the October 2016 auctions, barely 41% got sold. Even taking all the six e-auctions held since 2010 together, only about 60% has been sold. Even for the spectrum that was sold, the average sale price was hardly 5% above the reserve price. Considering, again, all the e-auctions since 2010, one notes that as much as 47% of the cases of sales happened at the reserve price. The inevitable conclusion therefore is that unreasonable spectrum pricing was the single biggest factor for past auctions’ suboptimal results and for operators still having below-par spectrum holdings. Government appears to be fully cognisant of the situation as it has clearly stated, as one of its strategies in the new policy: “Making adequate spectrum available to be equipped for the new broadband era.. by... optimal pricing of spectrum to ensure sustainable and affordable access to digital communications”.

Abundant spectrum at reasonable cost is fundamental for inclusive and affordable broadband for every Indian. India needs to set its sights high as regards to the allotment of this vital and strategic economic resource to operators. Exploding demand spurred by new technologies, innovative new applications and the resultant economic growth dictate the urgent need to enhance spectrum holding per operator to the best-in-class in the global digital arena. The time to act is now. Else, we might miss exploiting the rich potential of broadband and 5G.

Author is Hon.Fellow, IET (London) and President, Broadband India Forum. Views are personal. Research inputs by Garima Kapoor.





# Industry Speak: How can spectrum management be improved to ensure expeditious 5G roll-out?

*“For India to realise the objective of making 5G ubiquitous and affordable, the core spectrum millimetre wave bands of 26 & 28 GHz needs to be open up and assigned to the operators quickly at an optimal price”*



**Parag Kar**

Vice President,  
Government Affairs,  
India & South Asia,  
Qualcomm

*“The objective of spectrum management should not only be revenue maximization. Spectrum should be looked at as an enabler of new and innovative services. 5G technology will lead to many such services. Services that will generate demand for a new class of entrepreneurs, new skills and have a huge overall positive impact on the economy.”*



**Kuldip Singh**

Principal Adviser,  
BIF

*“5G landscape, dominated by wireless connectivity, shall be a combination of terrestrial (including High Altitude Platform Systems) and space services – this would require judicious allocation of spectrum to all of these three components.*

*While 5G roll-out shall push network boundaries to enable new applications and services across every industry and open new business opportunities, the focus on bridging the digital divide must not be lost.”*



**Rajesh Mehrotra**

Principal Adviser,  
BIF



# Newsflash:

## Updates and Achievements

### SPECTRUM/WIFI

- BIF along with Bharat Exhibitions organised a Conference on De-Licensing of 5GHz for Public Wifi on 15th February 2019 at Hotel Le-Meridian. At the event, BIF released a report on “Democratisation of Public Wifi in India with delicensing of 5GHz spectrum band”.

### 5G

- A meeting of the 5G Spectrum Working Group was held on 5th Dec 2018 at DBS Business Centre.
- BIF along with 5GIA & TSDSI organised a two-day workshop on the 5G Technology Landscape at the India Habitat Centre on 5th and 6th February 2019. At the event BIF & TSDSI exchanged the MoU for cooperation.

### SATCOM

- BIF submitted its recommendations on SATCOM 2018 to ISRO, ANTRIX, DoT, TRAI, NITI Aayog.
- TRAI issued Recommendations for Methodology of levy of Satellite Spectrum Charges for ‘sui generis’ category, in agreement with most of the the BIF position.

### TECHNOLOGY/APPLICATION

- BIF hosted an event in Shangri La on 27th November 2018 in which a report on Smartphone Performance in India by PhiMetrics Technologies Pvt. Ltd was released.
- BIF along with Bharat Exhibitions hosted an International Conference on AI & IoT India 2018 on 14th December 2018 at Hotel Shangri-La. At the event, BIF released the Compendium of all its reports published.
- A meeting of the DECT Committee a was held on 18th December 2018.

- BIF submitted its response to TRAI CP on Regulatory Framework for OTT Communication services.
- A meeting of the Content and Application Committee and DECT committee was held at Hotel Shangri La on 11th January 2019.
- BIF Hi-Level Committee Meeting on AI & IoT was held on January 24th 2019.

### DIGITAL INFRASTRUCTURE

- BIF hosted an event along with ADBI and ICRIER on “Digital Infrastructure for Transforming India” on 6th December 2018. On the occasion, a report on “The growth Dividends of Digital Communications” by ICRIER was released.
- A roundtable meeting was held at Hotel Shangri La with the Delegates of ADBI and Secretary DoT to discuss the way forward about the quality of Digital Infrastructure in India on 11th January 2019.

### OTHER SECTORS

- BIF submitted its response to the “Draft National Policy on Electronics” to MeitY in November 2018.
- TRAI issued International Cable Landing Access Facilitation Charges & Co-location Charges Regulations 2018 and it is in agreement with some of the issues raised by BIF.
- Government releases gazetted notification on the Inflight connectivity.
- A meeting on the Rural Digital Initiatives (RDI) was held on 17th December 2018.
- BIF submitted its inputs to TRAI regarding the ‘Work Programme’ for the year 2019.
- A meeting of the GPR working Group was held on 8th January 2018.
- A meeting of the VNO Committee was held on January 16 2019 at DBS business Centre.



# Reports & White Papers from BIF



# Topical Articles

**BELOW ARE THE ARTICLES AUTHORED BY BIF PRESIDENT, MR. TV RAMACHANDRAN WHICH HAVE BEEN PUBLISHED IN LEADING BUSINESS DAILIES:**

- ❖ Why cut off one's nose to spite one's face?? [\[LINK\]](#)
- ❖ India must get on the IoT highway fast [\[LINK\]](#)
- ❖ Broadband Priority: Key to the country's digital transformation [\[LINK\]](#)
- ❖ Why telcos and OTTs need to band together to drive digital future [\[LINK\]](#)
- ❖ Broadband for all: Why we aren't talking about the quality of digital infra? [\[LINK\]](#)
- ❖ Is India up for the IoT challenge? [\[LINK\]](#)
- ❖ Telecom trouble: Spectrum usage charge or surely unjustified charge? [\[LINK\]](#)
- ❖ Telcos Still Starved of Spectrum [\[LINK\]](#)

### FEW OTHER ARTICLES THAT YOU MAY FIND INTERESTING:

- ❖ Challenges in regulating OTT services [\[LINK\]](#)
- ❖ The OTT Conundrum [\[LINK\]](#)
- ❖ Difficult to reverse trends with Incremental steps...A review of DoT's draft NDCP 2018 [\[LINK\]](#)
- ❖ NDCP effect: Roadmap's for the sector's recovery [\[LINK\]](#)
- ❖ Inclusive 5G: Driving the transition to Digital economy [\[LINK\]](#)





## Events:

### Upcoming Events

#### Conference on “OTT: A win-win for all”



#### 5G India 2019: 3<sup>rd</sup> International Conference





# BIF Conference on IoT/AI/Cloud Services

ORGANISED BY

 **BIF**  
BROADBAND INDIA FORUM

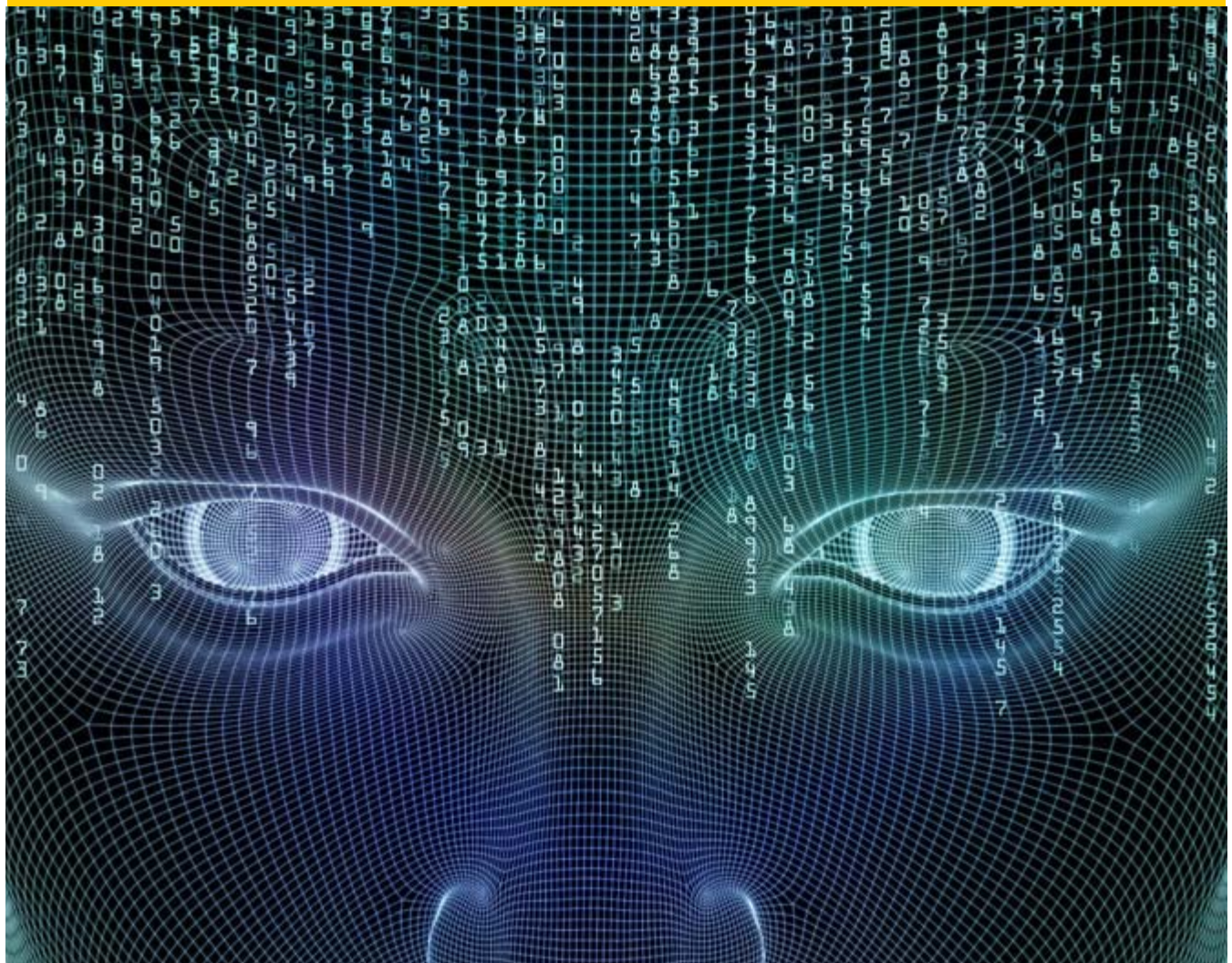
 **ASCI**  
Association of Software Companies of India

 **Healthcare Sector Skill Council**

**Conference on  
IoT/AI/Cloud Services -  
Impact on Jobs in India**  
"Special focus on Agriculture and Healthcare"

**NEW DELHI**

**Date to be announced soon**

A graphic illustration for the conference. It features a blue background with various white icons representing technology and industry: a lightbulb, a camera, a house, a person, a gear, a circuit board, a plug, a mail envelope, a smartphone, a padlock, a dollar sign, and a globe. A large blue square with the text 'IOT' in white is prominently displayed in the center.





India Satcom 2019

## India Satcom 2019

### International Summit - "India SatCom"

**India SatCom 2019** – 5<sup>th</sup> International SatCom Summit – to be organized by the Broadband India Forum, offers a unique opportunity to access key decision makers and business leaders driving the development of Satellite Broadband in India. Register today to gain the knowledge and contacts you will need to make your company part of this growing market for satellite communications services.

The 5<sup>th</sup> International Summit - India SatCom  
27<sup>th</sup>-28<sup>th</sup> November 2019 | Hotel Shangri-La, New Delhi

## Events: Past Events



De-Licensing of 5Ghz for Public WiFi



India-EU Stakeholders' Workshop on 5G Technology Landscape



Digital Infrastructure



Smart Phone & Customer Experience



My India Wifi India





## 2nd Edition FTTH India Summit 2018



## V band (60 GHz) is the Key to Affordable Broadband in India



## 10th Anniversary Celebrations of IPTV Society



## India Satcom 2018



## 5G India 2018 – International Conference & Exhibition



## Broadband with Wireless Fibre

# BIF Eminent Members

## Corporate Patron Members



## Corporate Members



## Startup & Professional Members





# BIF Hi Level Committees



# Panel of Principal Advisers



**Abhishek Malhotra**



**Air Cdre S.S. Motial**



**B K Syngal**



**D P Singh**



**Dr. B M Baveja**



**Dr. Kuldeep Singh**



**Dr. Mahesh Uppal**



**Rajesh Mehrotra**



**J. V. Ramamurthy**



**K V Seshasayee**



**P K Garg**



**Pranjal Sharma**



**Sudhir Gupta**



**Valsa Williams**



# About Broadband India Forum



**Mr. Anil Prakash**  
*Director General  
Broadband India Forum*

**Broadband India Forum (BIF)** functions as a policy-forum and think-tank that works for the development & enhancement of the entire broadband ecosystem in a holistic technology-neutral and service-neutral manner. BIF seeks to be a thought leader and a credible and effective voice to help propel the nation to achieve the country's ambitious vision of creating a Digital India. To achieve this, BIF works to promote the rapid

development of policies to promote affordable and high speed ubiquitous broadband throughout the country.

Registered as IPTV Society, its brand - BIF was formed in October 2015 and is a fairly nascent but dedicated Forum with participation from all stake holders, including Technology Providers, Telecom Operators, Internet Service Providers, Value-Added Service Providers, Satellite Operators and service providers, MSO, Broadcasters, startups and professional entities as well as seasoned Industry professionals who are familiar with different technologies, operations, regulations and policies.

The Forum's senior leadership team includes renowned and respected professionals from background of Industry, Regulator and Government.

1. Mr. Shyamal Ghosh, Former Secretary-Telecom and co-founder of IPTV Society, is the Chairman Emeritus.
2. Mr. M. F. Farooqui, IAS (Retd.), former Secretary-Telecom, is the current Chairman
3. Mr. T. V. Ramachandran, Hon. Fellow of the IET (London), former Resident Director-Regulatory Affairs

and Government Relations, Vodafone, and first Director General of COAI, is the President of the Forum.

4. Mr. Parag Kar, Sr. VP Govt. Affairs, India and South Asia- Qualcomm and Mr. Ashwani Rana, Head Connectivity Policy-Facebook are current Vice Presidents.
5. Mr Anil Prakash is the Director General.
6. Mr. S. N. Gupta, seasoned technocrat and senior luminary who has worked in DoT and as a Principal Adviser to TRAI (Regulator) is the Treasurer.

BIF functions through many specialist committees for the advocacy, coordination, facilitation and promotion of all activities with the objective of furthering the goals of the National Telecom Policy in Spectrum, Licensing and Standardisation, Broadband Infrastructure, Manufacturing Rural Digital Initiatives, Content & Applications, SatCom & Broadcasting, 5G, New Technology & Innovations, IoT and ICT for Inclusive Ability.

The activities of the Forum broadly relate to coordination, promotion and formulation of expert opinion on topical subjects related to Broadband. To act as a bridge between Industry on one side and Government and the Regulatory Bodies on the other, front ending several issues related to policy & regulation.

***"In the seventh Edition of the Newsletter, Broadband - Bits and Bytes, our endeavor is to keep you updated with latest technology, standards, innovation, policy and regulation, which embark on and facilitate speedy and affordable broadband proliferation in the country."***

*- Anil Prakash*



## Bidding Farewell to Mr. RN Tripathi

Mr. RN Tripathi retired from BIF in March 2019, after having worked with us since 2006. We thank him for his diligent services and hard work. Prior to BIF, he worked with MTNL for nearly 40 years, having retired as Deputy General Manager. He will continue to work with BIF as a Consultant on part-time basis. We wish him God speed, good health and a happy retired life.



#### Newsletter Development Team:

Garima Kapoor and Abhijit Panicker

#### Publisher:

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