Bulletin

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TRAI Guidelines on Spectrum Sharing

The TRAI recommendations on spectrum sharing could be the next logical step in the development of India's telecom sector. The gains in network efficiency that sharing can provide will benefit operators and customers alike. However, the detailed terms and conditions suggested by the TRAI in its draft recommendations could have broader repercussions than immediately apparent.

The Telecom Regulatory Authority of India (**TRAI**) has released its recommendations on 'Guidelines on Spectrum Sharing' (**Proposed Guidelines**) suggesting that sharing of spectrum between operators should be permitted, as long as certain minimum conditions are fulfilled. If accepted by the Government, this will be the next logical step towards the development of a modern telecom network in the country.

Infrastructure Sharing

In the decades before liberalisation of the telecom sector, the state owned monopoly, BSNL (MTNL in the metros) had had dismal success in rolling out telecom infrastructure through the length and breadth of this country. Which is why, when the government finally opened the sector to private sector ownership, it did so with policies aimed at encouraging the development of telecom infrastructure in order to increase telecom penetration in the country so much so that the initial regulatory framework forced telecom companies to invest in building their own infrastructure. As a result, the early pioneers of the Indian telecom market built their own towers, created their own infrastructure and jealously guarded their assets – as that was what gave them the competitive advantage over their competitors and the incumbent.

In 2004, amendments to the telecom regulations allowed telcos to share passive infrastructure. However, this was an idea that took some time to catch on, and in April 2007 less than 25% of the sites had implemented passive sharing of infrastructure. It took three telecom giants – Vodafone Essar, Bharti and Idea Cellular to join hands in an unprecedented partnership that saw each of them throw their infrastructure assets into a joint venture called Indus Towers, to demonstrate that infrastructure could be shared efficiently and profitably. Indus Towers is now the country's largest tower infrastructure company and provides passive infrastructure to multiple operators outside of the three principal shareholders.

Today, passive infrastructure companies form the backbone of the Indian telecom industry. All Indian telcos rent at least part (if not all) of their passive assets such as towers, generator sets, etc. from massive tower companies whose sole business is to manage these tower assets that dot the length and breadth of the country. It was this ecosystem of passive infrastructure companies that allowed new entrants in 2008, including Uninor, Etisalat and Videcon, to roll out their operations in the country as quickly as they did – a feat they could never have hoped to complete if it were not for sharing models that allowed them to significantly reduce their time to market.

While the passive sharing ecosystem grew rapidly in the country, the sharing of active network elements is yet to gain traction in India. Although the DoT allowed the sharing of RAN, antennae, feeder cables etc. in April of 2008, there has been little, if any, implementation of

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active infrastructure sharing by telcos. One major concern cited by operators relates to the lack of clarity in the regulations as to how the active elements of the infrastructure can be shared without impinging on the prohibition against spectrum sharing. Given this uncertainty, most operators may have decided against sharing their RAN at all. In addition, others have cited technical difficulties in making the equipment of both the telcos interoperable, and the operational challenges attendant on the complex negotiations and sharing of confidential subscriber data with tower companies and competitors that this would entail.

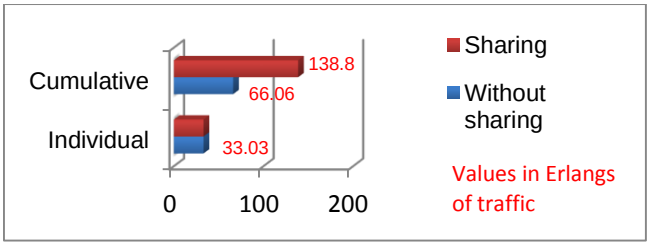
Spectrum Sharing

Today, telcos continue to be saddled with high capex and operational costs, making it difficult to develop high-capacity networks to service India's growing mobile market. Monthly ARPU for GSM services is at INR 113 (TRAI: March, 2014) and OTT services have hit traditional revenue generators such as SMS and VAS. Besides profitability concerns, network inefficiencies have also resulted in poor service across the board. Telcos have complained that inadequate spectrum is the direct cause of the falling quality of service (**QoS**) standards and have raised demands for the release of additional spectrum in order to address this.

The Proposed Guidelines seek to address network efficiency concerns by allowing telcos to leverage non-linear gains in spectral efficiency. This can be better explained in the context of the chart reproduced below. If two operators holding 5 MHz of spectrum each were to share their spectrum, it is possible to minimise network congestion and carry greater amounts of traffic. While the two operators in this example can cumulatively carry 66.06 Erlangs of network traffic without sharing spectrum, implementing a sharing model would allow them to carry 138.08 Erlangs, which is more than double the sum of their individual capacities.

Non-linear gains in spectral efficiency (in Erlangs of traffic)

138.08 > (33.03 + 33.03) x 2



Key Aspects of the Proposed Guidelines

In this context it is important to understand the key elements of the proposed guidelines to understand better how they impact consumers and telecom companies in India.

- **Inter-band sharing:** The Proposed Guidelines permit sharing between two access licensees, provided both licensees have spectrum in the same circle and in the same band. This condition could have a significant impact given the superiority of some frequency bands over others. For instance, the 900 MHz band is widely acknowledged to be more efficient over a greater distance than the 1800 MHz since the lower frequency produces higher wavelengths, allowing these signals to travel greater distances far more efficiently than the higher bands.

  Under the Proposed Guidelines, early entrants such as Airtel and Vodafone will not be able to share their spectrum in the 900 MHz band with new players such as Uninor or Videocon that hold spectrum in the 1800 MHz band. Reliance Jio (2300 MHz and 1800 MHz) and Reliance Communications (800 MHz and 2100 MHz) will also be hit by the ban on inter-band sharing, based on their current spectrum holdings.

- **Usage Charges and Share of Spectrum**: The Spectrum Usage Charge (**SUC**) will be chargeable on the entire service area, even if a portion of it is used to build a common RAN and share spectrum. The revised SUC is illustrated as follows:

SUC	
Prior to Sharing	6% of AGR
After sharing	6.5% of AGR

  Since this is only a marginal increase, it is hardly likely to discourage operators from sharing their spectrum holdings. In fact, sharing could be seen to be a viable alternative to mergers and acquisitions (**M&A**) as a path to acquiring additional spectrum, given that, under the new M&A guidelines, operators are obliged to true up the value of any acquired spectrum that has been administratively allocated.

  While the Guidelines for Mergers and Acquisitions, released by the DoT in February of 2014, pegs the market cap for spectrum of the resultant entity at 50% of the total spectrum assigned in that band in a service area, the Proposed Guidelines recommend the application of a new formula in the context of spectrum sharing, as follows:

	Before sharing	After sharing
Licensee 'A'	X	X + (Y/2)
Licensee 'B'	Y	Y + (X/2)

This could, however, play out differently in different bands depending on the competition. For instance, since there are as many as eight operators in the 1800 MHz band in the Mumbai circle, it is unlikely that the prescribed spectrum caps will be breached in Mumbai if any two telcos agree to share spectrum. On the other hand, only three or four operators currently hold spectrum in the 800 MHz (CDMA), 2100 MHz (3G) and 2300 MHz (BWA) bands across all circles. Sharing of spectrum between two out of three operators will probably be hit by the spectrum cap under the Proposed Guidelines. It is reasonable to expect that we will see more spectrum sharing agreements being entered into for 2G GSM services, as opposed to the CDMA, 3G, BWA bands.

- **Unliberalised spectrum**: Pursuant to spectrum sharing, if any one of the two licensees holds unliberalised spectrum, both operators can provide only those services which are permitted using the unliberalised spectrum. This regulation is likely to particularly affect early entrants such as Vodafone and Bharti Airtel, which continue to hold unliberalised spectrum, and could be a disincentive to sharing if the earlier players are looking to retain any advantages they get from holding off from migrating to the unified license regime. On the other hand, the regulator will probably be hoping that the benefits afforded by spectrum sharing will be the impetus that they require to make the migration to a unified regime.

- **Leasing**: The Proposed Guidelines expressly prohibit spectrum leasing, involving the transfer of usage rights in spectrum to another party. Having said that, it is possible that spectrum trading will be permitted in the near term, given TRAI's recent publication of the 'Working Guidelines on Spectrum Trading'.

- **Roll-out obligations and QoS**: Under the Proposed Guidelines, existing roll-out obligations and the prescribed QoS standards will continue to apply to operators who share spectrum. Therefore, regardless of whose RAN is being shared, the telco will be answerable to customers and the DoT in relation to its roll-out and QoS obligations.

[1] ***Disclaimer***: *These figures are based on publicly available information and may vary. Trilegal cannot guarantee the accuracy of this data.*

Impact on the Industry

There is little doubt that these Proposed Guidelines will have a profound impact on the industry as it exists today. Both, larger telcos such as Airtel, Vodafone and Idea and smaller telcos such as Uninor and Videocon operating in the 2G GSM band stand to benefit from spectrum sharing in several circles where one holds a greater quantity of spectrum compared to the other.

In the Mumbai circle, the existing spectrum holdings of operators is as follows:[1]

	900 MHz	1800 MHz	2100 MHz	2300 MHz
Airtel	5.0	15.2	5.0	20
Vodafone	11.0	8.2	5.0	-
Idea	-	6.4	-	-
Reliance Jio	-	6.6	-	20
Reliance Comm.	-	5.0	5.0	-
TTSL	-	4.4	-	-
Aircel	-	4.4	-	-

Airtel could clearly share its spectrum holding in the 1800 MHz band with Vodafone, in the same band in the Mumbai circle. Similarly, Airtel and Idea could consider entering into a spectrum sharing agreement for the 1800 MHz band, and still remain within the prescribed spectrum caps. Even smaller players such as TTSL and Aircel that hold spectrum in the 1800 MHz band in Mumbai can improve their network efficiency by sharing spectrum with each other.

However, the Proposed Guidelines would not permit spectrum sharing across the board between Reliance Jio and Reliance Communications – two companies widely reported to be entering into extensive infrastructure sharing agreements. The table below lists their spectrum holdings in different frequency bands:

	Reliance Jio	Reliance Communication
800 MHz	No	Yes
1800 MHz	Yes	Yes
2100 MHz	No	Yes
2300 MHz	Yes	No

Although old telcos that hold larger quantities of spectrum are most likely to gain from the Proposed

Guidelines, the gains in network efficiencies from sharing would be available to all telcos, irrespective of their spectrum holdings. Given the current spectrum holdings and the prescribed spectrum caps, the Proposed Guidelines do not favour CDMA, 3G and BWA band sharing in most circles. Once the guidelines have been finalised, telcos wishing to enter into spectrum sharing arrangements will have to carefully analyse commercial terms and take adequate precautions in drafting their sharing agreements to allocate responsibility in rectifying QoS failures and to address the operational details in coordinating with tower companies.

If there is one thing that the government should re-consider, it is possibly the restriction on inter-band sharing that would clearly hamper the ability of telcos to deploy next-generation networks. The Proposed Guidelines have been designed to encourage network efficiency, and there is no doubt that operators who share spectrum will experience improvements in traffic carriage.

It is likely that the government recognises the need to implement spectrum sharing if it wants to achieve its ambitious broadband penetration target of 175 million connections by 2017. This target will only be reached if telcos employ RAN-sharing models in both rural and urban areas, and may require the state-owned BSNL to be open to sharing agreements with private players in rural areas where it has the maximum coverage of all the telcos. While BSNL has, historically, been reluctant to enter into sharing agreements, despite its vast wireline infrastructure being largely underutilised with over 4,000 microwave repeater stations sitting idle across the country, its active participation will unlock tremendous potential for rural consumers of telecom services.

Finally, the Proposed Guidelines will benefit consumers who have been plagued by poor data services and frequent call drops. Spectrum sharing is likely to result in improved wireless data speeds, and see the growth of an entire ecosystem enabled by telecommunications, including mobile apps, e-governance initiatives, OTT services, VAS, e-governance and social mobile apps and cross-border information flows. When taken together with the NTP objectives, the Proposed Guidelines, if finalised in their current form, could be the most useful policy measure initiated by the government in the recent past. It is likely that telcos will employ spectrum sharing models to roll out their networks into the hitherto neglected rural areas, leading to better coverage and reception for rural subscribers. In urban markets, the non-linear gains from spectral efficiencies can boost internet speeds, which would accelerate the adoption of data services amongst users, leading to an increase in ARPU's for telcos.