

# Analysis of Global Challenges and Issues for Spectrum Allocation in India

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## **Abstract**

*Spectrum is at the centre of almost all the controversies in the booming Indian telecom industry. And, there have been spectrum-related standoffs over the past couple of years, between companies, regulator Trai and the communication ministry.*

*Currently, India is the only country that allocates spectrum to telcos on the basis of their subscriber bases. This practice has led to charges that several mobile operators inflate subscriber numbers to corner the resource. The lack of transparency in dealing with the issue also led to allegations that certain operators got radio frequencies out of turn and without having the requisite number of subscribers.*

*The telecom ministry's latest assessment reveals that only four private players can be given airwaves for offering these high-end services in Delhi, while in Mumbai, there is enough frequency for eight players. Key circles, such as Andhra Pradesh, Karnataka and Tamil Nadu, have space for 11 private players each. A minimum of six private operators can be given these airwaves in all circles except in Uttar Pradesh, Himachal Pradesh, North East, West Bengal and Rajasthan.*

*India has more operators per circle than anywhere else, higher network costs, and services nowhere near as good. Consequently, operators have to use more equipment inefficiently because of limited spectrum.*

*The consultants estimate that India's spectrum usage is eight times more intense than in the UK, Hong Kong or Singapore. Operators in these countries have from 16 MHz to 26 MHz, the latter for the Netherlands, the UK, Singapore and Malaysia; Pakistan has 14 MHz.*

**Key words:** *Global challenges, Spectrum, Telecom, Technology*

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## **Introduction**

The information and communication technologies (ICT) sector has been experiencing renewed growth recently. Notwithstanding the highly volatile market conditions of the past decade, long-term technology drivers suggest that tomorrow's telecom market demand will not be measured just in terms of increased bandwidth and quality of service, but will also offer truly pervasive access: "anytime, anywhere, by anyone and anything." Tomorrow's networks will have to provide the necessary

flexibility, coverage and transparency to immerse users in a total connectivity universe. The deployment of such infrastructures can only be realized by capitalizing on spectrum-based resources in new and innovative ways.

This new environment presents technical, commercial and policy challenges. In the field of spectrum management, techniques are slowly being replaced by market mechanisms and services. Operating in an unplanned manner, spectrum bands are becoming as economically significant as those in planned bands. This raises the question of how centralized spectrum management agencies will need to adapt and whether techniques for rationing spectrum (*e.g.*, licences, auctions) can co-exist alongside unlicensed uses.

The communication ministry has floated the idea of an independent spectrum regulator with powers to oversee all issues related to allocation, pricing, monitoring and withdrawal of airwaves, on which all communication signals travel. In a bid to end controversies over allocation and pricing of spectrum, the Department of Telecom (DoT), India has proposed to present before the Parliament the 'Spectrum Act', modelled on the lines of the Trai Act that led to the creation of the telecom regulator.

Spectrum is at the centre of almost all the controversies in the booming Indian telecom industry, and, there have been spectrum-related standoffs over the past couple of years, between companies, regulator Trai and the communication ministry. Operators are now involved in a bitter battle amongst themselves over what they call 'excess radio frequencies held by some players'. While CDMA operators claim that GSM operators are not entitled to more than 6.2 MHz of radio frequencies as per the licence conditions, GSM operators, on their part maintain that all their allotments are based on telecom regulator Trai's recommendations and existing government policy.

Currently, India is the only country that allocates spectrum to telcos on the basis of their subscriber bases. This practice has led to charges that several mobile operators inflate subscriber numbers to corner the resource. The lack of transparency in dealing with the issue has also led to allegations that certain operators got radio frequencies out of turn and without having the requisite number of subscribers. Hence, DoT, justifying the move for a 'Spectrum Act', said it required sophisticated equipment and trained personnel to check if operators are using their allocated airwaves efficiently. Also, an effective enforcement wing is required to ensure that "violations of spectrum usage are effectively dealt with," it added.

### **Important Facts for Spectrum Allocation in India**

The Department of Telecom (DoT) has finally mapped out the availability of third generation (3G) airwaves that can be put up for the upcoming auctions across the country. The plan shows that the government can earn over Rs 21,480 crore if the frequencies are auctioned according to the Finance Ministry's formula.

The Telecom Ministry had earlier recommended a reserve or minimum price of Rs 2,020 crore which was not accepted by the Ministry of Finance who has asked the Telecom Ministry to double it. The likely contenders for the 3G spectrum may include Bharti Airtel, Vodafone, Reliance Communication, Tatas and a few other

new private telecom operators and restrict the number of players to a maximum of seven. Similarly, on the lines of 3G the Government will also auction spectrum for wireless broadband services known as WiMAX.

The telecom ministry had recommended a pan-India reserve price of Rs 1,010 crore for wireless broadband services whereas the Ministry of Finance had doubled it in this case too. In addition, three slots will be auctioned for WiMax spectrum and another for CDMA operators. It has also been agreed to double the base price for WiMax players from Rs 1,010 crores to Rs 2,020 crores. For CDMA operators, the base price will be Rs 500 crores as they will get only 1.25 MHz spectrum as compared to 5 MHz for GSM operators. State-owned BSNL and MTNL have already been given spectrum for both 3G and WiMax services.

Spectrum or radio frequencies are airwaves on which telecom signals travel. The availability of 3G spectrum, vital for high-end services such as video conferencing and high-speed internet on the mobile, varies across different regions of the country, according to an internal note of DoT.

The Telecom Ministry's latest assessment reveals that only four private players can be given airwaves for offering these high-end services in Delhi, while in Mumbai there is enough frequency for eight players. Key circles, such as Andhra Pradesh, Karnataka and Tamil Nadu have space for 11 private players each. A minimum of six private operators can be given these airwaves in all circles except in Uttar Pradesh, Himachal Pradesh, North East, West Bengal and Rajasthan. (refer table).

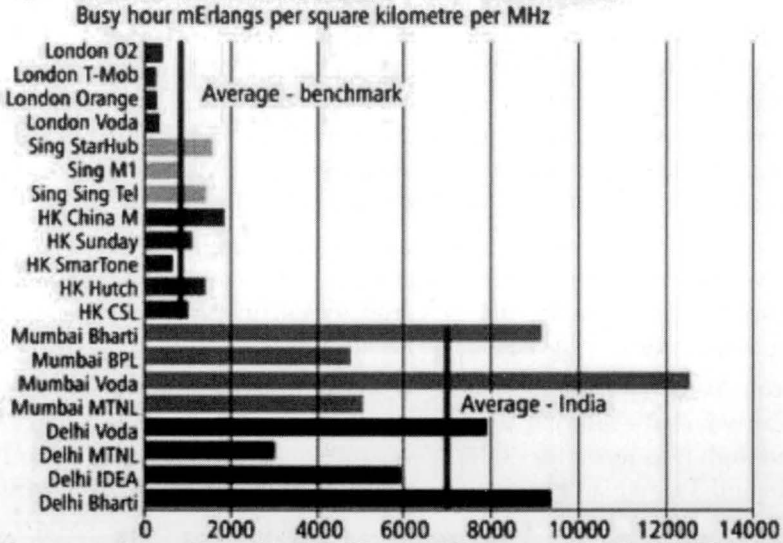
Our spectrum usage is not driven by net benefits. So, India has the most 'efficient' use of spectrum as measured by traffic-per-unit-of-spectrum, according to a report by consultants to the Spectrum Allocation Committee (SAC) which made its recommendations in May this year.

#### Enough to Spare

<b>Circles</b>	<b>Total spectrum available (MHz)</b>	<b>Blocks available after allocation to BSNL/MTNL</b>
Kolkata, AP, Karnataka, TN, Kerala, Orissa	60	11
Haryana, MP	50	9
Punjab	45	8
Mumbai, Bihar, Maharashtra	40	7
UP (east), J&K, Assam	35	6
UP(west), HP	30	5
Gujarat, Delhi	25	4
Rajasthan, WB, North-East	10-20	1-3

However, the consultants point out that India is burdened with additional costs, as we need both more equipment and better technology. Further, by restricting spectral carrying capacity, we get less overall utility.

**Fig 1 SPECTRAL EFFICIENCY BY COUNTRY**



In India, a communications company gets a small sliver of spectrum depending on its technology, *i.e.*, GSM operators get 8.8 MHz, while CDMA operators get 5 MHz. Once these companies get subscribers, the government provides another sliver of spectrum. Further, the amount of spectrum provided for a given level of subscribers has been reduced from one-half to one-fourth between 2006 and 2008. That's like reducing NH1 to a single lane each way.

India has more operators per circle than anywhere else, higher network costs, and services nowhere near as good. Consequently, operators have to use more equipment inefficiently because of limited spectrum. Second, they need more advanced (*i.e.*, expensive) technology to make the most of each unit of spectrum. Third, service quality drops as the density of subscribers saturates the capacity of available spectrum; else, they must invest more to prevent deterioration.

Other countries have three to five operators (China, Hong Kong, Indonesia, Malaysia, the Netherlands, Pakistan, Singapore, South Korea and the UK), while India has 11 to 12 operators per circle with more expected, going up to 14-16. Spectrum auctions imply more operators and even more intense, inappropriate competition. India's policy of a large number of operators leads to fragmented spectrum assignment, with lower traffic capacity for a given amount of spectrum (like narrow roads in land use). The consultants estimate that India's spectrum usage is eight times more intense than in the UK, Hong Kong or Singapore. Operators in these countries have from 16 MHz to 26 MHz, the latter for the Netherlands, UK, Singapore and Malaysia. Pakistan has 14 MHz.

The average spectrum per operator in these countries is nearly 22 MHz with far better services, against India's average of 5.5 MHz. Advanced technology in India implies significant costs for operators as well as for users, because of more advanced handsets. The consultants suggest that advanced technology be deployed only when it is cost-effective. India has issued 281 licences for the country's 22 telecoms zones, or up to 14 licences per zone. These include 122 licences from 575 applications received in 2007 from 46 firms, including real-estate and technology firms with no telecoms experience.

### **Latest issues related to spectrum allocation in India**

Currently, there is no consensus between the Finance Ministry and the Communications Ministry on key issues related to 3G auctions, such as the base price for these radio frequencies as well as the number of players to be allowed to offer these high-end services. According to DoT officials, 5 MHz of 3G spectrum will be given to six highest bidding operators. While the Telecom Ministry earlier wanted 3G spectrum to be given to at least eight players, the Finance Ministry was pushing for five.

The Spectrum Allocation Committee (SAC) Report, (May 2009), has some constructive recommendations, *e.g.*, an expert group to rationalize the use of the entire spectrum, a uniform spectrum fee, and fewer operators to avoid fragmentation as in other countries.

Some recommendations, however, are seriously flawed from a net benefits perspective, *i.e.*, faster, more ubiquitous services at reasonable costs. One of these is a preoccupation with pricing and spectrum auctions, whose goal — collecting revenues — is in conflict with the goal of net benefits.

Another is delinking service licences from spectrum allocation, whereas access to spectrum may be the most effective way to deliver services. Unfortunately, the committee's charter did not stipulate net benefits and broadband as goals. Therefore, the committee did not address either. The government needs to act on the SAC's positive recommendations, while reviewing and addressing the basic purpose of communications, which is presumably for net benefits ('welfare') in the public interest.

### **Conclusions**

By setting different goals, *e.g.*, efficient capacity resulting in net benefits, we could capitalize on economies of scale and increase net benefits. This implies a less fragmented spectrum, with a lower number of operators as in other countries. Less fragmented spectrum also allows a lower number of cells in a given area with more capacity, *i.e.*, lower costs. These are compelling reasons for more generous spectrum allocation.

India must follow international spectrum allocation for various types of services. The benefit is the availability of equipment meeting international service requirement. The real problem is that a large amount of spectrum is reserved with the Government Departments and their reluctance to part with it. The country is large and to compare India with Britain as regards the number of players is, in my opinion, wrong. One could compare with the USA where the number of commercial



operators is large. The spectrum must be related to the service and follow international norms. In India, it is not the operator who decides the technology but the Government.

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