



IIM Ahmedabad IDEA Telecom Centre of Excellence

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To Dr JS Sarma  
Chairperson  
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Dear Dr Sarma,

Thanks for providing this opportunity to share views on Overall Spectrum Management and Review of License Terms and Conditions. Enclosed are my views.

Thanks

Rekha Jain  
12/11/2009

## **Comments on the Consultation Paper on Overall Spectrum Management and Review of License Terms and Conditions dated 16<sup>th</sup> October, 2009.**

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The objective of the Consultation paper is the “need to take a comprehensive look at different issues concerning spectrum availability for telecom services and its management”. In this context, it is worthwhile to examine the approach of other regulators.

*Driven by economic opportunity presented by the growth of wireless, technological changes and a move towards greater deregulation, several regulators, namely the FCC, Ofcom etc had announced mechanisms for review of spectrum management. For example, Ofcom came out with a spectrum Framework Review in June 2005. (<http://www.ofcom.org.uk/consult/condocs/sfr/sfr2/>)*

*For both FCC and Ofcom, the focus was on the strategic review of the spectrum allocation and management processes, rather than on detail of spectrum allocation in specific bands. Both wanted to move towards greater allocation to license exempt bands, and where that was not possible, to use market mechanism for allocation of spectrum. Also, both the reviews specify a market based mechanism for allocation of spectrum in new bands (auctions )and a progressive approach towards greater flexibility to service providers regarding the services that may be provided using spectrum. Both Ofcom and FCC Task Force state that their effort would progressively move from “command and control” models to reliance on market mechanisms and greater use of license exempt bands.*

*A key basis of the review was the acknowledgement that the legacy command and control regime had led to many portions of the spectrum not in use for significant period of time and there was significant scope to improve the use of “white spaces” both geographically and temporally.*

*There was recognition that different approaches would be suitable for the various parts of the spectrum. The review laid out a roadmap for the transition from a predominantly “command and control” models to greater license exempt and market mechanisms.*

*In light of the significant value of spectrum to economic growth, it is time that TRAI undertakes a comprehensive spectrum policy and framework review within which the parameters of future governance such as organizational structure, relationship of spectrum managers to other institution, instruments etc should e worked out.*

*A strategic review should lay down the policies for allocation, management, refarming etc and be based on principles of fair allocation, parity in pricing across different technologies/ standards, service/technology neutrality, user pays (including*

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<sup>1</sup> Views are personal

government) and be forward looking. For example, service/technology neutrality could include not allocating spectrum based on types of services (broadcast/ telecom), technology (GSM/ CDMA) and generation of service (2G/2.5G/3G). This would also enhance property rights and let the market decide the most efficient use of the spectrum.

The key elements of such a policy should cover the following:

- A framework for managing the entire range of spectrum bands (not only for the spectrum for cellular operators). Development of a comprehensive blueprint that should provide a strategic perspective on new services such as digital TV, the time frame for their introduction, the standards to be adopted. It should also include the spectrum likely to be available due to technological developments and from other government sources). This should include a Framework for compensation for refarming spectrum.
- The Strategic Review should also provide for the creation of a separate fund for spectrum management. The operators have been giving an entry fee and a percentage of their revenues as an annual charge. A part of the annual charges should constitute the Spectrum Management Fund. The amounts so collected should be used to provide for refarming. The committee should work out a mechanism by which there is an incentive for the incumbent operator to make available the spectrum it is not using or shift to alternate bands. On the other hand, if the incumbent does not relieve the spectrum within the specified time frame for commercial purposes, it will have to pay compensation. The amount of compensation should be a deterrent for the incumbent.
- It should suggest the instruments that are to be used for managing this critical resource across all bands (such as auctions etc), otherwise, there will be problems when the same services could be provided in different bands or the services or devices become indifferent to the specific band. TRAI should adopt forward looking instruments and start to provide guidelines for operating and managing the new instruments. This should also include the scope for experimenting with newer mechanisms such as entitlements. This would be a move towards operator flexibility.
- The Strategic Review should formulate an approach suggesting the time frames over which the policy will progressively move from a predominantly command and control to greater focus on license exempt and market mechanisms.
- A review of the governance structures and processes. It should review the role, responsibilities and functioning of the existing bodies in spectrum management and suggest how to change it, to enable new services and applications. Specifically an organizational review of the structures and processes of WPC, any possible restructuring, short and longer term training requirements for WPC need to be worked out. A review of SACFA processes is also required.

- *A framework for enhancing R & D and manufacturing.*

#### *Some General Points*

- *In the current Consultation Paper, the questions are at very different levels of granularity. While some of the questions deal with the overall frameworks for new regulatory instruments such as trading and sharing, others are more detailed such as what should be the unit of trading. Given that so many different topics were dealt with in this paper, it would have been useful to divide this consultation in to macro and micro issues. For example, if TRAI does not recommend trading, there is no point in suggesting the smallest unit of trading.*
- *The Consultation Paper should provide scope to incorporate new regulatory models such as sharing and non exclusive licenses, use of white spaces etc, while this is an opportune time to do so. These regulatory instruments have already been deployed as in the experimental license granted by FCC to Spectrum Bridge to use TV white space for provision of wireless broadband to communities that did not have such access (<http://www.cellular-news.com/story/40193.php> accessed on November 10, 2009).*
- *The 2007 TRAI Recommendations (Pg 20-27.Recommendation on Review of license terms and conditions and capping of number of access providers, TRAI-August 28, 2007) on not capping the number of access providers is to be seen in the context of TRAI's recognition of paucity of spectrum for service provision in the existing allocated bands. The cap on access providers had been relaxed for those services where spectrum may not be required.*
- *While the views of an "eminent" technical expert are provided, the rationale for his /her view and corroboration from other sources are not provided. A public consultation paper should be more open.*
- *According to this consultation paper around 30% of the total mobile subscribers have subscribed to GPRS services as on June 2009 (Page No. 11), But the TRAI, The Indian Telecom Service Performance Indicators, April- June 2009 (Page No. 28) indicates 30% of the users are **capable** of accessing Data Services. Please clarify. If a user is able to access certain services it does not mean that he/she is using it.*

#### **Spectrum Requirement and Availability**

1. Do you agree with the subscriber base projections? If not, please provide the reasons for disagreement and your projection estimates along with their basis?
2. Do you agree with the spectrum requirement projected in ¶ 1.7 to ¶1.12? Please give your assessment (service-area wise).

*Yes, by and large these estimates are OK. I would believe that these estimates should be used to derive spectrum requirements.*

*But nowhere in the Consultation Paper is this estimate used to derive spectrum requirements. In addition, spectrum requirements will depend on the new kinds of applications and services that are made available for the future, their costs and relevance. More importantly, if more services are made available in the low power transmission, shared spectrum mode, then spectrum requirements are not linearly proportional to the number of subscribers.*

*However, the TRAI consultation paper examines the issue of spectrum requirements only in the context of 800/900/1800, 3G, BWA and LTE. Moreover, the availability for future wireless services is assessed based on the present spectrum allocations and availability. There is no scope provided to consider additional spectrum that may be made available based on re-farming. The data in the table below shows the availability of spectrum in India and US. With much lower number of subscribers, there are more spectrums available in USA.*

*The TRAI consultation paper should examine alternative sources of spectrum for commercial purposes.*

3. How can the spectrum required for Telecommunication purposes and currently available with the Government agencies be re-farmed?

*A policy agenda that focuses on spectrum as a scarce resource and one that has increasing has potential for commercial services needs to be established. A number of instruments may be used for re-farming from government agencies. These include a **systematic audit** of spectrum usage, creation of **compensation funds, pricing incentives, and secondary trading**.*

*The framework must emphasize the commercial aspects of usage. Agencies involved in specific public goods provision such as disaster management, public safety, police etc need to be incentives to shift to more **efficient bands and technology**. Those that are using analog (Public broadcasting) must have a clear cut **time frame** for shifting. The released spectrum may be auctioned to commercial users. The funds generated from this exercise may be used to allow the public agency to make the transfer. In any case, such agencies should have **monetary and efficiency considerations** to utilize improved technologies. Where reframed spectrum auctions do not meet the costs of shifting, such costs should be met through a spectrum re-farming fund. There should be a review mechanism to ensure that such agencies continue to upgrade their networks and use technology most efficiently.*

*This issue has been discussed in the Spectrum Management Committee in the context of Defense Services in 1998. The Spectrum Management Committee, 1998 had recommended that a fund for facilitating re-farming of spectrum be created from the revenue share of the mobile operators. Though the cellular operators have paid the revenue share, the Fund has not been created. The creation of such fund would have incentives the incumbents to move to other bands. The government needs to formalize this arrangement. This point has also been stressed in the report of the Standing Committee.*

*(Sources: A Framework for Review of Indian Spectrum Management Policies – [www.iimahd.ernet.in/iitcoe](http://www.iimahd.ernet.in/iitcoe)).*

*Examples from other countries, include USA, European Commission and UK. As per the Spectrum Relocation Report, (USA) 2006 “In December 2004, the Congress passed the Commercial Spectrum Enhancement Act to provide a mechanism for federal entities to receive compensation when federal government stations as assigned to certain frequency bands incur relocation costs because of the relocation of frequencies from federal to non-federal use” ([http://www.ntia.doc.gov/ntiahome/press/2006/specRelo\\_hrs5419.doc](http://www.ntia.doc.gov/ntiahome/press/2006/specRelo_hrs5419.doc) ) Until September, 2006, the National Telecommunication and Information Administration (NTIA) identified 225 MHz of spectrum with the estimated cost of relocation of federal users of between (\$ 477million to \$592 million).*

*The European Commission Report (<http://circa.europa.eu/Public/irc/infso/rspg/home> ) states that “in some Member states, public sector bodies pay the same spectrum fees as any other private undertaking using spectrum...The fact that public sector bodies pay spectrum fees is regarded as contributing factor to increase spectrum efficiency”.*

*In UK, the Spectrum Framework for the Public Sector statement published in January 2008 (<http://www.ofcom.org.uk/consult/condocs/sfrps/statement>) states “..Complementary initiatives include: adoption of presumptions that public bodies will acquire spectrum through market save in exceptional circumstances...a review of arrangements for managing spectrum used by emergency and public safety services”*

4. In view of the policy of technology and service neutrality licences, should any restriction be placed on these bands (800,900 and 1800 MHz) for providing a specific service and secondly, after the expiry of present licences, how will the spectrum in the 800/900 MHz band be assigned to the operators?

*When licences are technology and service neutral, then restrictions on provisions can not be placed. After expiry of the license, operators would need to participate in auctions for the spectrum.*

5. How and when should spectrum in 700 MHz band be allocated between competitive services?

*Since spectrum in the 700 MHz band has extremely good propagation characteristics and there is a huge demand for it (as shown by the January 2008 auction of 700 MHz in USA), a plan to exploit the “digital dividend” should be put forth at the earliest.*

6. What is the impact of digital dividend on 3G and BWA?

*Countries such as USA have already made this spectrum available for 3G and BWA. UK and Japan have plans to do so. The lower cost of service provision and better propagation characteristics make it suitable for both rural (reduction in number of sites) and urban (indoor coverage).*

## Licensing Issues

7. Should the spectrum be delinked from the UAS Licence? Please provide the reasons for your response.

*UASL should be delinked from spectrum license. An operator could provide fixed line services without having a requirement of spectrum (also the recommendation from TRAI's Recommendation dated 28<sup>th</sup> August, 2007). Though, in practice, most operators want to operate wireless services as well due to the future growth potential in such services.*

8. In case it is decided not to delink spectrum from UAS license, then should there be a limit on minimum and maximum number of access service providers in a service area? If yes, what should be the number of operators?

*If it is decided not to delink spectrum from UAS license (though why should two separate entitlements: the right to provide access services and the right to use spectrum in its provision should be bundled is not clear), there has to be a limit on the number of access providers in an exclusive non sharing mode of spectrum allocation due to the limited amount of spectrum available in any band.*

9. What should be the considerations to determine maximum spectrum per entity?

*There would be some technical minimum requirements for any service plus some additional requirements for efficiency considerations.*

10. Is there is a need to put a limit on the maximum spectrum one licensee can hold? If yes, then what should be the limit? Should operators having more than the maximum limit, if determined, be assigned any more spectrum?

*Yes, as long as an exclusive non sharing mode of spectrum allocation is followed, and there is more demand than supply. This will encourage competition. Where is the question of assigning "more spectrum" once a "limit on maximum spectrum is established"?*

11. If an existing licensee has more spectrum than the specified limit, then how should this spectrum be treated? Should such spectrum be taken back or should it be subjected to higher charging regime?

*Treatment of spectrum allocation over the specified limit should be to take this spectrum back and then auction it. Although in both instances the concerned entity is going to "pay a price", either in terms of forgoing services to some subscribers, additional capital investment that may need to be made to provide "equivalent coverage" as before or higher charging regime, the additional spectrum if allowed to be allocated to the concerned entity could provide significant advantage to it without other entities having a fair chance of accessing it.*

12. In the event fresh licences are to be granted, what should be the Entry fee for the license?
13. In case it is decided that the spectrum is to be delinked from the license then what should be the entry fee for such a Licence and should there be any roll out condition?

*Entry fee may be used to deter non serious entry. Despite this, in order to mitigate the costs of entry, the entry fee could be paid back to operators on fulfilling certain roll out obligations (thus guaranteeing revenues to the government through service tax etc).*

14. Is there a need to do spectrum audit? If it is found in the audit that an operator is not using the spectrum efficiently what is the suggested course of action? Can penalties be imposed?

*There is a need to do spectrum audit, as large parts of spectrum are unutilized (due to variable demand from subscribers). The objective of spectrum audit should be to understand better methods of spectrum allocation. For example, the deployment of new services in the TV white spaces in the US recently (<http://www.cellular-news.com/story/40193.php> accessed on November 10, 2009). In UK, an independent audit of spectrum was undertaken in December 2005(<http://www.ofcom.org.uk/consult/condocs/sfrps/statement>)*

*Since operators have already paid the determined spectrum price, it would not be fair to penalize them if the audit reveals inefficient usage. However, incentives should be created for efficient utilization by allowing the operator to opportunistically allow other operators (if they have such services), to utilize the spectrum that is not being used. (No operator can use all the spectrum all the time over all geographic areas). The mechanism to allow this mode of operation, will need an appropriate regulatory framework..*

15. Can spectrum be assigned based on metro, urban and rural areas separately? If yes, what issues do you foresee in this method?

*This could be done, however the definition of what constitutes metro, urban and rural areas needs to be defined and discussed. This approach will give more commercially oriented allocation as these are different markets and customer segments. In USA, the allocations are based on “Major Trading Areas (MTAs) and Basic Trading Areas (BTAs)”. However, the definitions of these geographic entities would change over time, and may require review within the license period. Moreover, there would be a need to evolve an appropriate interconnection framework.*

16. Since the amount of spectrum and the investment required for its utilisation in metro and large cities is higher than in rural areas, can asymmetric pricing of telecom services be a feasible proposition?

*The contention that “Since the amount of spectrum and the investment required for its utilisation in metro and large cities is higher” needs to be qualified. In urban areas, the number of customers is large and population densities are higher, the additional investments in spectrum for service can be offset against potential larger revenues. The*



*cost per subscriber in urban areas is lower with corresponding higher Average Revenue per User.*

*Therefore, it is not only the spectrum costs that determine price of services but other elements like equipment, interconnection costs, marketing costs are equally important.*

## **Merger and Acquisition**

17. Whether the existing licence conditions and guidelines related to M&A restrict consolidation in the telecom sector? If yes, what should be the alternative framework for M&A in the telecom sector?
18. Whether lock-in clause in UASL agreement is a barrier to consolidation in telecom sector? If yes, what modifications may be considered in the clause to facilitate consolidation?
19. Whether market share in terms of subscriber base/AGR should continue to regulate M&A activity in addition to the restriction on spectrum holding?
20. Whether there should be a transfer charge on spectrum upon merger and acquisition? If yes, whether such charges should be same in case of M&A/transfer/sharing of spectrum?
21. Whether the transfer charges should be one-time only for first such M&A or should they be levied each time an M&A takes place?
22. Whether transfer charges should be levied on the lesser or higher of the 2G spectrum holdings of the merging entities?
23. Whether the spectrum held consequent upon M&A be subjected to a maximum limit?

*Please see the report of the Second Committee*

## **Spectrum Trading**

24. Is spectrum trading required to encourage spectrum consolidation and improve spectrum utilization efficiency?
25. Who all should be permitted to trade the spectrum ?
26. Should the original allottee who has failed to fulfill “Roll out obligations” be allowed to do spectrum trading?
27. Should transfer charges be levied in case of spectrum trading?
28. What should be the parameters and methodology to determine first time spectrum transfer charges payable to Government for trading of the spectrum? How should these charges be determined year after year?

*Please see the report of the Second Committee*

29. Should capping be limited to 2G spectrum only or consider other bands of spectrum also?

*With changing technology it is difficult to specify what is a 2G band as ITU has cleared existing bands and services and equipments are available in existing 2G bands for 3G and BWA services.*

30. Should size of minimum tradable block of spectrum be defined or left to the market forces?

31. Should the cost of spectrum trading be more than the spectrum assignment cost?

*Please see the report of the Second Committee*

### **Spectrum Sharing**

32. Should Spectrum sharing be allowed? If yes, what should be the regulatory framework for allowing spectrum sharing among the service providers?

33. What should be criteria to permit spectrum sharing? Give your comments with justification.

34. Should spectrum sharing charges be regulated? If yes then what parameters should be considered to derive spectrum sharing charges? Should such charges be prescribed per MHz or for total allocated spectrum to the entity in LSA?

35. Should there be any preconditions that rollout obligation be fulfilled by one or both service provider before allowing the sharing of spectrum?

36. In case of spectrum sharing, who will have the rollout obligations? Giver or receiver?

*Please see report of the Second Committee*

### **Extensions of Licenses**

37. Should there be a time limit on license or should it be perpetual?

38. What should be the validity period of assigned spectrum in case it is delinked from the licence? 20 years, as it exists, or any other period?

39. What should be the validity period of spectrum if spectrum is allocated for a different technology under the same license midway during the life of the license?

40. If the spectrum assignment is for a defined period, then for what period and at what price should the extension of assigned spectrum be done?
41. If the spectrum assignment is for a defined period, then after the expiry of the period should the same holder/licensee be given the first priority?

### **Licensing Fees**

42. What are the advantages and disadvantages of a uniform license fee?
43. Whether there should be a uniform License Fee across all telecom licenses and service areas including services covered under registrations?
44. If introduced, what should be the rate of uniform License Fee?

### **Spectrum Assignment**

45. If the initial spectrum is de-linked from the licence, then what should be the method for subsequent assignment?
46. If the initial spectrum continues to be linked with licence then is there any need to change from SLC based assignment?

*Various committees have suggested that SLC is not tenable and is distortionary (including the Second Committee). Each winner in an auction process must get a predefined amount of spectrum.*

47. In case a two-tier mechanism is adopted, then what should be the alternate method and the threshold beyond which it will be implemented?

*What is a two tier mechanism?*

48. Should the spectrum be assigned in tranches of 1 MHz for GSM technology? What is the optimum tranche for assignment?
49. In case a market based mechanism (i.e. auction) is decided to be adopted, would there be the issue of level playing field amongst licensees who have different amount of spectrum holding? How should this be addressed?

*As suggested by the Second Committee, a new auction process must reflect the valuation of the spectrum by each entity. This valuation takes in to account the past availability with the operator and future business plans. There is no absolute level playing field in any case.*

50. In case continuation of SLC criteria is considered appropriate then, what should be the subscriber numbers for assignment of additional spectrum?

*SLC should be done away with, so there is no need to look at models to arrive at appropriate SLC. Various developments (TEC, TRAI Committees, First Committee et.c) so far would have informed TRAI that any such estimate is based on a number of business and technical assumptions, which are open to interpretation and thus cause more regulatory uncertainty.*

51. In your opinion, what should be the method of assigning spectrum in bands other than 800, 900 and 1800 MHz for use other than commercial?

*If the question is how should spectrum in bands other than 800, 900 and 1800 MHz for use by public agencies then they too need to bid to discover the true price of service. Only some agencies, Defence, Public Safety etc need not pay from their budgets. However, such a market discipline will force them to look for efficient and possibly alternative technologies*

52. What in your opinion is the desired structure for efficient management of spectrum?

*Does this question refer to the desired Organizational Structure for Managing National Spectrum, or just about the allocation of bands and frequencies to different services etc? In case the reference is to the appropriate Organizational Structure, then as stated above, spectrum, like other resources such as the Numbering Plan, should be managed by the regulator, as is the practice in several other countries. The current dispensation in which the DoT governs spectrum is untenable, due to one of the competitive service providers, BSNL and MTNL being government owned entities. Only one aspect of spectrum allocation is about technology, the other aspect is about future business and economic growth. The latter aspects need an agency that has a user perspective. Ideally, there should be a national level committee that has representatives from commerce, industry, telecom, regulatory bodies, broadcasting, and academics to suggest and give broad policy level issues. Specific allocations and implementation may be left to TRAI.*

## **Spectrum Pricing**

53. Should the service providers having spectrum above the committed threshold be charged a one time charge for the additional spectrum?

*Already answered above.*

54. In case it is decided to levy one time charge beyond a certain amount then what in your opinion should be the date from which the charge should be calculated and why?

55. On what basis, this upfront charge be decided? Should it be benchmarked to the auction price of 3G spectrum or some other benchmark?

56. Should the annual spectrum charges be uniform irrespective of quantum of spectrum and technology?

57. Should there be regular review of spectrum charges? If so, at what interval and what should be the methodology?

*Definitely. Charges should reflect the commercial value exploited by the service provider from a public good. As technologies and businesses develop, this will change.*

## References

1. *A Framework for Review of Indian Spectrum management policies – Rekha Jain*
2. Spectrum Framework Review, Ofcom, June 28,2005
3. Spectrum Policy Task Force: Finding and Recommendations, Paul K. Kolodzy, Presentation to the international Symposium on Advanced Radio Technologies, March 2003
4. Standing Committee on Information Technology (2005-06), Ministry of Communications and Information Technology ( Department of Telecommunications), Spectrum Management , 28<sup>th</sup> Report, Lok Sabha Secretariat, New Delhi.
5. Telecom Regulatory Authority of India, Recommendation on Spectrum Related Issues, May 13, 2005, New Delhi.
6. Telecom Regulatory Authority of India, Report of the committee for “Allocation of Access (GSM/CDMA) Spectrum and Pricing”, May 2009
7. Telecom Regulatory Authority of India, Recommendation on Review of license terms and conditions and capping of number of access providers, August 28, 2007
8. Spectrum Relocation Report: Compensation Options for Relocation Costs of Federal Entities, September 2006; [http://www.ntia.doc.gov/osmhome/reports/2006/specrels\\_HR5419.doc](http://www.ntia.doc.gov/osmhome/reports/2006/specrels_HR5419.doc) .
9. Spectrum Framework Review-the Public Sector-statement; <http://www.ofcom.org.uk/consult/condocs/sfrps/responses/>