A PEEP INTO RF SPECTRUM ALLOCATION PROCESS IN INDIA

"India may be one of the world's biggest telecom success stories, but when it comes to quality of service, its mobile-telephony sector portrays a gloomy picture. Despite billions of dollars of investments over the past decade, the world's fastest-growing telecom market is still grappling with inadequate infrastructure, which is resulting in poor voice quality, dropped calls, undelivered messages, and of course, harassed customers."

Introduction :

1. Radio frequency spectrum is a limited natural resource. The word 'Spectrum' basically refers to a collection of various types of electromagnetic radiations of different wavelengths. In India, the radio frequencies are arbitrarily confined between 9kHz and 3000 GHz and are being used for different types of services like fixed communication, mobile communication, broadcasting, radio navigation, radiolocation, fixed and mobile satellite service, aeronautical satellite service, radio navigational satellite service etc. Some of the important and typical characteristics of the radio frequency spectrum are as below:-

(a) Radio frequency spectrum does not respect international geographical boundaries as it is spread over a large terrestrial area.

(b) Use of radio frequency spectrum is susceptible to overlapping interference and requires the application of complex engineering tools to ensure interference free operation of various wireless networks.

(c) Unlike other natural resources, radio frequency spectrum is not consumed upon its usage. It is also liable to be wasted if it is not used optimally and efficiently. Radio frequency spectrum usage is therefore to be shared amongst the various radio services and must be used efficiently, optimally and economically in conformity with the provisions of national and international laws.

The limitation of the radio frequency spectrum is mainly due to the following factors:-

(d) Propagation characteristics of different types of radio waves.

(e) Availability of technology and equipment for different types of radio frequency spectrum applications.

(f) The suitability of frequency bands for specific applications.

Spectrum Management at International Level

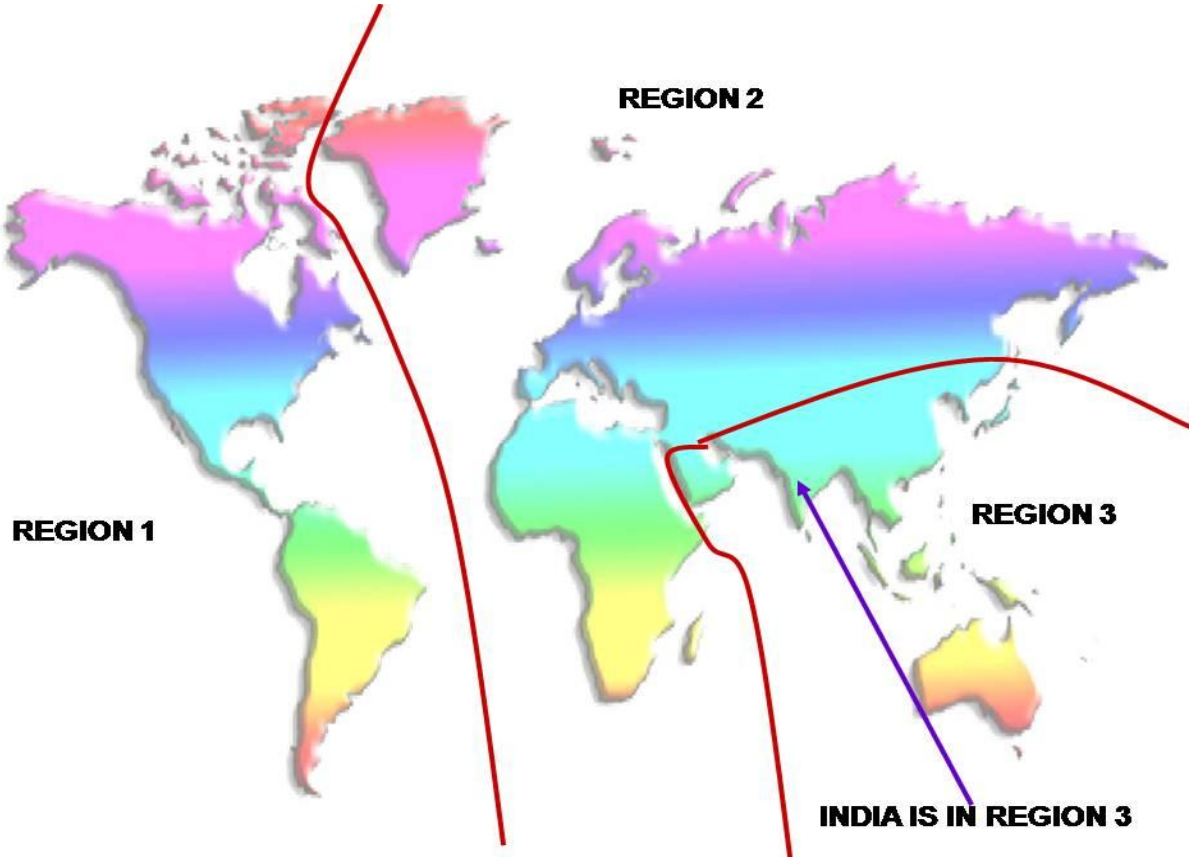
2. All nations share the electromagnetic spectrum and reserve their right to its unlimited use. However, for international telecommunications cooperation to support trade, transportation, communications, and mutual protection against interference, they have agreed to an International Telecommunications Convention. This serves as the basic instrument of the International Telecommunications Union (ITU) and its supporting

bodies. The United Nations recognizes the ITU as the specialized agency in the telecommunications field. The ITU maintains cooperation to improve all telecommunications. The ITU allocates the international radio frequency (RF) spectrum, registers frequency assignments, and coordinates resolving interference. Upon ratification by member nations, ITU regulations have treaty status. Each ITU member nation imposes regulatory measures within its administration. These measures must comply with the current Radio Regulations (RR) unless expressly excluded by either footnotes or by special arrangements.

The ITU Organization

3. The Plenipotentiary Conference is the supreme agency of the ITU. It formulates general policies, establishes budgetary guidelines, elects members, and concludes agreements between the ITU and other international communications organizations. The ITU has three organizations: the World Administrative Radio Conference (WARC), the International Frequency Registration Board (IFRB), and the International Radio Consultative Committee (CCIR).

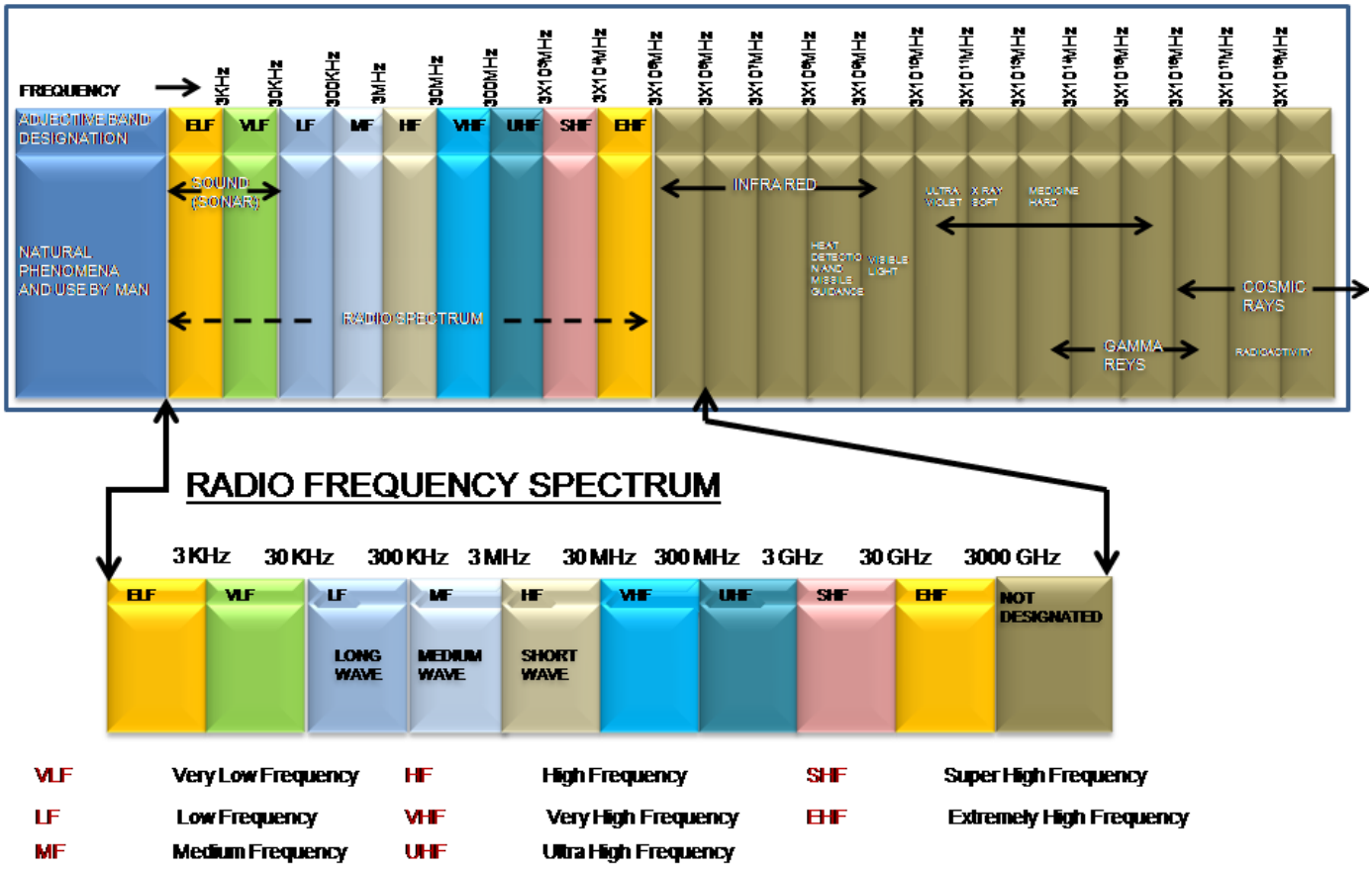
4. WARC may deal with all of the radiocommunications services, or it may deal with specific radiocommunications services such as space, maritime, or aeronautical. Each WARC updates the Radio Regulations (RRs) which allocate radio spectrum use on a worldwide basis except where regional requirements differ and are agreed. The ITU has divided the world in three regions.



Distribution of region by ITU

In addition, the tropical area centred on the equator has additional provisions to offset its higher electrical noise. The Figure shows all the uses of radio spectrum that are managed by services. Exceptions to these allocations may be footnotes for specific countries or reservations made by that country at the WARCs.

ELECTROMAGENTIC SPECTRUM



RADIO FREQUENCY SPECTRUM

VLF	Very Low Frequency	HF	High Frequency	SHF	Super High Frequency
LF	Low Frequency	VHF	Very High Frequency	EHF	Extremely High Frequency
MF	Medium Frequency	UHF	Ultra High Frequency		

The IFRB records ITU member nation frequency assignments. It advises the WARCs and member nations on technical matters on harmful interference and radio spectrum use. The IFRB serves as the office of record of frequency assignments in priority and adjudicates interference conflicts among member nations. The CCIR provides technical criteria on frequency sharing and examines technical and operational questions about international radio use. It also addresses technically related questions pertinent to ITU member nations and forthcoming WARCs. The findings of the CCIR serve a significant influence on the state-of-the-art and as a basis for RRs. However, these findings are recommendations rather than having an obligatory treaty status.

Asia Pacific Telecommunity

5. The APT is an organisation of Governments, telecom service providers, manufactures of communication equipment, research & development organisations and other stake holders active in the field of communication and information technology and it serves as the focal organisation for communication and information technology in the

Asia Pacific region. The APT now has 34 Members, 4 Associate Members and 111 Affiliate Members. Throughout the years, APT has been able to help the members in their preparation for global conferences such as the World Telecommunication Development Conference (WTDC), WRC, World Summit on the Information Technology (WSIT), and the ITU meetings as well as promoting regional harmonization for these events. The APT Conference Preparatory Group for WRC (APG) is an important activity of APT. APG was started in 1996 with the objective of harmonizing views and developing common proposals from the Asia-Pacific region for the World Radio Conference (WRC). The main objective of APG is to take regional preparation to harmonize the views of the members and to develop common proposals for submission to the ITU World Radio Conference (WRC).

Spectrum Management at National Level

6. The Wireless Planning & Coordination (WPC) Wing of the Ministry of Communications, created in 1952, is the National Radio Regulatory Authority responsible for Frequency Spectrum Management, including licensing and caters for the needs of all wireless users (Government and Private) in the country. It exercises the statutory functions of the Central Government and issues licenses to establish, maintain and operate wireless stations. WPC is divided into major sections like Licensing and Regulation (LR), New Technology Group (NTG) and Standing Advisory Committee on Radio Frequency Allocation (SACFA). SACFA makes the recommendations on major frequency allocation issues, formulation of the frequency allocation plan, making recommendations on the various issues related to International Telecom Union (ITU), to sort out problems referred to the committee by various wireless users, Site clearance of all wireless installations in the country etc.

7. TRAI (Telecommunication Regulatory Authority of India) was set up in 1997 by the government of India. The Telecommunication Regulatory Authority of India acts as an independent regulator of the business of telecommunications in the country. The mission of TRAI is to create and nurture such conditions that encourage the growth of the telecommunications sector in India so that the country can play an important role in the world telecommunications society. The main objective of TRAI is to form a transparent and fair policy environment that encourages fair competition. The authority recommend the timing and need for the introduction of a service provider that is new, ensure successful inter- connection and technical compatibility between various service providers, and suggest the conditions and terms on which license would be provided to a service provider.

NATIONAL FREQUENCY ALLOCATION PLAN

8. The National Frequency Allocation Plan (NFAP) forms the basis for development and manufacturing of wireless equipment and spectrum utilization in the country. It contains the service options in various frequency bands for India and also provides the channeling plan in different bands. Some of the typical frequency bands allocated for certain types of radio services in India are as given below:

Ser No.	Radio Service	Frequency Band
1	Radio Navigation	9 – 14 kHz
2	Mobile (Distress & Calling)	495 – 505 kHz
3	Broadcasting	535 – 1605.5 kHz
4	Maritime Mobile	2065 – 2107 kHz 2170–2178.5 kHz 2190.5 – 2194 kHz
5	Fixed, Mobile, Broadcasting Radio Astronomy	610 – 806 MHz
6	Mobile, Fixed, Broadcasting	890 960 MHz
7	Mobile satellite	942 – 960 MHz
8	Radio Location	1350 – 1400 MHz
9	Mobile, Fixed, Space operation, space research	1710 – 1930 MHz

Spectrum and Mobile telephone services:

9. Mobile telephone service providers in India use GSM and CDMA technologies. GSM technology works in the frequency bands of 900 and 1800 MHz and CDMA technology works in the 800 MHz band. 800, 900 and 1800 MHz bands were earlier allotted to the Defence Services for their mobile communication usage. However, upon the launch of mobile communication services for public, coordination was sought from the Defence department to make the spectrum available for mobile services. Since the mobile communication technologies provide international roaming facilities, it is essential to allocate spectrum in the common bands which are being used the world over. Also, the mobile handsets being used are imported, hence, conforming to the GSM 900/1800 bands is an inescapable requirement. If radio frequencies are allotted in other bands then handsets will not be compatible with it and new handsets will have to be developed which will be costlier and therefore the cost of mobile communication services will also increase.

10. Presently, **25 MHz** spectrum in 900 MHz band (890 – 915 / 935 – 960 MHz) and **75 MHz** in the 1800 MHz band (1710 – 1785 / 1805 – 1880 MHz) is earmarked for GSM services. However, out of this total **100 MHz**, only 15 MHz in GSM 1800 band is available for use as the remaining 60 MHz is still to be vacated by the Defence department. Also out of the total 25 MHz in GSM 900 band, a total of 20.2 MHz is available for GSM networks and Railways' Train Safety systems. The minimum amount of spectrum required for launching GSM services is 2 x 4.4 MHz.

11. For CDMA services, 20 MHz spectrum in the 800 MHz band (824 – 844 / 869 – 889 MHz) is available. In this 20 + 20 MHz spectrum, 14 CDMA carriers of nominal 1.25 MHz each are possible for assignment to service providers. Spectrum for the roll out of 3G services (voice, data and video) will be allotted through e- auction in the 2.1 GHz (1920 – 1980 / 2110 – 2170 MHz) band. However, the spectrum required for the launch of 3G services is yet to be vacated by the Defence Services. Ministry of Defence (MoD) has signed a memorandum of understanding (MoU) with Ministry of Communication & IT agreeing to vacate spectrum needed for 2G and 3G licensees over a three-year period. It is understood that the Defence Forces will initially release 10MHz of spectrum suitable for 3G services, and a further 5MHz for 2G service with immediate effect. The MoD will subsequently release the remainder of its held spectrum in a phased manner upon completion of a fibre-optic network being built for it by state-owned Bharat Sanchar Nigam Ltd (BSNL) and Mahanagar Telephone Nigam Ltd (MTNL). The new network will see the two telcos install around 40,000km of Core Network and 20,000 km of Access Network of fibre-optic cable, connecting 219 army stations, 33 navy stations and 162 air force stations across the country.

SPECTRUM ALLOTMENT PROCEDURE:

12. In the case of licensed telecom service providers, spectrum was initially allotted in accordance with the relevant provisions of the service license agreements. However, due to an exponential increase in the number of mobile subscribers additional spectrum is required by the mobile operators. Serving a larger number of subscribers requires either a larger amount of spectrum or an increase in the number of base stations. Therefore, additional spectrum is required at some stage as a techno economic solution to meet the growth of mobile services. Department of Telecommunications has evolved guidelines for the allotment of extra spectrum, based on the justification and fulfillment of the prescribed criteria. The subscriber-based criteria have been formulated taking into account demographic characteristics of different categories of service areas, average traffic per subscriber, number of base stations in a specified area etc. Spectrum is allotted subject to completion of coordination and availability at a particular location. The utilisation of spectrum for commercial purposes began with the release of a limited amount of spectrum in 1995. The management of spectrum in the country can be divided into the following stages:

First Stage – Auctioning Scarce Spectrum (1995-2003):

13. The Indian government auctioned 2 × 4.4 MHz of start-up spectrum for the Global Systems for Mobile (GSM) based mobile services in 1995. Two operators were selected for each License Service Area (LSA). Subsequently, the third operator license was awarded along with 2×4.4 MHz of start-up spectrum in the 900 MHz band to the government operator on a pro bono basis in 2001. The fourth operator license was issued in 2001 using a three-stage auction procedure and a start-up spectrum of 2 × 4.4 MHz in 1800 MHz was given to the winning bidder. In addition to the entry fees, licensees were required to pay a percentage of annual revenue as spectrum charges.

Service Area	Subscriber base* (In Lakh) supported by GSM spectrum in MHz. (eligibility for allotment of next step)										
	2 X 4.4	2X6.2	2X 7.2	2X 8.2	2X 9.2	2X10.2	2X11.2	2X12.2	2X13.2	2X 14.2	2x15 @
Metro Service Areas	5	15	18	21	26	32	40	48	57	65	
Telecom Circles as Service Area Category 'A' & B	8	30	41	53	68	82	90	98	107	116	
Category 'C' Circles	6	20	31	42	52	62	70	78	87	96	

Further allocation of spectrum beyond the start-up spectrum levels was based on availability and justification and attracted additional revenue share as spectrum charges. The contractual rights of spectrum holders were incrementally established through a series of government orders. In 2002, the subscriber linked spectrum allotment procedure referred to as Subscriber Based Norms (SBN) was introduced, which laid down a road map up to allotment of 2 × 12.5 MHz of spectrum per operator in each LSA.

Second Stage – De-linking License from Spectrum (2003-06)

14. During 2000-01, the government also liberalised the basic telecom services market, which provided traditional landline based services. In 2000, basic telecom services operators approached the government with a proposal to provide local access loop at much lower cost using the alternative Code Division Multiple Access (CDMA) wireless technology. After a couple of years of litigation between the basic telecom services operators and GSM mobile operators, the Indian government announced Unified Access Service (UAS) licenses in November 2003 that allowed basic service license holders to provide full mobility based services with a stipulated entry fee based on the bid price paid by the fourth operator in 2001. The fixed fee based license (as opposed to auction based) theoretically allowed any number of mobile licenses to be provided and implicitly de-linked spectrum allocation from licensing. Though firms were awarded licenses after paying the required entry fee, they were given start-up spectrum only as and when available. Following the entry of two or three CDMA based mobile operators in each LSA; one or two new firms also paid the stipulated entry fee and got

licenses to operate GSM services in certain LSAs. In 2005, the Telecommunications Regulatory Authority of India (TRAI) reviewed the spectrum allocation process taking into account spectrum availability and efficient techniques for utilisation of assigned spectrum. TRAI stated that the spectrum held by the GSM and CDMA operators was well below international averages. It was recommended that existing operators be given adequate spectrum before considering allocating spectrum to new service providers especially since "there is adequate competition in almost all service areas".

Service Area	**Subscriber base * (In Lakh) supported by CDMA spectrum in MHz. (eligibility for allotment of next step)**				
	2X2.5 MHz (2 carriers)	2X3.75 MHz (3 Carriers)	2X5 MHz (4 carriers)	2X6.25 MHz (5 Carriers)	2X7.5 MHz (6 carriers) @
Metro Service Areas.	5	20	30	50	
Telecom Circles as Service Area Category 'A' and 'B' circles.	8	50	80	100	
Category 'C' circles.	6	40	60	80	

TRAI continued to maintain that there was a shortage of 2G spectrum. The entitlement of incumbents naturally extended to future 3G spectrum since in a spectrum scarce environment, 3G could be considered as an extension of 2G. It also followed that the scarce resource of spectrum need not be spread too thin thereby justifying a cap on the number of operators.

Third Stage – Stricter Criterion for Allocation of Spectrum (2006-08)

15. As technological progress took place, it began to be believed that if used maximally, spectrum held by incumbents was sufficient for meeting their near term requirements. Meanwhile, additional spectrum was also being vacated by the Defence. As a result, in keeping with the principle of maximal usage of spectrum, new SBN were defined, incumbents kept out of fresh allocations, 3G treated as a separate service from 2G and the cap on the number of operators removed. As mentioned in the TRAI recommendation on 3G spectrum, "the Defence Services have agreed to vacate 2 × 20 MHz in the 1800 MHz band, in addition to 25 MHz in the 2.1 GHz UMTS band. The availability of additional spectrum in the 1800 MHz band provides sufficient room for growth of 2G services for the medium term." Therefore, "the authority has recommended that the government should not treat the allocation of 3G spectrum in continuation of 2G spectrum". The TRAI (2007) recommendation that no cap be placed

on the number of telecom access providers in the country allowed more new firms to enter the market by paying the low fixed entry fee.

Fourth Stage – Policy on 3G (2008)

16. The government announced the policy for 3G mobile services in August 2008. In line with TRAI's recommendation, the government opted for a simultaneous ascending auction for allotment of a start-up spectrum of 2×5 MHz in the 2.1 GHz band with specified reserve prices for different categories of LSAs. It may be noted that 2×5 MHz is the minimum carrier requirement for providing 3G services using wideband code division multiple access (WCDMA) technology in the 2.1 GHz band. The 3G policy also states that 2×1.25 MHz carriers will be allotted to UAS licensed CDMA operators at a price equal to the highest bid received for 2.1 GHz band, prorated for 2×1.25 MHz.

Optimal versus Maximal Use of Spectrum:

17. The formulation of spectrum policy in India began under conditions of very limited availability of spectrum. In the initial phase the policymaker's requirement of maximal usage of spectrum with the associated SBN was justified. However, as spectral efficiency increased and additional spectrum got released, more nuanced definitions of efficiency needed to be applied in order to promote the growth of the industry. The single-minded agenda on maximizing the number of subscribers per unit of spectrum ignores the importance of efficiently using other inputs like base transceiver stations (BTSs). The specific interpretation of technical efficiency used by the government has resulted in high reuse of spectrum and hence, more BTSs and cell towers. In some circles, the inter-site distance between cell towers is less than 100 metres, which is one of the lowest in the world leading to iron-clad structures clogging some of the cities. This implies that unit costs decline with an increase in the scale of operation, at least over the range of subscriber minutes observed in the industry to date. In view of this, the policymaker should allow accumulation of spectrum, where such accumulation leads to lower costs without increased threat of cartelisation. This would allow operators to integrate operations and aggregate spectrum holdings to take advantage of economies of scale.

Efficient Use of Mobile Infrastructure

18. Under- utilisation of BTSs leads to an increased demand for spectrum. There are several new technologies to ensure optimal yield from BTSs. These include: (a) implementation of in-building solutions such as Femtocell to improve the efficiency of BTSs; (b) single antenna interference cancellation that can improve downlink bandwidth of GSM networks without changes to network configurations; and (c) utilisation of smart antenna arrays that can confine channels to narrow beams thus improving capacity gain. The government should monitor the optimal use of base stations in the same way it monitors the use of spectrum. Prescribing SBN for BTSs is one possible option, though challenges of administering and monitoring would need to be addressed. Further, the government must do more to promote infrastructure sharing. While it has allowed both passive (towers, rental places) as well as active (antenna, feeder cable, node B, radio access network and transmission systems) infrastructure amongst service providers in order to effectively use the radio access network infrastructure, incentives

in the form of lower regulatory levies need to be provided to improve adoption, thus improving the efficiency of the radio access networks.

Spectrum Pricing:

19. The government has chosen to provide the UAS license for up-front fixed fees along with a revenue sharing agreement. The revenue share of government is increased by a percentage point on every fresh allocation of spectrum. SBN is used to determine eligibility for fresh spectrum. The fixed fee has been benchmarked to the fee paid by the fourth cellular operator in the auction of 2001. A benchmarked price is appropriate only if the object being sold (in this case, a license) is the same and the market conditions are similar. The fee paid by the fourth operator in the auction process was specifically for a cellular mobile telephone service (CMTS) license along with start-up spectrum. The UAS allows the licensee to provide access services using non-spectrum related technologies such as wire line service as well. As per the guidelines of the UAS license: The unified access services cover collection, carriage, transmission and delivery of voice and/or non-voice messages over licensee's network in the designated service area and includes provision of all types of access services. The access service includes but not limited to wire line and/or wireless service including full mobility, limited mobility and fixed wireless access. The UAS license is therefore a super set of the CMTS license and its price cannot be equated with the price paid for a CMTS license. Further market conditions in 2003, and even more starkly, in 2007 were quite different from those in 2001. Let alone factoring the increased value of spectrum in the booming telecom sector, the government did not even factor inflation to arrive at the 2003 and 2007 prices. Inappropriate benchmarking has resulted in under pricing of spectrum. Under-pricing spectrum leads to a tendency of hoarding and therefore, should be avoided. The confusion regarding the CMTS and UAS licenses has cut both ways since UAS licensees providing CDMA services and applying for a GSM license in 2007 had to pay exactly the same amount that they paid when they were issued the CDMA-UAS license. In fact, as per the above argument, only the charge for GSM spectrum should have been levied. Though UAS implicitly separated licensing from spectrum, license fee needs to be separated from spectrum fee for pricing both licenses and spectrum appropriately (in case a fixed fee method is chosen).

Regulatory Certainty:

20. Telecommunication licenses should balance regulatory certainty with the flexibility necessary to address future changes in technology, market structure and government policy. The fixed fee is paid by the UAS licensees without any firm guarantee on the date of allocation. It, therefore, involves a promise to allocate spectrum at an uncertain point in the future. Further, the SBN represents a very complicated future contract in spectrum with an additional clause of the seller having the right to renegotiate the terms by strengthening the SBN. This contract is very non-transparent and difficult to convert into monetary terms for the purpose of decision-making by the involved parties. Moreover, there is no injunction on the regulator for an orderly step-by-step change of SBN in response to technological changes. Thus, the government decision on strengthening of SBN by an order of six to 15 times increased the price of spectrum from nil to infinity (since the incumbents became ineligible for

fresh allocation). This does not represent a very conducive environment for business decision-making.

Number of UAS Licenses Issued:

21. The UAS license regime de-linked license from spectrum in the sense that it allowed the possibility of giving licenses without present availability of spectrum. However, it included a promise to provide 2×4.4 MHz of start-up 2G spectrum "as and when available". In 2007-08, the government failed to take into account the availability of 2G GSM spectrum while granting licenses. In theory, the maximum available GSM spectrum in the 900 and 1800 MHZ bands is 100 MHz. In practice, in India, only 60-70 MHz can be used. Over 40 MHz is already in the possession of incumbents. The remainder is insufficient for even the start-up needs of the six to nine new entrants, let alone the incremental spectrum required thereafter. The government can be faulted for not restricting the total number of licenses granted (or alternatively, not de-linking license from spectrum) based on its knowledge of spectrum availability.

Policy on 3G

22. The migration from 2G to 3G requires the setting up of new infrastructure by operators and the purchase of 3G compatible handsets by end users. 2G services can continue to be provided using 3G spectrum and equipment, but 3G services cannot be provided in a 2G environment. The government is currently viewing 3G as a high value service distinct from 2G and formulating allocation policies accordingly. The policy announcement on 3G spectrum marked the culmination of almost three years of wait following the TRAI recommendations on allocation and pricing of spectrum for 3G presented on September 27, 2006. The delay in the 3G policy was in a sense responsible for the rush for licenses in 2007 when entrants unsure of the 3G allocation rushed to get 2G spectrum that was promised along with the UAS license.

23. Seen independently of the policy legacy, the 3G policy has several salutary features. These include the separation of the license from the spectrum, the choice of an auction mechanism to reveal the current market value and the opening of doors to foreign participants. However, the under pricing of 2G spectrum in 2007 and the auction determined price of 3G spectrum in 2008 will result in a new entrant to the Indian market paying much higher prices for entry through the 3G route as opposed to entry through the 2G route. While we may overlook the case of global entrants who have deeper pockets than their Indian counterparts, we cannot turn a blind eye to UAS license holders who will not be able to get the promised 2G spectrum due to non-availability and therefore must bid for 3G spectrum to be able to provide even voice services. Regarding the details of the auction procedure recommended, TRAI advocated that the lowest bidder in each stage of the auction be placed in the wait list for spectrum. However, it also mentioned that the size of the wait list should take spectrum availability into account. It is imperative for the government to limit the length of the wait list in order to avoid the impasse in the allocation of 2G spectrum. In case of 2×1.25 MHz carrier in 800 MHz, TRAI recommended a single stage auction if more UAS-licensed CDMA operators are interested. TRAI also explicitly specified that the 2G subscriber base should not be taken in to account for 3G spectrum allocation as 3G is a different service from 2G. However, DoT policy states that 2×1.25 MHz be given to the

operator having maximum 2G subscriber base. There is inconsistency in the method of allocation stated by TRAI and DoT where DoT appears to flout its stated policy of treating 2G and 3G as distinct services. The policy announcement is silent on the road ahead after the present allocation. A clear road map of spectrum availability, use of the auction mechanism for allocation, and rationalization of the subscriber based norms to serve as a low hurdle of eligibility to participate (as opposed to requiring maximal usage) would be appropriate.

Technology Neutrality

24. The introduction of CDMA based mobile service during 2001-03 was clouded by the legal battles between the incumbent GSM and BTS operators. Given their defensive position and the prevailing paradigm of maximal usage, the CDMA mobile service providers were allotted a lower start-up spectrum block (2.5 MHz as compared to 4.4 MHz for GSM) as they were considered more efficient. Parity was established between the two technologies in terms of the number of subscribers each could reach with the spectrum allotted to them. The definition of parity is tantamount to handicapping a more efficient player by restricting access to a necessary resource. In an environment where maximal usage is no longer relevant, the correct definition of parity is “equal access to resources” to be used as inputs. Such an approach would create a truly level playing field in which the respective technologies would be able to compete. Promoting such competition would also economize on the use of spectrum. The only qualification to this conception of parity could be the threat of monopoly power. However, if anything, the strengthening of CDMA service would increase competition in an industry that is currently largely dominated by the GSM players. As per TRAI recommendations, both types of operators should have the same amount of startup spectrum and be held to the same subscriber based norms.

Level Playing Field

25. As pointed out by TRAI, the ratio between actual subscriber base and subscribers that should be serviced as per the SBN is much larger for private operators compared to government operators, indicating that private operators are having to stretch spectrum much more than government operators. In some LSAs, this ratio is even less than one for some government operators, indicating that these government operators were given spectrum despite not meeting the SBN.

Conclusion

26. Spectrum policy in India while having been very successful in nurturing the growth of industry, suffers from the lack of a long-term vision and absence of a holistic perspective that considers all the relevant factors before making policy decisions. The trajectory of spectrum policy in India has been marked by many flip flops: on SBN, spectrum pricing, 3G policy and competing technologies. The Spectrum Management Committee, set up by the Govt in 1999, was to provide a blueprint for spectrum allocation and management. However, the committee was not very specific about using auctions as an allocation mechanism. To date, there are different mechanisms for allocating spectrum for various services. For the fourth cellular operator, spectrum and service areas were auctioned, while those providing WLL (LM) are to get the spectrum

based on a fixed entry fee and it would be allocated on a first come first serve basis subject to completion of rollout conditions. This would result in two services that both require spectrum (incidentally in adjacent bands) to be treated differently. The resulting uncertainty is harmful for the industry. A clear defined, consistent policy is the need of the hour.