Telecom Regulatory Authority of India

Recommendations

On

Review of license terms and conditions and capping of number of access providers

New Delhi: August 28, 2007

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Preface

TRAI received a reference from Department of Telecommunications seeking recommendations on the issue of determining the number of access providers in each service area and for reviewing the terms and conditions in the access provider license pertaining to substantial equity holding, transfer of licenses, mergers and acquisitions, permitting service providers to offer access services using combination of technology under the same license, roll-out obligations, etc.

With due diligence, observing the spirit of transparency and carrying out wide ranging consultations with the stakeholders, the Authority has now finalized its recommendations which are being forwarded to Department of Telecommunications. We do hope that the Department would take final decision promptly on these matters so that the policies of the licensor are in synchronism with the developments in the telecommunication sector.

It had become essential to seriously consider the issues like “Who should be the best judge to determine the spectrum prices?” and “What is the most transparent mode of spectrum allocation?” The Authority while making recommendation has made attempts to introduce market forces to maximum in the decision making. It is obvious that lot of development have already taken place in this sector and the Authority while respecting legacy and level playing field has to fall back on a modular building approach. The Authority has approached the issues to enable open market functioning and a transparent predictable process where decision necessarily has to flow from the licensor. It has attempted to make it easy for potential rivals to get into the market. As a Regulator we are concerned with maximizing the welfare of the consumers, healthy growth of telecom and financial viability of the telecom companies. It is our belief that these objectives have been largely addressed in these recommendations.

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Chapter 1 Introduction

1.1 The telecom industry in India has seen phenomenal growth in the recent past. Annual growth in the past fiscal year has almost outpaced total combined growth from the beginning of telephony in India through to March 2004 and the industry has already met the 2010 goal of a teledensity of 15 percent set in the New Telecom Policy 1999, and is poised to surpass the DoT's target of 250 million telephone subscribers by 2007. A major factor in this success has been the liberalization of the Indian telecom market accompanied by an effective policy and regulatory framework.

1.2 However, competition and subscriber growth by itself may not be sufficient to ensure that the Indian telecom sector will sustain the same phenomenal growth in the changing market scenario. In the last few years the telecom Sector has also witnessed a major transformation, with the entry of a large number of operators, higher wireless growth, addition of innovative value added services, inclination of operators to deploy state of art technologies, introduction of bandwidth hungry applications and the requirement of additional spectrum for such services, increase in FDI limit, etc.

1.3 The telecom access market in future will be served by a combination of technologies due to convergence of technology/market in ICT sector. The purpose of regulation is to facilitate and intensify competition when it is not occurring efficiently or fairly in the market. In a developing economy, the regulator has not only to address the social good or consumer interest but also has to provide a catalytic role in development.

1.4 It is imperative that policy framework is periodically reviewed to provide the required impetus for sustained growth. For further growth there is an urgent need to ensure a clear, fair, predictable, transparent and stable policy & regulatory framework, especially with regard to spectrum policy, investment norms, competition policy, and the licensing regime. A robust competitive environment wherein service providers and technologies compete to deliver wide variety of telecom services to the end user is vital for sustained growth.

1.5 Recognizing the need to ensure that the policies keep pace with the developments in the Telecommunication sector, the Government has sought recommendations of TRAI, as per the provisions of TRAI Act. The reference from Department of Telecommunications (letter No. 16-3/2004-BS-II dated 13th April 2007 (see **Annex I**)) seeking recommendations is on the issue of determining the number of Access providers in each service area and review of the terms and conditions in the Access provider license which include the following:

- Substantial equity holding by a company/legal person in more than one Licensee Company in the same service area (clause 1.4 of UASL agreement).
- Transfer of licences (clause 6 of the UASL).
- Guidelines dated 21.02.2004 on Mergers and Acquisitions. TRAI in its recommendations dated 30.01.2004 had opined that the guidelines may be reviewed after one year.
- Permit service providers to offer access services using combination of technologies (CDMA, GSM and/or any other) under the same license.
- Roll-out obligations (Clause 34 of UASL).
- Requirement to publish printed telephone directory.(TRAI has already sent its recommendations on 5th May 2005)

Certain issues are applicable to other licenses (National long distance (NLD)/International long distance (ILD) etc.) also.

1.6 In the said letter, DoT has also requested TRAI to furnish their recommendations in terms of Clause 11(1)(a) of TRAI Act, 1997 as amended by TRAI (Amendment) Act, 2000 on the issue of limiting the number of Access provider in each service area.

1.7 TRAI issued a consultation paper in this regard on June 12, 2007. The main issues raised in the consultation paper are given below:

- **Determining a cap on number of Access providers in each service area** – Since 2003/2004 open competition has been introduced in the access service sector. As a result we have 6-9 mobile/Unified Access service providers in each service area and some more companies have applied for new licenses. Spectrum – a scarce resource is vital for provisioning of mobile services. As noted earlier most of the spectrum useful for mobile services is used by incumbent users and vacation/refarming efforts has not given the desired results, as of now. It is also pertinent to note that in the past as a result of introduction of more and more players and healthy competition the country has witnessed tremendous growth, lower tariffs, availability of wide variety of services, etc. The main issue that needs consideration relates to determining the optimum number of players to be permitted to operate in a particular service area or leave it for market forces.
- **Merger and Acquisition** – In the existing licensing regime, mergers and acquisitions are permitted subject to certain conditions viz. presence of minimum 3 operators and consequent upon merger, market share of less than 67% of the merged entity. The guidelines (enclosed at **Annex II**) also specify the limit of spectrum that a merged entity can retain consequent upon merger. While deciding the issues related to mergers and

acquisitions, main issues relate to defining markets, criteria for determining dominance/market power, maximum spectrum holding for a merged entity, cross technology mergers, minimum number of access providers in a service area as a result of mergers and acquisitions have been considered.

- **Substantial equity** – In the existing licensing regime, no single company/ legal person can, directly or indirectly have substantial equity holding i.e. equity of 10% or more in more than one licensee in the same service area for the Access services. In order to prevent anti competitive ownership patterns and ensure effective competition in the market it is imperative to restrict ownership level of a company in different companies of the same service area. At the same time it is required to be ensured that policy environment facilitate investment and healthy consolidation. The main issues that need consideration pertain to the need and scale of existing substantial equity clause.
- **Permitting combination of technology under same license** – Today the licensing regime does not explicitly permit a licensee to offer access services using combination of technologies (CDMA, GSM and/or any other) under the same license. The licensee have been allocated spectrum either in 900/1800 MHz bands for GSM technology or in 800 MHz band for CDMA technology. In addition spectrum has also been allocated to some access service providers in 1880-1900 MHz band for micro cellular architecture based system. The spectrum band relevant to mobile services is also being used by Defence and other users, as a result demand outstrips supply. The main issue relates to desirability and modality of permitting a licensee to offer access services using combination of technologies (CDMA, GSM. etc) under the same license.
- **Roll out obligations** – At present the telecom sector is one of the fastest growing sectors. During the last decade, it has witnessed a change from a state owned monopoly to oligopoly with unprecedented growth in the number of users. The overall teledensity today is around 20% and there is

enough scope for further growth. There are millions of ears of Indians which are still waiting to hear the ring tone. To make it possible, the immediate need is to accelerate the pace of penetration of telecom networks especially in rural and remote areas of the country. The issues that need consideration relates to desirability, form and scale of roll out obligations to be imposed on access service providers especially keeping in mind the present teledensity figures and the widening gap between the urban and rural teledensity.

1.8 Written comments received in the consultation process were posted on TRAI's website. Open House Discussions were also held in this regard, in New Delhi on 18th July 2007. Based on the comments received in the consultation process, study of international best practices, and changed market scenario both in India and the world over, and also the technological advancements that have happened in the recent past, TRAI has framed these recommendations. The basic guiding principle has been that the Regulatory environment must take into consideration the changing requirements of dynamic telecom sector, and must hold the final benefit to the consumer as the ultimate guiding factor in deciding any policy. There have been so many changes in the Telecom environment that certain ideas and concepts perhaps require rethinking, or may even be required to be changed in order to be in line with the developments that have taken place. As a Regulator, keeping in mind the larger interest of the Sector and the telecom penetration targets, the TRAI has taken a broader view on each issue, in an attempt to keep pace with the fast changing environment and to facilitate the consumers to derive maximum benefit from the technological advancements that are perpetually being brought about through research and innovation.

1.9 As the Indian market matures, the requirements and aspirations of the subscribers are also changing. The subscriber, who was initially satisfied

with simple mobility or plain vanilla services, now requires that all his communications needs be met while on the move. In this scenario, every Service Provider would like to create a brand for himself by introducing new and more advanced services at the most affordable and competitive rates possible.

1.10 While acknowledging the aspirations of both the subscriber as well as the Service Provider, the Authority has to also take into account the legacy of the policy and regulatory environment which has existed and been in operation to date. While framing these recommendations the Authority has endeavored to maintain the sensitive balance between the conflicting demands with the main aim of maximizing consumer interest and facilitating growth in the sector.

Fostering future growth

1.11 Going forward, the newer technologies coming into the market are moving more and more towards convergence and the lines between different services and different categories of services are fading. Whether it is the 3G Services, NGN, BWA etc, in all these cases the road ahead is towards a converged situation. The growth in Wire line services is minimal and the exponential growth seen in the Telecom sector, today, is largely in the Wireless segment, and this trend is likely to continue. Keeping in mind the nature of, and the future developments in the Telecom Sector and the need for quick deployment of new technologies, the Authority has taken a broad and progressive view on the issues referred to TRAI.

1.12 This review of sectoral policy particularly licensing is an important milestone which will significantly contribute to the future of telecom services in India. While deciding the issues mentioned in ¶ 1.5 it is important that we recognize that it is the right time to provide the required fillip to our telecom industry that will go a long way to facilitate India's

vision of becoming an IT superpower and develop a world class telecom infrastructure in the country, as envisaged in our New Telecom Policy 1999. In many respects TRAI's recommendations are poised to achieve next generation reforms in Telecom sector.

1.13 Wireless technology is the future growth driver. Spectrum is the single most important input. Unfortunately the spectrum management policy has not kept pace with the dynamism of this sector. Even today it is tied to legacy and traditional approach of spectrum management. It is not predictable. The policy does not address in comprehensive manner the challenges of future growth where a radical change in technologies is emerging. The future growth of wireless services will receive a set back unless spectrum issues are addressed on emergency basis. India is already behind in the development of 3G technology. Option of Broadband Wireless Access is not readily available either to the manufacturer or to the telecom service provider because of the uncertainty both in terms of spectrum band policy, allocation and pricing. Perhaps the Government could consider relocation of spectrum related work on lines of global practices.

1.14 In an environment, where technology changes outdistance the ability of regulators to modify current rules and adopt new ones to take advantage of the technology advances, decision taken to manage and license spectrum solely on a specific technology or technologies are inefficient, distort the market place, and inhibit competition. The service providers should be encouraged to deploy new technologies that offer higher data rates, provide better quality of service and more diverse applications, particularly when adoption of the new technologies result in less spectrum being needed to provide the service.

1.15 The new advanced technologies and converged services that use spectrum are demanding more flexibility and service/technology neutral frameworks. The task of spectrum management in a multi user and multi usage scenario is more daunting and crucial than ever before. As new spectrum technologies unfold and proliferate, spectrum management will have to adapt and dynamically evolve in a responsible, fair, transparent, predictable and technology neutral manner.

1.16 While framing these recommendations, the Authority has kept in mind all the above mentioned issues and objectives of facilitating growth in telecom sector, maximization of consumer interest, ensuring efficient utilization of scarce resources, ensuring availability of adequate spectrum, promoting efficiency in operations, maintaining level playing field and facilitating technological developments.

1.17 Thus it has addressed in these recommendations removal of barrier to entry or exits and creation of newer opportunities for substitute deliverables. The regulator and policy makers today have to offer a transparent set of performance platform and leave rest to telecom operators. Instead of end to end networks role the telecom sector will have multiple performers including content providers and end users. The Regulator, the policy maker and the telecom companies will have to come out from the 'prevent mode' to viable alternatives. The message conveyed through Chapter-2 to Chapter-5 is a 'light handed' regulatory paradigm.

Chapter 2 Entry Limit in Access service provision

2.1 Since the liberalization of India's telecommunications sector starting in 1992, the number of service providers has consistently increased over time. As of July, 2007, there are over 180 licensed cellular and unified access service providers in the country. The increase in the number of service providers has brought with it specific benefits. In the mid-1990s, there were generally two cellular service providers in each circle. Through the introduction of the third and fourth operator, tariffs for cellular service have fallen over 90 per cent, and today it matches the fixed-line tariffs. Additionally, the subscriber base and coverage have increased dramatically due to increased competition and the effort by service providers to capture the largest market share.

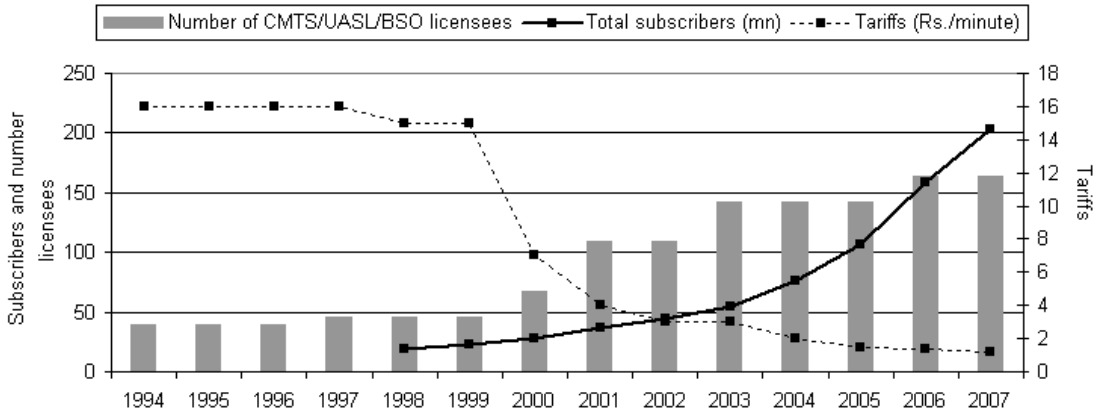


Figure1: The market has benefited from competition

2.2 The whole of the country has been divided into 23 telecom service areas and today, there are six to nine access service providers in each service area. The number of service providers in each service area along with their market share as on quarter ending June 2007 is provided in **Annex III**. From this table it is observed that the market share of existing service providers in various service areas range from 10% to 35% except few exceptions. The overall wireless market share of various operators is shown in figure 2.

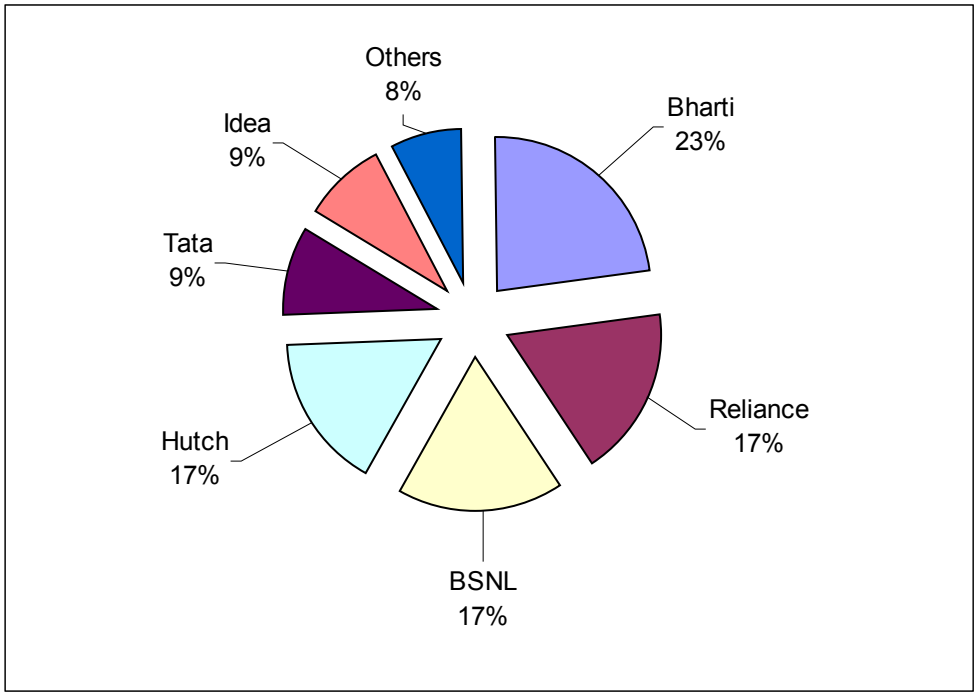


Figure 2: Wireless market share of various operators.

2.3 Though 6-7 million subscribers are being added on an average to the network per month, for the past mobile penetration of our country is very low as compared to many countries (see figure 3).

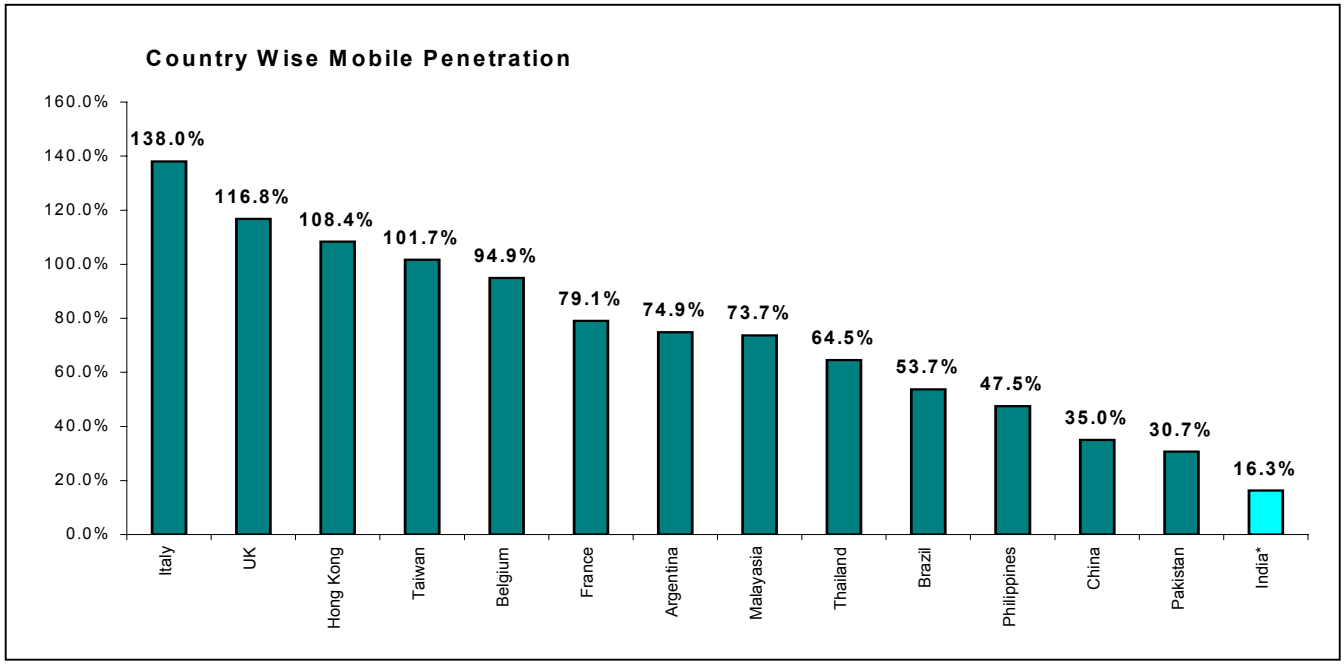


Figure 3: Mobile penetration in selected countries[1].

[1] Source: Merrill lynch global Matrix 4Q 06 and TRAI. * Data for India is as on June 2007.

2.4 As on March 2007, the urban teledensity is around 48% and rural teledensity is only around 6%[2]. Last decade has witnessed a widening gap between the urban and rural areas.

2.5 The present licensing policy allows any Indian company fulfilling the eligibility criteria to apply for the UAS license. However, DoT vide its letter dated 13th April 2007 has sought TRAI's recommendation in terms of clause 11 (1) (a) of TRAI Act 1997 on the issue of limiting the number of Access providers in each service area. The main reason mentioned in the letter is as follows:

"The policy on Unified Access Service Licensing was finalized in November 2003 based on the recommendations of TRAI. As on date, 159 licenses have been issued for providing Access Services (CMTS/UASL/Basic) in the country. Generally, there are 5-8 Access Service Providers in each service area. The Access Service Providers are mostly providing services using the wireless technology (CDMA/GSM). As per the present policy, any Indian company fulfilling the eligibility criteria can apply for UAS license. These are increasing the demand on spectrum in a substantial manner. The government is contemplating to review its policy. A suggested option can be to put a limit on the number of Access Service Providers in each service area, in view of the fact that spectrum is a scarce resource and to ensure that the adequate quantity of spectrum is available to the licensees to enable them to expand their services and maintain the Quality of Service."

2.6 The suggestion contained in the reference received from the Government to put a limit on the number of access service providers in the service areas on account of spectrum shortage had been raised in

[2] Rural teledensity takes into consideration Rural DELS and rural mobile connections. Rural population is taken as 70% of total population as on 31st march 2007 (1129.87 million).

the consultation paper and the views of the stakeholders on this issue among other things have also been received and published on the website of TRAI. These are discussed in the paragraphs that follow.

2.7 Response to this issue from the stakeholders is on the expected lines. That is significant number of incumbent wireless operators do not favour a free entry and the likely entrants in the wireless space including those who are on the waiting list for licenses are against putting a cap on the number of access service providers.

2.8 The central issue underlying these comments however pertains to the availability of spectrum, its allocation criteria, pricing methodology and method of evaluating utilization of the spectrum as to its technical and economic efficiency. Continued uncertainty as to the total availability of spectrum has generated apprehensions and anxieties leading the stakeholders to take firm positions resulting in polarization of viewpoints in the matter.

2.9 Supporting the idea of limiting the number of access service providers, some stakeholders primarily representing incumbent wireless operators have strongly argued that Indian access market is already intensely competitive and entry of any further operators may harm the competitive equilibrium and will have a negative impact on the quality of service. It is further argued on their behalf that low tele-density of 20% does not necessarily mean that scope exits for introduction of new players. One major line of argument of the incumbent wireless operators is that once a service provider has been granted a cellular license, that licensee must be assured of adequate spectrum. The present policy of open competition is not sustainable and must therefore be reviewed to consider capping number of service providers because even some of the new licensees who have been granted licenses have not yet been allotted their initial spectrum entitlement. Further, the Government has laid down a roadmap of at least 2x15 MHz for each GSM operator and even that is well below the

international best practices. One other argument that has been put forth by an existing major operator is that the spectrum efficiency is maximized by unifying spectrum allocations and sub-dividing spectrum among licensees would only diminish overall spectral efficiency and the consequence of spectral inefficiency is higher cost for all licensees.

2.10 Proponents of free entry into market argue that service providers as corporate entities are expected to go through due diligence process before entering into any business and thus they would have weighed the pros and cons of waiting in queue to begin their operations in any given service area as wireless service provider. Further, it is argued that considering the requirement to cover uncovered areas in the country and in view of the low tele-density in the context of booming economy, there is still space for more number of players in the market. In fact, it is argued that intense competition witnessed in the wireless market has not adversely impacted any service provider and on the contrary the financials of wireless service providers have improved substantially and they continue to look very bright. Strong argument in favour of persisting with the existing licensing policy of free entry is that in recent times, innovations/technical progress have enabled greater spectrum efficiency, creating space for additional operators in the market. Evidence also has been cited to support this argument by saying that the Quality of Service (QoS) benchmarks have been met by the wireless operators despite exponential growth of subscribers. It is argued that limiting the number of licensees through regulatory regime changes, could result in inefficient use of the spectrum by incumbent wireless operators, because such a policy change will discourage innovation. In this context, some stakeholders argue that incumbents who have taken the lion's share of spectrum evaluate the options of deploying capex for adopting innovative technology solutions to improve spectrum efficiency with that of the potential cost of acquiring additional spectrum and in the ultimate analysis it is seen by them to be more profitable to ask for more spectrum even at the cost of payment of higher annual spectrum charges. Therefore, the present licensing

policy does not encourage efficient utilization of spectrum which is a finite resource and which is demanded and used by multiple agencies. Stakeholders who support free market principle have also suggested that in the interest of level playing field between existing operators and the new entrants, and in the context of overall shortage of spectrum availability, that a cap be placed on further allocation of spectrum above 10 MHz.

2.11 The Authority has examined the conflicting viewpoints on this vital issue and tested the suggestions arising out of the consultation process in the light of the following:-

1) New Telecom Policy i.e. NTP, 1999
2) Growth objectives
3) Sector experience till date including financials of existing operators
4) Principles of fair competition and other vital economic criteria
5) Upcoming technological developments

NTP 1999

2.12 On the issue of mobile access license policy, NTP, 1999 states as under:

"CMSP would be granted separate license for each service area. Licenses would be awarded for an initial period of 20 years and would be extendable by additional period of 10 years thereafter….. Availability of adequate frequency spectrum is essential not only for providing optimal bandwidth for every operator but also for entry of additional operators….. It is proposed to review the spectrum utilization from time to time keeping in view the emerging scenario of spectrum availability, optimal use of spectrum, requirements of market, competition and other interests of public."

2.13 It is evident from the policy that there is no intention of placing any artificial cap on the number of access service providers. Clearly, the underlying theme is to ensure optimality for existing operators so as to

provide good quality service but at the same time it has not barred entry of new operators.

Sector experience in India

2.14 Sector experience in India particularly in the wireless market suggests that the explosive growth of wireless market being witnessed during the last few years in India, has been made possible by the open competition policy that permits free entry. Growth continues to remain the top priority of the Government. Further, current indications clearly suggest tremendous opportunity/potential for further growth. Also further growth requires huge amount of capital investment not only for strengthening the existing areas but also for penetrating into newer areas hitherto uncovered. Huge capital investment for achieving higher tele density and the target of 500 million subscribers by 2010 and for penetrating into rural areas has to be augmented by the industry at a faster pace than before. Relying upon few operators for raising these capital resources for further growth may not be an appropriate option as it would be a time consuming process for the existing operators to fill the gap in funding requirements for capital investment. No doubt, the market has out performed all expectation and today Indian wireless market is said to be one of the fastest growing wireless markets in the world clocking 67% CAGR during the last four years. The market continues to grow with an incremental subscriber base of 6-7 million per month and with sound financials of the existing major operators crossing 40% EBITDA. Statements made by one industry association on stagnant EBITDA margins and poor financials are not supported by evidence. Current market performance and the projected growth scenario do not justify the claim for limiting the entry.

2.15 An argument has been made by one of the stakeholder in response to the consultation paper that the capex to sales ratio is one of the highest for Indian service providers (as high as 70-80% in some cases) and thus implying thereby that the high amount of funds are required for expansion of service by them. The Authority examined this statement

with the available evidence across the emerging markets in the Asian region. In general, capex requirement is likely to be high during the initial growth phase and this trend has been seen in the past in many markets and it is seen even now in some of the emerging markets like Indonesia where the capex to sales ratio estimated for the year 2007 ranges from 56% for Indosat to 147% for Bakrie Telecom.[3] Requirement of the high capex deployment is also to be viewed in the context of growth scenario in the country. The Asia Pacific average of 44% of capex to sales ratio as cited in COAI's submissions is only an average and there are number of countries where growth has already happened as evidenced from the wireless penetration rates and the current growth rates of these countries are given below:-

Asia Wireless Growth Rankings 2007

	Wireless Sub Growth	Wireless Penetration
India	54%	20%
Bangladesh	53%	22%
Pakistan	52%	44%
Vietnam	36%	27%
Sri Lanka	35%	34%
Indonesia	34%	37%
Cambodia	33%	15%
China	16%	40%
Philippines	15%	55%
Malaysia	11%	86%
Thailand	10%	60%
Korea	6%	86%
Singapore	6%	110%
Hong Kong	3%	118%
Taiwan	1%	96%

Note: All data is based on December 2007 forecasts[4]

2.16 Evidently, capex requirement is inversely related to the existing penetration levels and the future potential for growth. It is clear from the above that Indian market is in the high growth phase and therefore

[3] Valuation matrix of emerging countries, Bloomberg, JP Morgan estimates

[4] Source: JP Morgan estimates

the capex requirement for Indian market will be much higher during this phase as compared to many other markets in the Asia Pacific region where saturation levels has almost been reached. It is on account of this factor, some stakeholders have suggested not to consider the option of limiting the operators in access service provision.

Principles of fair competition and other economic criteria

2.17 From the perspective of competition in the market, it is important to ensure that existence of potential competition ensures that competition is sustained. The existence of potential competition is negated when barriers to entry are erected by way of policy. Threat of entry is an important stimulant for competition in the market. European Commission Guidelines on Market Analysis (2002) has underlined the importance of potential competition which is reproduced below:-

"In electronic communications markets, competitive constraints may come from innovative threats from potential competitors that are not currently in the market. In such markets, the competitive assessment should be based on a prospective forward looking approach."

2.18 Threat of potential entry may prevent incumbent firms from raising prices above competitive levels. However, if there are significant barriers to entry this threat may be weak or absent. Incumbent operators in such situations are then likely to raise prices and make persistent excess profits without attracting additional competition. Absolute barriers are said to exist where enterprises have access to or are granted privileged use of resources which are not similarly accessible to potential entrants.[5]

2.19 It is clear from the above that ensuring a potential competition in the market would mean no barrier to entry. Needless to say, competitive

[5] Oftel's market review guidelines : criteria for assessment of market power, 2002 (www.ofcom.org.uk).

market provides the greatest benefits to consumers. Low or nil barriers to entry facilitate a high degree of innovation.

2.20 A recent study by BDA/Confederation of Indian Industry on wireless market in India has concluded that the Indian market has always benefited when the number of service providers has increased and competition has become stronger.[6]

2.21 On the entry based approach to the design of competition policy for developing countries, Ross C. Singleton (1997)[7] has stated the following:-

"Freedom of entry is the sine qua non of the competitive process. Freedom of entry promotes the development of efficient, innovative firms capable of competing in international markets and ensures that market reforms will enhance social welfare."

2.22 In a paper on Competitive Access to Telecom : Spectrum Policy and M&As, Arvind Virmani (2004)[8] argues that modern analysis of monopoly and competition focuses on two aspects which are relevant for today's telecom sector and these are contestability and abuse of market power. In this context, he has described ***contestability*** as follows:-

"The threat of entry has been found to be as important an instrument of competition as actual entry. A lot more attention therefore needs to be paid to this factor than is common. In particular, in the telecom context it is essential to ensure that there is free spectrum available for new entrants when the number of providers goes below some threshold."

2.23 Harald Gruber in a paper on spectrum limits and competition in mobile markets has examined the impact of scarcity of frequency spectrum on

[6] Wireless India, a joint study between BDA and the Confederation of Indian Industry, June 2007
[7] Ross C. Singleton (1997), Competition Policy for Developing Countries: A long-run entry based approach, Contemporary Economic Policy 15(2), 1-11, April, 1997
[8] Economic and Political Weekly, Vol.XXXIX No.7, February 14-20, 2004

the performance of mobile telecommunications industry. A key observation by the author which has relevance to the subject matter under discussion is reproduced below:-

"As technological progress creates the conditions to support a large number of firms in the market, competition in the market increases and market growth for mobile telecommunications accelerates as well."[9]

2.24 The Author has supported the viewpoint that technological progress relaxes the constraint of scarcity of radio spectrum somewhat and to that extent it leads to enhancement in the efficiency of spectrum usage and thus increased service capacity.

2.25 One industry association in its written submission has argued that "to state that consumer interest are served by higher competition is not correct" and to support this statement, the association has explained this point by saying that a fragmented market deprives players from reaping the benefits of economies of scale which otherwise could have been passed on to the subscribers.

2.26 The Authority examined the import of this statement made by the industry association in the light of experience of various liberalized telecom market including India. It may be recalled that at the time of liberalization of telecom markets, the then incumbent operators had argued exactly the same way and made attempts to stall the process of reforms in telecommunication sector by stating that economies of scale would be compromised. Growth of telecommunication services during the period after liberalization world over proved that such apprehensions of the incumbents were misplaced. Further, it has been proved time and again in many liberalized markets for telecom services including India that competition in the market has facilitated high levels of growth. Empirical evidence suggests that even the benefits of scale

[9] Gruber H, Spectrum limits and competition in mobile markets: the role of license fees, Telecommunications Policy 25 (2001) 59-70

effect are largely cornered by the dominant incumbents in the wireless market. This is evident from the results of analysis contained in a research report[10] on the Asian telecom markets released recently which is reproduced below:-

"Dominant incumbents could largely benefit from scale effect in terms of network coverage, distribution channels, brand name and bargaining power across the value chain. This could lead to tremendous entry barriers to new comers and we believe the gap between the leading players and the smaller one is actually wider than expected in large, growing markets such as India and China."

2.27 Implications of this research finding are twofold : one, scale economies for major operators in India are huge and it benefits only them and two, such scale effect could lead to tremendous entry barriers to the late entrants leading to disadvantages to the latter. The Authority is therefore not convinced of the argument that there is trade off between the benefits of "economies of scale and greater competition". Empirical evidence suggests that interests of consumers are best served by the forces of market and thus the Authority is convinced that to sustain competition in the market in the long run, it is necessary to ensure that barriers to entry into the market are reduced/removed.

2.28 Eun-A Park and Richard Taylor (2006)[11] have examined the question of barriers to entry comparing the US and South Korean markets for broadband services. In their review of literature regarding determinants of market entry, one important citation indicates that the entry decision is driven by two critical factors: one, the post entry profitability and two entry costs. Firms decide to enter a market only if it is profitable to do so. Factors that determine the post entry profit of new firm as identified in the study include market size, intensity of price

[10] Asian Telecom Themes and Strategy, page no.3, UBS Investment Research, 15.5.2007.
[11] Eun-A Park and Richard Taylor, Barriers to Entry Analysis of Broadband Multiple Platforms: Comparing the US and South Korea, Telecom Policy Research Conference, September-October,2006, Washington DC.

competition, level of product differentiation and existence of rival networks. Thus, the factors that influence the post entry profit therefore determine new entry. The Authority believes that when such market forces are said to be the determinants of entry decision of a firm in the access market, placing artificial entry restriction in the form of a licensing policy may not be appropriate at this stage.

Upcoming Technological Developments

2.29 The Authority examined the conflicting viewpoints of the stakeholders on the issue of limiting the entry of players in the access services provision, in the light of current technological developments and those that are on the horizon.

2.30 The range of arguments and viewpoints put across by some stakeholders to justify limiting the number of access service providers reveal there is in fact only one reason which prompts them to demand erection of an entry barrier which is the spectrum availability/allocation.

2.31 The Authority notes that the business model of either the existing operators or the potential entrants is not normally decided either by the Government or by the regulator and it is appropriate that such barriers are not put in place in a growing market. Policy should therefore not deny entry particularly in a market where the firms are exposed to constant technological changes that has implications for spectrum efficiency. Harold Gruber[12] an authority on this issue has concluded that '***waves of generations of technology have typically been a trigger for additional entry, as newer generations of technology with more efficient use of radio spectrum permitted the entry of more firms***'.

2.32 Further, the Authority noted the provisions in the existing license agreement wherein it is seen that the license is for access services. A major implication of placing a cap on the number of access providers is

[12] Harald Gruber, The Economics of Mobile Telecommunications, Cambridge University Press

that, such a policy would mean even if an access service which does not require the spectrum or a service which requires spectrum of a band whose availability is not in short supply will also be not available to the society. Unified licensing regime was recommended by the Authority in January 2005 with the key objective of encouraging free growth of new applications and services leveraging on the technological developments in the information and communication technology sector. Therefore, limiting the number of players in the access service market in India would be construed as a retrograde step.

2.33 The Authority also recalls its recommendations on allocation and pricing of spectrum for 3G broadband wireless access services wherein it had recommended allocation of spectrum for 3G services be made available only to the existing operators. In the same recommendation, the Authority expressed its viewpoint on the supply demand position of the spectrum which is relevant in the current context. Excerpts from the said recommendation are reproduced below:-

"In view of the scare availability of spectrum and the increasing demand by wireless technologies, the Authority feels that now there is an urgent requirement to have a fresh and comprehensive look at the present practices of spectrum allocation and pricing as well as ensuring its efficient usage."

2.34 Evidence available with the Authority and cited by many stakeholders suggests that QoS benchmarks of existing wireless operators have not been adversely affected by the availability or otherwise of spectrum to these operators. On the contrary, 'spectrum drought' is noted in select pockets of circle and they remain the top 20 cities. Needless to say, growth of wireless service in many of these areas has been quite high and the tele density levels of major towns are substantially higher than the national average of 19%. Therefore, to say that spectrum availability to existing operators needs to be augmented even beyond 10 MHz on this score does not stand to reason. Therefore, following

the principles laid down in the NTP, 1999 it would be in order not to place any cap on the number of players but it is certainly necessary to revisit issues like optimal usage of spectrum, assessment of spectrum requirements of market in the light of the new data on availability of spectrum in the near future. In fact, this aspect had been highlighted by the Authority in its 'Recommendations on Spectrum Related Issues' in May, 2005, the extracts of which are reproduced below:

"*The spectrum policy may be reviewed periodically depending upon the development in the market, level of competition, development of technologies and availability of equipments and spectrum.*"

2.35 The Authority has thus reviewed various arguments and counter arguments, evidences cited by the stakeholders representing conflicting viewpoints in this matter. The Authority has extensively surveyed the empirical evidences on its own, through published material and has carefully examined the sector experience and the existing provisions of the license agreement governing access service provision. The Authority has also examined the whole issue from the standpoint of the current and upcoming technological developments. Principles of competition and other vital economic criteria have also guided the Authority in understanding this crucial issue of entry regulation in the access service market. Separately, the Authority has examined issues relating to the utilization of spectrum keeping in view the emerging scenario of spectrum availability, optimum use of spectrum, requirements of market and competition in the market. It is noteworthy these are the guiding principles that have been laid down in NTP, 1999.

2.36 Having considered all the above aspects and considering the implications of having to suggest a framework covering other issues that have been referred by the Government; the Authority is not in favour of suggesting a cap on the number of access service providers in any service area. It is not advisable to exogenously fix the number of access service providers in a market which is in a dynamic setting.

2.37 Accordingly, the Authority recommends that no cap be placed on the number of access service providers in any service area.

Need for spectrum management review

2.38 Predictability and transparency in spectrum management are quite important so as to ensure the degree of uncertainty is minimized in the market place. Investors, current and potential base their investment decisions depending upon the likely availability of spectrum which is a key raw material for the wireless industry. Continued uncertainty on the quantum and timing of its availability can seriously erode the confidence of the investors which may impede the growth of the sector itself. Another major area of concern that has arisen out of this consultation process is that which relates to the need for transparency in the allocation of spectrum. ***The Authority recommends that it is necessary, to ensure that allocations of spectrum are made in accordance with the laid down policy and the information on such allocations and pending requests for allocation of spectrum, the reasons for pendency, the duration of pending requests, etc. is available in public domain. Above all, the likely availability of spectrum in different bands in all the circles, the time period by which it will be available for allocation, the criteria to be adopted for setting up a 'Q system' needs to be made public.***

2.39 The Authority is conscious of the fact that DoT has not asked for any specific recommendation on the issue of spectrum allocation or pricing. However, as noted earlier also, Spectrum is a scarce resource and is the most vital raw material to offer mobile services. Main growth is happening in wireless segment and future growth will also be wireless centric. Having come to the conclusion that there should not be any limit to the number of access providers, the Authority is of the opinion that in order to have an actual free market, there is an urgent need to have a predictable and transparent road map for any new entrant

wishing to enter the sector. There is a need to have a simple licensing regime and a transparent and efficient spectrum management system; otherwise the free market will only be a myth.

2.40 The present spectrum allocation criteria, pricing methodology and the management system suffer from a number of deficiencies and therefore **the Authority recommends that this whole issue is not to be dealt in piecemeal but should be taken up as a long-term policy issue.** There is an urgent need to address the issues linked with the spectrum efficiency and its management. In the subsequent paragraphs, following issues are being discussed:

- Measures to increase the spectrum efficiency
- Spectrum allocation criteria
- Efficient pricing of spectrum
- Need for improving the spectrum management

Measures to increase the spectrum efficiency

2.41 Spectrum is a scarce and limited resource; there is an increasing pressure on its availability with more and more new wireless application coming in. In managing spectrum, regulators are concerned with two forms of efficiency: technical and economic. The objective of technical efficiency primarily relates to achieving the most intensive use possible of available spectrum within acceptable interference limits. It also seeks to promote the development and introduction of spectrum saving technologies. Therefore, world over, there is a concerted effort to adopt new technologies which are more spectrum efficient and are able to use the same amount of spectrum to deliver increase capacity. Some of these techniques are discussed below[13]:

[13] Source : COAI, http://www.nokia.com/NOKIA_COM_1/Operators/Mobile_Operators_&_Service_Providers/Mobile_Entry/Low_ARPU_Business_Enablers/amr_5.pdf, http://www.mobiledia.com/glossary/108.html, http://en.wikipedia.org,

2.42 Spectrum Efficiency occurs when the maximum amount of information (i.e., output) is transmitted within a given amount of spectrum (i.e., input), or equivalently, when the least amount of spectrum is used to transmit a given amount of information[14]. This could be expressed as:

Spectrum Efficiency= Output/Spectrum impacted

2.43 As per ITU-R Recommendations SM.1046-1 on "Definition of Spectrum use and efficiency of a radio system':

SUE=M/U=M/BxSxT where

SUE: Spectrum utilization efficiency

M: amount of information transferred over a distance

B: frequency bandwidth

S: geometric space (usually area) and

T: Time

For cellular mobile system, it can be expressed as

$$SUE = \frac{\text{(Traffic in Erlangs)}}{\text{(Amount of spectrum in MHz)X(Area in Sq. Kms)}} \Big| \text{For a specified Grade of Service (GoS)}$$

- **Synthesized frequency hopping (SFH)**

Synthesized Frequency Hopping (SFH) is a technique whereby spectrum efficiency is further increased (from earlier technique of Baseband hopping) by reusing the same spectrum across all cells in the network.

In Synthesized Frequency hopping, the call stays on one transceiver (TRX), but the frequency of the TRX changes for every frame. The number of hopping frequencies is only limited by the number of available frequencies, thus providing greater spectral efficiency. As per the information available with

[14] FCC spectrum policy task force, Report of the spectrum efficiency working group dated November 15,2002

TRAI this technique has already been deployed by GSM operators in their networks.

- **Tighter Frequency Reuse Plan**

Since each cell is designed to use radio frequencies only within its boundaries, the same frequencies can be reused in other cells not far away with little potential for interference. The reuse of frequencies is what enables a cellular system to handle a huge number of calls with a limited number of channels.

Fractional Load Planning (FLP) is a technique which uses Synthesized Frequency hopping. Fractionally loaded networks, planned with extremely tight reuse (1/1 or 1/3) have shown to be a very competitive method in order to achieve high spectrum efficiency. A lot of hopping frequencies per cell is possible if a tight TCH frequency reuse is applied, for example 1/1 or 1/3.

- **Adaptive Multi Rate Codec (AMR)**

Adaptive Multi-Rate (AMR) is an audio data compression scheme optimized for speech coding. AMR was adopted as the standard speech codec by 3rd Generation Partnership Project (3GPP) in October 1998 and is now widely used in GSM. It uses link adaptation to select from one of eight different bit rates based on link conditions.

The proven, highly efficient and very robust AMR (Adaptive Multi-Rate) narrowband codec is the 3GPP mandatory standard codec for narrowband speech and multimedia messaging services over 2.5G/3G wireless systems based on evolved GSM core networks (WCDMA, EDGE, GPRS). AMR operating at various bit rates is built into every GSM and WCDMA phone, ensuring that content generated by AMR can be played by virtually any wireless phone in the world. AMR operates on narrowband (200-3400 Hz) signals at variable bit rates in the range of 4.75 to 12.2 kbps. It provides toll quality speech starting at 7.4 kbps, with near-toll quality and better robustness at lower rates and better reproduction of non-speech sounds at higher rates. AMR is the only narrowband speech codec offering eight different bit rates that can be adapted according to network congestion.

Adaptive Multi Rate Codec adds capacity to densely populated areas to bring better speech quality. It also improves indoor coverage and results in increased spectral efficiency and the ability to increase capacity of the existing base station sites with no extra hardware. AMR increases individual base station cell size by about 30% (figure 4), reducing the amount of investment needed in infrastructure because fewer base stations can be used to build coverage. Operators currently using Enhanced Full Rate (EFR) coding can almost double their network voice capacity with AMR.

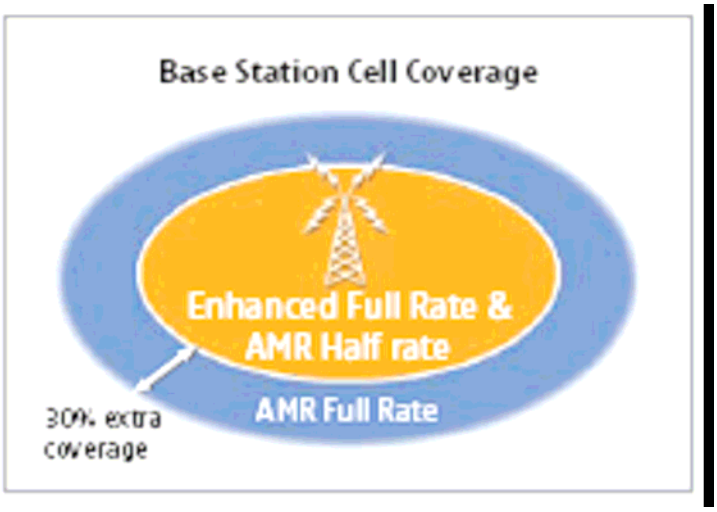


Figure 4: AMR increases coverage

AMR enables the network to provide service to 140% more subscriber traffic from the same number of base station sites (figure 5) with voice quality even exceeding that of the EFR codec.

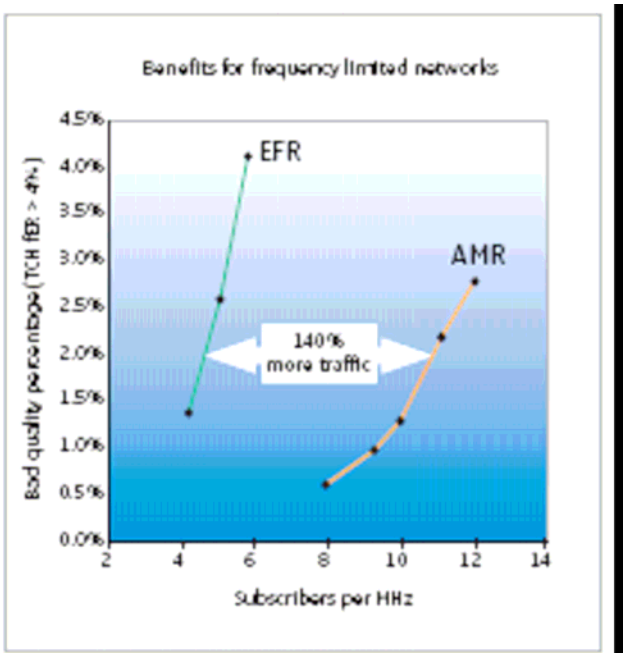


Figure 5: Capacity increase by AMR

AMR is deployed extensively in India by operators to take advantage of this enhanced voice quality algorithms and provide improve customer satisfaction. Benefits of AMR deployment depends upon:

- Good carrier-to-interference ratio (C/I) of the network in the location of the mobile
- Penetration of AMR compatible mobiles in the network
- Support for AMR in all network elements of the network.

As per the information available with TRAI, since last 2 years most of the handsets available in the market are AMR enabled.

- **Single Antenna Interference cancellation**

Single Antenna Interference Cancellation or known as SAIC is a promising technology to boost the capacity of GSM network without any needed change in the network. It is in the high interest of network operator to use the allocated spectrum as efficiently as possible and to the highest possible capacity because most of the investment is done to get the licence for it. It would be desirable to have the frequency reuse of one, which means that each cell can operate in the same frequency. This in turn creates interference to the users operating in the nearby places. Increase Interference cause the

voice quality to drop and may cause call drop. It is now well know fact that it is possible to cancel the interference at the mobile handset side by changing the base band software without changing anything in the network side. SAIC enabled mobiles can work in high interference level. They also need comparatively less transmit power from network which in turn reduces the interference for non SAIC mobiles. Studies show that with 100% SAIC mobile penetration, a capacity gain of 60 to 80% is achievable.

- **Discontinuous transmission:**

Discontinuous transmission (DTX) is a method of momentarily powering-down, or muting, a mobile or portable wireless telephone set when there is no voice input to the set. This optimizes the overall efficiency of a wireless voice communications system. It can be used in both uplink & downlink and GSM operators have deployed this technique. In addition to improving voice quality, it helps in reducing power consumption of the BTS & mobile.

- **In-building solutions (IBS) & Micro cells**

Indian GSM operators have already deployed such IBS solutions in many central Business District (CBD) areas / Hotels / Hospitals / Conference centers etc.

2.44 Other techniques available to enhance the network capacity and improve the QoS include Antenna Hopping, Multiple layers (underlay/overlay concept) Power control, Deployment of EDGE, Common BCCH functionality, Synchronized Network, Electrical down tilt antenna/reduced power/cell splitting, Software Features: Dynamic SDCCH allocation, Directed Retry, Handover Power Boost, Interference Rejection Combining, etc.

2.45 During the consultation process, the service providers informed the Authority that most of them are using these techniques to increase the efficiency of spectrum utilization. As a result many service providers are able to serve a much larger subscriber base than that specified in the subscriber base criteria with the same amount of spectrum. The

status of deployment of optimization techniques by GSM operators is shown in the table 1 below:

Optimization Techniques	Op-1	Op-2	Op-3	Op-4	Op-5	Op-6
a. Synthesized Frequency Hopping (SFH)	Y	Y	Y	Y	Y	Y
b. Tighter Frequency Reuse Plan (TFR / Cell Splitting / Electrical down tilt antenna)	Y	Y	Y	Y	Y	Y
c. Discontinuous Transmission (DTX)	Y	Y	Y	Y	Y	Y
d. Power Control	Y	Y	Y	Y	Y	Y
e. Multiple Layers (underlay/overlay concept)	Y	UT[2]	Y	Y	Y	Y
f. In-building Solutions & Micro cells	Y	Y	Y	Y	Y	Y
g. Antenna Hopping	Y	N		UT[2]	N[5]	N[8]
h. Use of AMR Codecs	Y	N[3]	Y	Y	Y	Y
i. Software Features (congestion relief, etc)	Y[1]	Y	Y	Y	Y[6]	Y
j. Synchronized Network	UT[2]	Y		UT[2]	N[7]	N[8]
k. Any Other (please specify)	N	HR[3]		Y[4]		Y[9]

Notes:

1. Direct Access to desired layer/band, dynamic SDCCH allocation, Intelligent directed retry, AMR.
2. Under Trial
3. Using Half rate
4. Common BCCH, Dynamic SDCCH, Dynamic EDGE TS config, Traffic reason HO
5. This technique is not very effective in the frequency hopping environment and hence not implemented
6. Features such as Handover power boost, Dynamic SDCCH allocation and Interference rejection Combining are used in the network
7. This technique is not used, as it is not proven.
8. Under techno commercial evaluation
9. IRC-Interference Rejection Combining, Dynamic SDCCH, Handover Power boost.

Table 1: Status of deployment of optimization techniques

2.46 The Authority is of the view that the existing spectrum allocation criteria should take into consideration all the spectrum efficient technologies that are available to enhance efficiencies of spectrum utilization

Allocation of spectrum

2.47 In this era of convergence, coupled with multi-user and multi-uses scenario it is imperative to have a transparent process of allocation of

frequency spectrum which is effective and efficient. There is an urgent need for spectrum management so as to :

- allow regulatory certainty in the industry/predictability and transparency
- makes India a spectrum policy leader
- enables investment in new technology deployment
- ensures a cleaner transition to an era of converged and intelligent wireless devices
- allow a balance in the public and private uses of spectrum

Need for revision of subscriber base criteria

2.48 The quantum of spectrum assigned to UASL or CMSPs depends on what is colloquially referred to as the subscriber-base criteria. However, this method of spectrum allocation has a number of limitations and problems, especially in the current market environment.

2.49 The current subscriber-base allocation criteria, as defined by the DoT in March 2006, award a certain amount of spectrum to a licensee once their subscriber base figures cross a pre-defined level. The criteria depend on three variables: the technology, the number of subscribers in the VLR, and the service area (see Table 2). For example, if the subscriber base for a GSM operator in Maharashtra (Category A circle) crosses 1.4 million, that operator will be eligible for 2 x 10 MHz of spectrum. This method of spectrum assignment is inadequate for a number of reasons, both inherent to the criteria, and from a network planning perspective.

As per WPC Letter Nos. J-14025/200(17)/2004-NT(GSM) and J-14025/200(17)/2004-NT(CDMA) dated 29 March 2006.

GSM subscriber base criteria (millions of subscribers)

Service Area	2 x 6.2 MHz	2 x 8 MHz	2 x 10 MHz	2 x 12.4 MHz	2 x 15 MHz
Delhi/Mumbai	0.3	0.6	1	1.6	2.1
Chennai/Kolkata	0.2	0.4	0.6	1	1.3
A	0.4	0.8	1.4	2	2.6
B	0.3	0.6	1	1.6	2.1
C	0.2	0.4	0.6	0.9	1.2

CDMA subscriber base criteria (millions of subscribers)

Service Area	3rd carrier (2 x 3.75 MHz)	4th carrier (2 x 5 MHz)	5th carrier (2 x 6.25 MHz)	6th carrier (2 x 7.5 MHz)
Delhi/Mumbai	0.3	1	1.6	2.1
Chennai/Kolkata	0.2	0.6	1	1.3
A	0.4	1.2	2	2.6
B	0.3	1	1.6	2.1
C	0.15	0.5	0.9	1.2

Table 2: Subscriber base criteria

2.50 Some of the gaps in the present framework for spectrum allocation are mentioned below:

- The criterion does **not consider subscriber base density across service areas**. For example, both Mumbai and Delhi circles have the same criteria. However, the population density of Mumbai is about 37,600 persons/sq Km while that of Delhi is about 10,000 persons/sq Km. It is a well-established fact that higher population (and hence subscriber) densities will lead to a higher demand for spectrum per cell site. However, the criteria equate these and other groups, in spite of their different population/subscriber densities.
- The criterion does **not account for subscriber distributions within service areas**. Consider a GSM licensee in circle X of category A. One or two cities in X has about 2-4 million population and the rest of the cities/towns has lower population

base. However, the present criteria do not take into account the population distribution and allots similar amount of spectrum as specified for a metro. This results in inefficient use of spectrum in majority of the service area.

- These criteria have led to attempts at ***over reporting of the subscriber base***. Given that spectrum is a vital input to cellular operations, and one that can significantly impact costs, these criteria create incentives for over reporting. While some of this problem might be addressed with verification and VLR reporting (and not HLR), the possibilities and incentives are not eliminated.

2.51 The subscriber-base allocation criterion also causes problems from a network planning perspective. If a licensee has less spectrum to start with, their **network capex increases** because they need additional frequency reuse that requires more BTSs to provide service. As a result, the **upfront costs for service provision increase** if they get less spectrum to begin with. If subscriber growth is not strong, revenues do not come in, and service provision costs remain high, which leads to **financial instability** for new service providers. It is also **difficult and costly to adjust networks repeatedly** to use additional carriers. Every time additional spectrum is made available, licensees have to do network planning, incrementally purchase equipment, and re-tune and adjust network parameters.

2.52 Given these problems with the subscriber base criteria, it is necessary that in a truly competitive, growing market, where technology neutrality is the norm, spectrum assignments should not be based only on subscriber base growth.

2.53 The standard approach followed around the world is for regulators or governments to assign blocks of spectrum to operators at one time. In order to **ensure use of spectrum**, countries like the USA and South Korea have and enforce “use-it-or-lose-it” license conditions.

Maximized spectral efficiency is almost a necessary outcome, because operators will want to derive the maximum capacity from their spectrum assignments – with the precondition that spectrum be assigned at a price and not free.

2.54 The authority recognizes the fact that the principle of allocating spectrum in one block is an efficient method both from the point of its efficient usage and operator's investment. *However, in view of non availability of large amount of spectrum at the time of issue of initial mobile license and also subsequently, this approach could not be implemented.*

2.55 Today the spectrum allocation follows grant of UAS License. On payment of certain entry fee, the applicant is given the license and subject to availability, he is given a certain amount of spectrum in the 2G band. In case the applicant does not require this spectrum for providing the access service, he may want to use only wire-line or may want to provide services using some other spectrum, e.g. BWA, there is no clear cut path for him. He is required to pay the full license entry fee. The Authority in the past has also recommended that the license fee should be separate from the spectrum fee. With the advent of new technologies where spectrum other than 2G band will be used, resolution of this issue is becoming critical. As recommended earlier, the Authority again reiterates that spectrum should be de-linked from the licensing regime. There is also a need to clearly specify the license fee charges without spectrum. The Authority is of the view that license fee charges should be on a reduced scale to facilitate penetration of telecom services. Bifurcating present entry fee in to license fee and spectrum charge is difficult. It is also a fact that entry fee determined in 2001 does not bear any relationship to present spurt in the telecom market. Keeping in mind that spectrum is a scarce resource, **the Authority recommends that the DoT should examine the issue early and specify appropriate license fee for UAS licensees who do not wish to utilize the spectrum.**

2.56 Presently, initial spectrum either 2 X4.4 MHz in 1800 MHz band or 2X2.5 MHz in 800 MHz band is allocated to a licensee based on his choice of technology and then additional spectrum is allocated by WPC based on a predetermined subscriber based criteria (**Annex IV**). The subscriber based threshold for getting the next installment of spectrum is different for metros, A, B and C categories of service areas. The Authority has compared the subscriber threshold with the actual subscriber base of all the service providers in all the service areas (**Annex V**). The comparison of the two tables reveal that :

- With the same amount of spectrum, some service providers are able to serve more than three times the subscribers the number specified in the spectrum allocation criteria.
- Some of the service providers have excess spectrum as their actual subscribers are far below the subscriber numbers specified in the allocation criteria.

2.57 The Authority deliberated over the above results and has concluded that :

- *The service providers have been able to serve the increasing subscriber numbers without additional spectrum by using state of the art spectrally efficient technologies and also putting more number of BTS for increasing the capacity.*
- *The present spectrum allocation criteria needs to be immediately reviewed as it is not spectrally efficient and has not taken into consideration the present technology innovations for increasing spectral efficiency.*
- *The service providers who are having more spectrum than their usage should be asked to surrender the additional spectrum in a specified timeframe.*

- *Hoarding of scarce resource like spectrum should be viewed very seriously and in case of non-vacation, a heavy penalty should be imposed on the service providers.*

2.58 As noted in ¶ 2.50, the present spectrum allocation criteria do not take into account the **subscriber distributions within service area.** Therefore an examination of the allocation criteria will reveal that the difference in the subscriber threshold for a certain amount of spectrum for a metro service area and a category A, B or C service area is marginal. For example, in metros like Delhi or Mumbai, for getting 10 MHz of GSM spectrum or 5 MHz of CDMA spectrum, a service provider is required to have a subscriber base of 1 million while for say B category service area, where the subscriber are distributed across the service area, having many times the area than a metro, the subscriber base required for the same amount of spectrum is also 1 Million.

2.59 The Authority has analyzed the list of cities with over a million population (**Annex VI**). There are in all 35 such cities out of which excluding the 4 metros, there are only 5 cities with population above 3 million. Excluding the metros, Bangalore is the most populated city with a population of about 6 million. Even if it is assumed that these cities will reach 100% tele-density in next 1-2 years and assuming that the leading operator in these cities will have around 30% market share than also it can be safely argued that based on the present subscriber base being served in metros with 10 MHz of spectrum, an operator in the category A, B or C service areas will not require more than 10 MHz for any of the cities. Therefore, the ***Authority is of the opinion that there is a need to tighten the subscriber criteria for all the service areas so as to make it more efficient from the usage and pricing point of view. Further, in the category A, B and C service areas the subscribers are widely distributed in the service area and therefore the amount of spectrum required in these areas for the***

same number of subscriber as in a metro will be comparatively lower.

2.60 The Authority is conscious of the fact that due to paucity of time it is not possible to frame and recommend revised allocation criteria for a longer term framework taking into account the latest spectrum efficient techniques and the foregoing discussion. However, in views of the findings given in ¶2.57 and theoretical simulations done on the basis of data gathered from the associations and vendors during the consultation process, to arrive at the subscriber numbers possible to serve with different spectrum amounts (**Annex VII**), the Authority suggests revision in the criteria.

2.61 **The Authority recommends that in order to frame a new spectrum allocation criteria, a multi-disciplinary committee may be constituted consisting of representatives from DoT/TEC, TRAI, WPC wing, COAI & AUSPI. The committee may be headed by an eminent scientist/ technologist from a national level scientific institute like Indian Institute of Science, Bangalore.**

2.62 **However, in view of reasons stated in ¶2.60 and so as not to delay bringing a semblance to more effective utilization of spectrum, it is felt that at present the existing criteria may be continued but also recommends to enhance the present subscriber norms as an interim measure so that the task of spectrum allocation is not stalled. The suggested revision is given below (Table 4) :-**

GSM subscriber base criteria (millions of subscribers)

Service Area	2 x 6.2 MHz	2 x 8 MHz	2 x 10 MHz	2 x 12.4 MHz	2 x 15 MHz
Delhi/Mumbai	0.5	1.5	2	3.0	5
Chennai/Kolkata	0.5	1.5	2	3.0	5
A	0.8	3	5	8	10
B	0.8	3	5	8	10
C	0.6	2	4	6	8

CDMA subscriber base criteria (millions of subscribers)

Service Area	3rd carrier (2 x 3.75 MHz)	4th carrier (2 x 5 MHz)	5th carrier (2 x 6.25 MHz)	6th carrier (2 x 7.5 MHz)
Delhi/Mumbai	0.5	2	3.0	5
Chennai/Kolkata	0.5	2	3.0	5
A	0.8	5	8	10
B	0.8	5	8	10
C	0.6	4	6	8

Table 4 Revised spectrum allocation criteria

The Authority further recommends that the GSM operators and CDMA operators should be given additional spectrum beyond 2X4.4MHz in GSM and 2x2.5 MHz in CDMA after the operators achieve the recommended subscriber base and also submit compliance of roll-out obligation.

Spectrum Pricing and Usage Charges

2.63 Spectrum is at the heart of all types of telecom services. The importance of Spectrum as a scarce resource is globally recognized. It is a finite resource and an essential input for the knowledge-driven economy. It also plays an important role in increasing competitiveness and growth of the telecom sector in the country. 'Spectrum pricing' therefore, needs to be set in a manner that encourages the most optimum use of this resource, taking into consideration both its availability and its growing demand. Pricing of spectrum should therefore provide incentive for efficient utilization and discourage creation of self-perpetuating shortages.

2.64 The underlying concept of spectrum pricing is that fees should be based on the amount of spectrum used and on the value of the spectrum to its users. A market price is a fair payment criterion for the use of scarce resources. It is therefore, reasonable to adopt the same for pricing of spectrum. However, a balance has to be struck, so that an efficient organization is not unduly disadvantaged. In this, both pricing as well as allocation principles have an important role to play. An efficient use of spectrum would in turn have a direct impact on GDP and the resulting increase in competition thereby benefiting consumers through declining tariffs. Proper pricing and allocation principles would also encourage investment in more spectrally efficient technologies.

2.65 At the core of all aspects that form the basis for reference of the Government to TRAI lie the issues relating to spectrum allocation and its pricing. Spectrum allocation criteria have already been covered elsewhere in this chapter. Turning to the pricing aspects of spectrum, the following questions are relevant: -

a) Should the existing licensees who have acquired spectrum beyond the contracted limit of 6.2 MHz (upto 10 MHz.) pay any additional spectrum fee / charge over and above, what is payable as of now ? If yes, how much should that be and what is the basis of imposing additional charge / fee for spectrum on these licensees. If not, what is the basis for such a dispensation?

b) What should be the pricing policy of spectrum in the 800, 900 & 1800 MHz. bands with respect to licensees who may be allotted additional spectrum beyond 10 MHz.? What is the basis of such a policy being recommended?

c) What should be the pricing policy of spectrum in the 800, 900 & 1800 MHz. bands with respect to a new entrant who may be issued a license in future with an initial allotment of 4.4 MHz/2.5 MHz. in these bands? What is the basis of such a policy recommendation?

d) Should the approach to price the spectrum in bands other than 800, 900 & 1800 MHz. be different from the one being recommended for

800, 900 & 1800 MHz. bands and if so, what is that approach and what is the basis of such an approach?

2.66 Answers to questions raised above would serve the basis for addressing the currently relevant issues and also to tackle certain medium to long term issues that are likely to arise in future. In addressing these issues, the Authority has kept the following objectives in view:-

a. To promote the efficient use of scarce resource of radio spectrum
b. Reflecting market value of spectrum in the wake of scarcity, to ensure its efficient utilization
c. Increasing rural and semi-urban roll-out
d. To facilitate access to radio spectrum particularly to innovative technologies and services, and
e. To afford opportunity for equal competition.

2.67 Radio spectrum is a finite natural resource. Its efficient utilization should therefore acquire prime importance in the matter of its allocation and pricing. In general, the role of pricing in a market is to guide the users in making decisions to use the resource more efficiently. It, therefore, follows that the approach to pricing should reflect the scarcity besides incentivising efficiency in use.

2.68 Existing licensing framework imposes the following levies/fees on a UASL/CMTS licensee seeking to provide access services inter alia using wireless technologies:-

a) Entry fee for acquiring a license
b) License fee as a percentage of Adjusted Gross Revenue paid on a quarterly basis
c) Spectrum usage charges as a percentage of Adjusted Gross Revenue paid on a quarterly basis

2.69 The Entry fee for acquiring a UASL license enables the licensee to become eligible for spectrum allocation in certain specified bands

without any additional fee for acquisition of spectrum which means that allocation of spectrum follows the grant of license subject however to availability of spectrum. T*here is only one direct cost to the operator for spectrum i.e. spectrum charge in the form of royalty.* Besides this, the Government collects license fee as a percentage of Adjusted Gross Revenue of the operators. The amount of annual collection of spectrum charge realized by the Government for the last three years are given below:-

Year	Amount of spectrum charges collected (Rs. Millions)(approx)
2004-05	**10280**
2005-06	**13760**
2006-07	**20900**

Table 5 Amount of Spectrum Charge Collected from UASL/CMTS Licensees for the period 2004-05 to 2006-07

It is evident that the amount of spectrum charges collected from the operators who are offering cellular mobile services in the country has been increasing over a period of time and for the last financial year the amount collected is estimated to be of the order of Rs.21000 million . Further, the licensees pay license fee (including contribution to Universal Service Obligation) separately as a percentage of their Adjusted Gross Revenues on a quarterly basis. The amount of annual collection of license fee realized by the Government for the last three years is given below (Table 6):-

Year	Amount of License Fee collected (Rs. Millions)(approx)
2004-05	**62940**
2005-06	**56950**
2006-07	**63600**

Table 6 Amount of License Fee Collected from BASIC/UASL/CMTS Licensees for the period 2004-05 to 2006-07

2.70 Economic growth in general and the growth in wireless services in particular have led to buoyancy in the revenue to Government from the

access services using wireless technologies. Needless to say, the bands assigned so far for the purpose of providing access service are 800, 900 and 1800 MHz.

2.71 Spectrum pricing aims to ensure that the value of the spectrum is reflected in the fees that licensees pay for its access. There are generally three ways in which this is done:

- **Administrative Incentive Pricing** which attempts to calculate the value of the spectrum by assessing the cost associated either with the user employing an alternative solution, or its opportunity cost foregone by denying access to an alternative user.
- **Beauty Parades or Comparative Selection** which fixes the price of the spectrum to ensure optimum utilization by awarding spectrum to the user(s) who score highest against a group of pre-set criteria (such as rural coverage or the fulfillment of roll-out obligation).
- **Spectrum Auction is** fully market-based technique whereby spectrum is awarded to the highest bidder (or some combination of highest priced bids).

2.72 In each case, the aim is to change spectrum users' behavior towards the use of the spectrum, to ensure that the maximum (social, economic or technical) benefit is accrued. However, in the present context, none of these above techniques of spectrum pricing are being considered for reasons stated in the ensuing paragraphs.

2.73 The allocation of spectrum is after the payment of entry fee and grant of license. The entry fee as it exists today is, in fact, a result of the price discovered through a markets based mechanism applicable for the grant of license to the 4th cellular operator. In today's dynamism and unprecedented growth of telecom sector, the entry fee determined then is also not the realistic price for obtaining a license. Perhaps, it needs to be reassessed through a market mechanism. On the other hand spectrum usage charge is in the form of a royalty which is linked

to the revenue earned by the operators and to that extent it captures the economic value of the spectrum that is used. Some stakeholders have viewed the charges/fee as a hybrid model of extracting economic rent for the acquisition and also meet the criterion of efficiency in the utilization of this scarce resource. The Authority in the context of 800, 900 and 1800 MHz is conscious of the legacy i.e. prevailing practice and the overriding consideration of level playing field. Though the dual charge in present form does not reflect the present value of spectrum it needed to be continued for treating already specified bands for 2G services i.e. 800, 900 and 1800 MHz. It is in this background that the Authority is not recommending the standard options pricing of spectrum, however, it has elsewhere in the recommendation made a strong case for adopting auction procedure in the allocation of all other spectrum bands except 800, 900 and 1800 MHz.

2.74 Some of the existing service providers have already been allocated spectrum beyond 6.2 MHz in GSM and 5 MHz in CDMA as specified in the license agreements without charging any extra one time spectrum charges. The maximum spectrum allocated to a service provider is 10 MHz so far. However, the spectrum usage charge is being increased with increased allocation of spectrum. The details are available at Table 8.

2.75 The Authority has noted that the allocation beyond 6.2 MHz for GSM and 5 MHz for CDMA at enhanced spectrum usage charge has already been implemented. Different licensees are at different levels of operations in terms of the quantum of spectrum. Imposition of additional acquisition fee for the quantum beyond these thresholds may not be legally feasible in view of the fact that higher levels of usage charges have been agreed to and are being collected by the Government. Further, the Authority is conscious of the fact that further penetration of wireless services is to happen in semi-urban and rural areas where affordability of services to the common man is the key to further expansion.

2.76 However, the Authority is of the view that the approach needs to be different for allocating and pricing spectrum beyond 10 MHz in these bands i.e. 800, 900 and 1800 MHz. In this matter, the Authority is guided by the need to ensure sustainable competition in the market keeping in view the fact that there are new entrants whose subscriber acquisition costs will be far higher than the incumbent wireless operators. Further, the technological progress enables the operators to adopt a number of technological solutions towards improving the efficiency of the radio spectrum assigned to them. A cost- benefit analysis of allocating additional spectrum beyond 10 MHz to existing wireless operators and the cost of deploying additional CAPEX towards technical improvements in the networks would show that there is either a need to place a cap on the maximum allocable spectrum at 10 MHz or to impose framework of pricing through additional acquisition fee beyond 10 MHz. The Authority feels it appropriate to go in for additional acquisition fee of spectrum instead of placing a cap on the amount of spectrum that can be allocated to any wireless operator. In any case, the Authority is recommending a far stricter norm of subscriber base for allocation of additional spectrum beyond the initial allotment of spectrum. The additional acquisition fee beyond 10 MHz could be decided either administratively or through an auction method from amongst the eligible wireless service providers. In this matter, the Authority has taken note of submissions of a number of stakeholders who have cited evidences of the fulfillment of the quality of service benchmarks of the existing wireless operators at 10 MHz and even below in almost all the licensed service areas. Such an approach would also be consistent with the Recommendation of the Authority in keeping the door open for new entrant without putting a limit on the number of access service providers.

2.77 The Authority in its recommendation on “Allocation and pricing of spectrum for 3G and broadband wireless access services” had

recommended certain reserve price for 5 MHz of spectrum in different service areas. The recommended price are as below:

Service Areas	Price (Rs.in million) for 2X5 MHz
Mumbai, Delhi and Category A	800
Chennai, Kolkatta and Category B	400
Category C	150

The Authority recommends that any licensee who seeks to get additional spectrum beyond 10 MHz in the existing 2G bands i.e. 800,900 and 1800 MHz after reaching the specified subscriber numbers shall have to pay a onetime spectrum charge at the above mentioned rate on prorata basis for allotment of each MHz or part thereof of spectrum beyond 10 MHz. For one MHz allotment in Mumbai, Delhi and Category A service areas, the service provider will have to pay Rs. 160 million as one time spectrum acquisition charge.

2.78 As far as a new entrant is concerned, the question arises whether there is any need for change in the pricing methodology for allocation of spectrum in the 800, 900 and 1800 MHz bands. Keeping in view the objective of growth, affordability, penetration of wireless services in semi-urban and rural areas, the Authority is not in favour of changing the spectrum fee regime for a new entrant. Opportunity for equal competition has always been one of the prime principles of the Authority in suggesting a regulatory framework in telecom services. Any differential treatment to a new entrant vis-à-vis incumbents in the wireless sector will go against the principle of level playing field. This is specific and restricted to 2G bands only i.e. 800, 900 and 1800 MHz. This approach assumes more significance particularly in the context where subscriber acquisition cost for a new entrant is likely to be much higher than for the incumbent wireless operators.

2.79 In the case of spectrum in bands other than 800, 900 and 1800 MHz i.e. bands that are yet to be allocated, the Authority examined various

possible approaches for pricing and has come to the conclusion that it would be appropriate in future for a market based price discovery systems. In response to the consultation paper, a number of stakeholders have also strongly recommended that the allocation of spectrum should be immediately de-linked from the license and the future allocation should be based on auction. The Authority in its recommendation on "Allocation and pricing of spectrum for 3G and broadband wireless access services" has also favored auction methodology for allocation of spectrum for 3G and BWA services. **It is therefore recommended that in future all spectrum excluding the spectrum in 800, 900 and 1800 bands should be auctioned so as to ensure efficient utilization of this scarce resource.** In the 2G bands (800 MHz/900 MHz/1800 MHz), the allocation through auction may not be possible as the service providers were allocated spectrum at different times of their license and the amount of spectrum with them varies from 2X4.4 MHz to 2X10 MHz for GSM technology and 2X2.5 MHz to 2X5 MHz in CDMA technology. Therefore, to decide the cut off after which the spectrum is auctioned will be difficult and might raise the issue of level playing field.

2.80 The spectrum charges are currently on revenue share basis starting from 2% of AGR for spectrum up to 2X 4.4 MHz and 2X 5 MHz for GSM and CDMA respectively. The fourth Cellular license issued in 2001, stipulated that any additional bandwidth if allotted subject to availability and justification shall attract additional License fee as revenue share (typically 1% additional revenue share if Bandwidth allocated is up to 6.2 MHz + 6.2 MHz in place of 4.4 MHz + 4.4MHz). The above spectrum charge was subject to review by WPC wing from time to time.

2.81 The WPC wing of DoT, has over a period of time through its various orders communicated allocation and rates for additional blocks of spectrum.

The Table 7 below gives the current spectrum charge for the various blocks of spectrum.

GSM						
Spectrum Blocks	**2x4.4MHz**	**2x6.2MHz**	**2x8MHz**	**2x10MHz**	**2x12.4 MHz**	**2x15 MHz**
charges as a % of AGR	2%	3%	4%	4%	5%	6%

CDMA					
Spectrum Blocks	**Up to 2x5MHz**	**2x6.25 MHz**	**2x 10 MHz**	**2x 12.5 MHz**	**2x15 MHz**
charges as a % of AGR	2%	3%	4%	5%	6%

Table 7: Spectrum charges

2.82 The Authority noted that in the last few years the market capitalization of listed telecom companies has increased manifold and their operating margins are also going up in line with the world's competitive telecom markets/ operators. The Authority also noted that the share of the listed telecom companies in the total market capitalization (S&P CNX Nifty Index) was more than 13% for the period 01-Aug-2006 to 31-July-2007. The Authority further noted that the EBITDA Margin[15] of listed telecom companies is more than 1.75 times in comparison to listed IT companies. In the wake of growing demand of spectrum and its limited availability, the Authority has revisited the existing spectrum charges to reflect a reasonable market value of allocated spectrum.

2.83 Keeping in view the scarcity of the spectrum, there is a need to deploy spectral efficient technologies, if necessary through capital infusion, and to curtail the hoarding of spectrum. Tightening the norms for spectrum allocation, linking it with roll out obligations and a marginal

[15] Based on information available on website of telecom and IT Companies. The Average EBITDA margin of IT companies was about 24% for the 1st Quarter of FY2007-08, while Average EBITDA margin of two leading listed telecom companies was about 42% for the same period.

rate revision; it is felt, would make the service providers look for technical solutions and effective utilization of this very scarce resource. The Authority in its recommendations on "Allocation and Pricing of Spectrum for 3G and broadband wireless access services" had recommended an additional 1% of the operator's total AGR. After examining various options for rationalizing the spectrum charges, t**he Authority, recommends adoption of Revenue share spectrum charges as given in table 8 below:**

Spectrum	**Current**	**Proposed**
Upto 2X4.4 MHz	2%	No Change
Upto 2X6.2MHz/2x5 MHz	3%	No Change
Upto 2X8MHz	4%	No Change
Upto 2X10MHz	4%	5.00%
Upto 2X12.5MHz	5%	6.00%
Upto 2X15 MHz	6%	7.00%
Beyond 2X15 MHz	-	8.00%

Table 8: Revised Spectrum Charges

Spectrum Management

2.84 The radio spectrum is a key component of the telecommunications infrastructure that underpins the information society. Spectrum management, however, has not kept pace with major changes in technology, business practices and economic policies during the last decade. Traditional spectrum management practice is predicated on the spectrum being a limited resource that must be apportioned among uses and users by government administration. For many years this model worked well, but more recently the spectrum has come under pressure from rapid demand growth for wireless services and changing patterns of use. This has led to growing technical and economic inefficiencies, as well as obstacles to technological innovation.

2.85 Different frequency bands of radio spectrum are being used for a wide and diverse range of radio services by Government, private, industries for telecom, broadcasting, film and programme making, radar, radionavigation, air traffic control and satellites including low power devices.

2.86 Until recently the defence sector has had little difficulty meeting its spectrum needs; however, its ability is lessening as competing commercial demands for spectrum access grow rapidly. It is necessary for the defence to ensure that spectrum access does not limit its military options, whilst maximizing access to the civil community through innovative sharing mechanisms, especially in the Indian contributions.

2.87 With the proliferation of new technologies and participation of private sector in the telecom field it is a challenging task to provide them adequate spectrum and appropriate radio frequency spectrum for successful implementation of these systems. The emerging scenario as related to telecommunications is towards globalization, privatization and competition. The demand for spectrum for public cellular mobile, non public mobile wireless broadband, VSAT, radio and television broadcasting services have increased tremendously. The radio regulatory mechanism has to cater for the new demands on the radio frequency spectrum owing to the future technological advancements so that these developments could get proper momentum. The mechanism has also to cater for the phenomenal growth of present and future usage and has to adequately take care of the existing technologies and usage.

2.88 Due to cumbersome procedures, lack of automation, non availability of data bases, lack of networking and unresponsive procedures, the present arrangement and practices of allocating spectrum being followed by WPC is unable to keep pace with the best international standards and practices being followed. These aspects need immediate attention.

2.89 The present system of administrative spectrum management allowed the pursuit of non-market objectives such as national security, safety and equal access goals in addition to the goal of efficient spectrum

use. Its basic design was rooted in the simple radio technology of the 1920s, which required high signal-to-noise ratios. To avoid interference, licensees were given exclusive privileges and channels were spaced sufficiently far apart. Progress in information theory and the power of microprocessors has led to the emergence of a new vision of radio engineering in which multiple users can co-exist without the need for exclusive channel assignments. According to this new approach, sophisticated communications devices and protocols are sufficient to avoid interference. For example, agile radio devices are able to sense their radio environment and can choose communications parameters (frequency, polarization, coding, etc.) to control interference. Unlike analog radio, digital mobile communications allows more advanced forms of error correction. Communications therefore become less sensitive and tolerate a higher level of interference. Moreover, recent developments have questioned whether spectrum is scarce altogether, undermining another cornerstone of the exclusive licensing approach. Innovative network architectures, such as meshed networks, automatically configure themselves, using any active device to relay information.

2.90 With the tremendous growth in applications for licenses, the weaknesses of the administrative approach, including long delays, the impossibility for the government to pick the most promising proposals, and the lack of economic incentives to use spectrum efficiently, have became evident.

2.91 The spectrum manager needs to devise procedures to ration current and future demand for radio spectrum between competing commercial and public service users which requires mammoth planning task. The weaknesses and limits of the traditional approach to spectrum management make the frequency assignments process more time consuming and delay the rollout of the service. Consequently, measures to change the systemic deficiency in the functions of spectrum manager have to be sorted out in order to meet the growing need of spectrum.

2.92 Licensing process for issue of wireless operating licenses to various entities such as private telecom operator as well as Government Departments by WPC is still paper based. Though, recently, the method of licensing has been changed from manual to computerized system using new software Automated Spectrum Management System (ASMS) under which on-line submission of applications for frequency assignment, site clearances and issue of new licenses are possible, however, the full utilization of the software is yet to be made.

2.93 There is scope for change in the regulatory regime to make the licensing and frequency assignment more transparent and time bound manner. In this context the web based submission of applications for frequency, SACFA site clearances and licensing are being made and their status can also be monitored. The database for frequency assignment and licenses has not yet been shared with stakeholders to make it more transparent.

2.94 The review / revision of National Frequency Allocation Plan, which is policy document is undertaken generally every two years in line with the decisions of World Radio communication Conference and also keeping in view the current requirement of various stakeholders. This document was due to be reviewed in 2004 yet it has not been done

2.95 There is need to develop market based spectrum management tools to support spectrum management. Spectrum allocation criteria and spectrum pricing fees which include license fee and royalty need to be developed in consultation with all stakeholders in order to make it fair, more transparent, predictable and acceptable. Pricing of spectrum is to be made more effective in order to increase its efficiency. Spectrum refarming may be undertaken to refarm many spectrum bands for new services. The spectrum trading will make use of spectrum more efficient as it allows user to trade with new wireless users who require it most. Further there is a urgent need to strengthen the monitoring system to avoid hoarding and interference.

2.96 No long term and short term planning of spectrum for meeting the current and futuristic requirement of existing and new emerging wireless services exists in the spectrum management procedures, as

of now. The old assignments made to defence and other Government and public sector entities need to be reviewed and replaced with the existing spectrum efficient technologies. A short and long term plan for refarming of spectrum in different bands needs to be taken up and existing assignments should be shifted appropriately. Defence spectrum policy and strategies should be actively managed to take account of the changing spectrum management environment. Existing and new service providers are allocated spectrum as and when it is available. **There is no certainty as to when the spectrum, which is vital for rolling out mobile services would be available. Also the priority list of allocation of available spectrum is not clearly laid down.**

2.97 To begin the process, the following set of principles could form the basis of the spectrum management framework so as to respond to the challenges of new market dynamics and technological advances. These principles are as follows:

- **Responsive to change**: As the uses of spectrum change in terms of the balance between different industries or between the public and private sector, it will be important that the new framework allow these changes to happen smoothly.
- **Technology neutrality**: In order to equalize access to spectrum for different technologies, it is essential that the new framework is technology neutral.
- **Service neutrality**: This will be key if new services can use spectrum that might have been originally assigned for a different use. For example, if terrestrial broadcasting no longer needs all the spectrum assigned to it, new services like broadband wireless that require spectrum should be allowed to use that spectrum.
- **Market-oriented distribution**: In order that spectrum is distributed fairly among those who value it the highest, the use of market mechanisms should be employed for spectrum assignment.
- **Correct pricing of spectrum:** Presently, large parts of the spectrum have been set aside for use by the public sector (e.g. government departments, stated-owned enterprises, military). There is no economic reason why the public sector should not treat the radio

spectrum as any other factor of production, including paying for its use at market-related prices. Subjecting public spectrum use to market discipline can result in widespread efficiency gains within and beyond the public sector. This can start by putting together an inventory of public sector spectrum holdings, estimating their value, and levying spectrum charge from these organizations.

- **Mixed methodologies**: Licensing to services requiring interference protection, property rights for spectrum used commercially, and spectrum commons for free and unlicensed access should be mixed across bands to allow all types of users to access spectrum.
- **Pre-defined and stable**: In order to ensure service providers can determine their investment and deployment strategies, and reduce regulatory risk it will be important to clearly define a stable spectrum policy. This is especially important in case property rights are employed as an allocation regime.
- **Balances public and private uses**: Without doubt, public safety, research, and military uses will require spectrum. Any spectrum management regime should balance these public interest uses with private use of spectrum for commercial service provision.
- **Promote efficient use of spectrum**: By having an open and liberal spectrum policy framework, the allocation, assignment, and use of spectrum will move towards the most economically efficient situation.
- **Promotes growth**: For India to sustain high-growth in teledensity, and for the growth of the telecom and allied sectors such as content development, infrastructure provision, and equipment manufacture, it is essential that the spectrum policy allow a clear path for unfettered growth over the long-term.

2.98 Consequently, it is clear that the future spectrum management regime should be technology neutral to allow market forces to determine which technologies are deployed. In addition, service providers will have the freedom to deploy new technologies as they see fit and not be constrained by regulatory restrictions from investing in systems that

might improve the quality of service, coverage, or provide lower-cost service.

2.99 In its recommendation on allocation and pricing of spectrum for 3G and broadband wireless access services dated September 27, 2006 also the Authority had emphasized that considering the growth and development of wireless technologies and services, a long-term view on overall spectrum management policy including the organizational structure for spectrum management is necessary. A liberal and transparent approach is necessary so that it matches with the overall policy approach. There is a need to ensure availability of adequate spectrum, to ensure efficient utilization of the spectrum, and making the processes of spectrum allocation completely transparent, and based on a road map and well-researched plan. The organizations of spectrum management need to be strengthened. This whole issue is not to be dealt with in piecemeal but should be taken up as a long-term policy issue. From this perspective, perhaps it is timely to follow the international practices where telecom regulator has been given specific responsibility for the evolution of spectrum policy (**Annex VIII**) with management under the guidance of an interdepartmental coordination committee.

Chapter 3 Intra-circle Merger, Acquisition and Transfer

3.1 In the context of Intra-Circle Mergers and Acquisition, the Authority had identified the following key areas for detailed consideration and review.

- Definition of Market;
- Assessment of Market power-criteria and Methodology;
- Determination of minimum number of access service provider in a post-merger scenario;
- Spectrum cap of the merged entity;

3.2 These issues have been examined in depth based on available evidence, comments of stakeholders, international best practices, dynamics of telecom sector and in the light of current legal environment in general. Based on such an extensive review, the Authority seeks to make recommendations on specific issues and these are discussed in the paragraphs that follow.

Market Definition

3.3 The first step in any competition analysis is to define the relevant market. The purpose of market definition is to determine the boundaries of a given market. Within the contours of the relevant market, an analysis is then made of the prospects for competition in the market, opportunities for competing firms to acquire and exercise market power and the welfare implications for the consumer. The definition of the relevant market is of fundamental importance because effective competition can be assessed only with reference to the market thus defined. Broadly, the criteria for defining the relevant market that have been followed in many jurisdictions include (1) demand side substitution, (2) supply side substitution, (3) competitive constraints arising out of potential competition. Demand side substitutability is used to measure the extent to which consumers are prepared to substitute other services for the service in question, whereas

supply side substitutability indicates whether suppliers other than those offering the service in question could offer the relevant product or services without incurring significant costs. The existence of potential competition is required to be examined for the purpose of assessing whether the market is effectively competitive. Hence, it is also necessary to examine the existing legal or other regulatory requirements, which could deny a 'time efficient entry' into the relevant market.

3.4 In general, the relevant market comprises of all those products or services that are sufficiently interchangeable or substitutable not only in terms of consumer preference, usage and prices but also in terms of conditions of competition and/or the structure of supply and demand on the market in question.[16]

3.5 Once the relevant product/service market is identified the next step is to define the geographical dimension of the market. The relevant geographic market comprises an area in which the firms concerned are engaged in the supply of the relevant product/service, in which area the conditions of competition are similar or sufficiently homogenous. In the electronics communication sector, the geographical scope of the relevant market has more or less been determined with reference to the area covered by a network and the existence of legal/regulatory requirements.

Stakeholders comments on definition of Market

3.6 While majority of the stakeholders are of the view that the market in the access segment should continue to be classified separately as 'Fixed' and 'Mobile', some other stakeholders are in favour of combination of 'Fixed' and 'Mobile' subscriber for determining relevant market. There have also

[16] Commission guidelines on market analysis and the assessment of significant market power under the community regulatory framework for electronic communication networks and services (2002), official journal of the European Communities 11.7.2002.

been other suggestions like defining relevant market as 'wire-line' and 'wireless' or as per license and service area. The main grounds put forward in support of market being defined separately as 'Fixed' and 'Mobile' include the following:-

- 'Fixed' and 'Mobile' markets are not perfect demand substitute for each other as usage profile and requirements of the two sets of subscribers are not the same.
- Aggressive growth is taking place in the mobile segment while the growth in the fixed line is marginal. Future growth is also expected primarily for mobile industry and therefore, the relevance of dominance would be more applicable to the mobile segment.
- If market is defined as the entire access market, there could be problems in determining the dominance of the merged entity owing to the large market share of incumbents in fixed line segment.

3.7 The stakeholders who support combination of 'Fixed' and 'Mobile' as single market for assessing market share, have cited following grounds:-

- Since various technological developments will continue to be deployed, measuring subscriber based on technology will become more cumbersome. Technological development now permit access on wireless while outdoors and wire-line while indoors on the same subscriber enabling optimum utilization of scarce spectrum. It is difficult to say whether such subscriber is a wire-line subscriber or not.
- Since most of the operators are migrating to the USL regime, it would be advisable to define access market by combining fixed and mobile market. Even the financial market perceives the company value on total subscriber base.

3.8 Regarding the components of 'fixed' and 'mobile' the views are generally in support of continuing the present guidelines where the mobile segment comprises of cellular mobile and WLL (M) subscribers while fixed segment comprises fixed line and fixed wireless subscribers. Few stakeholders are in favour of including WLL (M) in the 'Fixed' market on the ground of this being part of the basic service.

3.9 Sub Section 7 of Section 19 of The Competition Act, 2002 has listed the following factors to be taken into account while determining the 'relevant product market':-

(a) physical characteristics or end-use of goods
(b) price of goods or service
(c) consumer preferences
(d) exclusion of inhouse production
(e) existence of specialized producers
(f) classification of industrial products

3.10 The Authority has kept in view these and other factors while determining relevant service market for purposes of assessment of competition. Difficulties inherent in defining the relevant market in a sector that is known to come across rapid technological change such as telecommunication sector are well recognized. Therefore, in attempting to define the relevant market for purposes of analysis of competition, the Authority has inter-alia reviewed the sector experience since it made its recommendations on Intra-Circle Mergers and Acquisition Guidelines in 2004 and Government's notification of Guidelines for mergers of licenses thereafter. It may be recalled that the Authority in its recommendations of 2004 classified the intra circle access market into fixed and mobile wherein mobile included mobility of any sort including WLL (M). Government guidelines that followed (which are presently in force) also

adopted more or less the same approach which is evident from the following:-

"For this purpose, the market will be classified as fixed and mobile separately. The category of fixed subscribers shall include wire line subscribers and fixed wireless subscribers."

3.11 Given the rise in Internet telephony and VoIP services, which have grown rapidly over the past few years, it is relevant to question if IP-telephony subscribers should also be included in this consideration. This factor is important also because most UASLs are also the major ISPs in the country, and it is technically possible for cable service providers to offer VoIP services. It is possible that a voice telephony provider that has never been part of the traditional market included in the present guidelines, and yet influences the telephony market.[17] In addition, the introduction of IPTV opens the possibility that one service provider can offer bundled triple-play services. Consequently, increased market power in one sector could translate to, and have an anti-competitive effect in another sector.[18] Thus, the market definition could expand to include all ISP subscribers in addition to traditional telephony subscribers. However, given that this review was to focus on CMTS and UAS licensees, and in effect, concentrate on the traditional voice telephony market, the Authority will not consider this issue at this time, but will defer it to a later review.

3.12 Two significant developments in the access market for voice telephony during the period from 2004 till date are noteworthy. One, the mobile

[17] An example of this possibility is Internet telephony service Skype, which is not a traditional ILDO, but has become a major player in international voice traffic, offering free service, and affecting multiple markets.
http://www.infoworld.com/archives/emailPrint.jsp?R=printThis&A=/article/06/03/30/76945_HNblamevoip_1.html; http://www.iht.com/articles/2003/12/15/itend15_ed3_.php; http://www.highbeam.com/doc/1G1-128000396.html

[18] For information on the effect of bundling on competition, see Yannis Bakos & Erik Brynjolfsson, Bundling and Competition on the Internet, Marketing Science, 2000 INFORMS, Vol. 19, No. 1, Winter 2000, pp. 63–82; Campbell Cowie & Christopher T. Marsden, Convergence, Competition and Regulation, International Journal of Communications Law and Policy, Issue 1, Summer 1998

segment of the market has witnessed explosive growth during this period, whereas the fixed line subscription has remained more or less at the same level during all these years. Compounded annual growth rate of cellular mobile services in India is estimated at 67% during the period March 2004 to March 2007. Secondly, a new category of wireless service emerged in the name and style of fixed wireless service and this service has attracted as many as five million subscribers so far. Demand characteristics of the fixed wireless service including the end-use, tariff, consumer preference and the marketing strategies of suppliers suggest inclusion of this in the fixed line segment. However, an important consideration on the supply side is that this service is rendered using spectrum, the availability of which is crucial for growth of the entire cellular mobile service in the country. Keeping these developments in view, the market analysis published periodically by the Authority takes into account performance of market using wireless and wire line segmentation and hence the fixed/mobile segmentation has lost some of its interpretive value. This change was in line with the shift to count all WLL (F) subscribers of all operators as mobile subscribers (wireless) from April 2006 onwards.[19]

3.13 In case, the relevant market is defined to mean the access segment by aggregating the fixed and mobile markets, it is more likely that the M&A Regulations for which the competition analysis is being done would become infructuous because of the relatively large market share of the public sector incumbents in fixed line services. It is quite likely therefore that any M&A activity amongst operators other than incumbents having potential to substantially lessen competition might go undetected.

3.14 The Authority further notes that the development of telecom markets and technologies is such that fixed mobile convergence is likely to become a

[19] TRAI, Consultation Paper, 12th June, 2007, para 2.24.

reality in the Indian market in the next few years. However, at this point of time with the possible merger of UASL and CMTS licensees based on their presence in the wireless segment, it is more important to keep a close watch of this segment to avoid consolidations that might lead to substantial lessening of competition. The Authority's another concern in this review as stated elsewhere is to ensure inter-alia that access to spectrum remains competitive.

3.15 Considering the fact that the future growth of the telecommunication sector is in the wireless segment and spectrum being the bone of contention and also considering the fact that the purpose of assessment of market power for which the relevant market is sought to be defined is to frame guidelines for Mergers and Acquisitions in the overall context of promoting competition and efficiency, the Authority is of the view that the relevant service market be defined as wire line and wireless services.

3.16 ***Accordingly, the Authority recommends that the relevant service market be defined as wire line and wireless services. Wireless service market shall include fixed wireless as well.***

3.17 The Authority noted provisions of Sub-Section 6 Section 19 of The Competition Act, 2002 wherein a number of factors including existence of regulatory trade barriers are to be considered by the Commission while determining the relevant geographic market. The Authority examined these factors and has come to the conclusion that the 'regulatory trade barriers' is of over-riding importance in defining the relevant geographic market for framing M&A guidelines. The reason being access services licensing framework in India in the telecom sector is circle based, and therefore licenses are issued circle-wise and spectrum is also allocated to licensees in terms of a circle for which licenses have been obtained by them. Therefore, the assessment of competition can also be in terms of

the market power within the circle in the relevant service market namely wire line/wireless.

3.18 ***Accordingly, the Authority recommends that the relevant geographic market shall be licensing service area as it exists today.***

Assessment of Market Power – Criteria and Methodology

3.19 The first step in assessing the market power is to decide on the criteria of assessment to be adopted for the purpose. The position in this respect in The Competition Act, 2002 (sub-section 4 of Section 19) is given below:-

"The Commission shall, while inquiring whether an enterprise enjoys a dominant position or not under section 4, have due regard to all or any of the following factors, namely:-

(a) market share of the enterprise;
(b) size and resources of the enterprise;
(c) size and importance of the competitors;
(d) economic power of the enterprise including commercial advantages over competitors;
(e) vertical integration of the enterprises or sale or service network of such enterprises;
(f) dependence of consumers on the enterprise;
(g) monopoly of dominant position whether acquired as a result of any statute or by virtue of being a Government company or a public sector undertaking or otherwise;
(h) entry barriers including barriers such a regulatory barriers, financial risk, high capital cost of entry, marketing entry barriers, technical entry barriers, economies of scale, high cost of substitutable goods or service for consumers;
(i) countervailing buying power;
(j) market structure and size of market;
(k) social obligations and social costs;

(l) relative advantage, by way of the contribution to the economic development, by the enterprise enjoying a dominant position having or likely to have appreciable adverse effect on competition;

(m) any other factor which the Commission may consider relevant for the enquiry."

3.20 The Authority has also examined the international practices governing the merger and acquisitions activity in various jurisdictions which includes Australia, Canada, European Union, Hong Kong, Singapore, News Zealand and United States.

3.21 Further, the Authority has considered the question of competition in the market also from the point of view of the other issues that have been referred to by the Government for recommendations. Hence, it is necessary to consider the whole question in its totality covering various aspects including the availability of spectrum, the present entry policy of licensing, the potential competition in the wireless sector, the upcoming technological developments leading to a converged environment, etc. It is in this context, the Authority has decided, (the details of which find mention in **chapter No 2** of this recommendation) not to place any cap on the number of service providers in a license area. Thus, the Authority is not in favour of erecting any entry barrier in the market so as to facilitate easy entry to the potential players in the market. Threat of potential entry is the most important factor in assessing the likelihood of substantial lessening of competition in the market by any undertaking be it dominant on its own or in combination with any other entity in the market.

3.22 In this context, the Authority recalls the detailed analysis contained in the Consultation Paper on this subject which includes the study of the growth of the sector, important milestones in the Indian telecom sector, the analysis of market structure in the wireless telephony, analysis of key

indicators in respect of GSM and CDMA operators, growth of revenue of telecom services sector, capital investment of telecom sector, etc. Market structure at the circle level has been examined with respect to subscriber base, revenue of operators and outgoing minutes of usage of wireless operators (see Annexure V of the Consultation Paper). Further, the Consultation Paper also contains a comparison of circle-wise HHI analysis for two period of time i.e. September 2003 and 2007.

3.23 Market share of operators in the relevant market is one of the important parameters that has been used for assessment of market power for purposes of regulating M&A activity in a large number of jurisdictions. However, there are a number of dimensions of market share of operators that can be examined and analysed. These include market share in terms of subscriber base, market share in terms of revenue earned, market share in terms of Minutes of Usage in the relevant service area and all these indicators of market shares provide the relative strength of market power of operators in the relevant market. Guidelines of the European Commission on market analysis (2002) states that as regards the method used for measuring market size and market shares, both volume sales and value sales provide useful information for market measurement. Further, the guidelines of the European Commission states that the criteria to be used to measure the market share of the undertaking concerned will depend on the characteristics of the relevant market. To quote from the EC's Guidelines of 2002,

"retail revenues, call minutes or numbers of fixed telephone lines or subscribers of public telephone network operators are possible criteria for measuring the market shares of undertakings operating in these markets."[20]

[20] European Commission Guidelines, 2002

Stakeholders comments

3.24 The stakeholders are generally in agreement for using the subscriber base as criteria for determining market share. However, many stakeholders have supported the idea of using Revenue also as criteria in addition to subscriber base, for determining the market share of an operator. Views also differ as to whether HLR or VLR data should be used for the purpose.

3.25 Major grounds relied upon by supporters for using combination of revenue and subscriber base as the criteria for determining the dominance in the market, are listed below:-

- The audited Adjusted Gross Revenue and Subscriber Base should be considered to calculate the market share of a service provider.
- It is not only the Subscriber Base of the service provider, which affects market share and the competitiveness but revenues and tariff charged by a service provider from its subscriber. Any dominating service provider with a large revenue share can dictate the tariff policies and scuttle the competition from smaller and new operators in a service area.
- The revenue is also an important factor which gives market power to an operator and an opportunity to skew the market and practice anti-competitive behavior like predatory pricing.
- An operator need not be dominant player in both ‘fixed’ and ‘mobile’ offerings. Collectively operator could have substantial revenue muscle through which he can dominate the market. Therefore, while determining dominance the revenue dominance should also be factored in.
- Subscriber base and revenue are both widely used for determining the valuation of telecom business and therefore are natural choices as criteria for determining market dominance.

3.26 Conventionally, market share in terms of subscriber base has been used to determine the relative strength of players in the relevant market. In fact, in its recommendations on Intra Circle Mergers and Acquisition Guidelines, the Authority had based the computation of market share based on subscription to service of operators for assessing market power. Since then, a number of developments have taken place in the telecommunication sector in general and in the wireless voice telephony in particular. While these developments have been discussed in detail in various chapters of this recommendation, one important conclusion from the analysis of market share based on subscriber base and market share based on net revenue of wireless operators is noteworthy. And this relates to the divergence seen in respect of certain circles and in respect of certain group of operators. It is seen from the circle wise data of market shares for the operators, market shares computed on subscriber base is higher than the market share computed based on net revenue for one set of operators and for the other set of operators the situation is exactly the reverse **(see Table at Annex IX)**. For few operators, the market share in terms of subscribers and in terms of revenue share is more or less the same. From this, it emerges that taking into account only one indicator for purposes of assessment of market power may not reflect the competitive constraints in a realistic manner. Moreover, the revenue base of operators is bound to reflect the overall economic power of the enterprise including commercial advantages over competitors, size and resources of the enterprise, the size and importance of the competitors in the relevant market, the level of scale economies enjoyed by the firm, etc.

3.27 Therefore, it may be necessary to consider having both the criteria i.e. market share based on subscriber base and market share based on revenue of operators as the two quantifiable criteria for assessment of market power with a view to regulate the M&A activity in the relevant market.

3.28 ***The Authority recommends that for determination of market power, market share of both subscriber base and Adjusted Gross Revenue in the relevant market shall be considered to decide the level of dominance for regulating the M&A activity.***

3.29 The next issue to be resolved is to decide on the source of subscriber data to be relied upon for arriving at market share based on subscribers and to decide on the definition of revenue of operators that would be considered to compute market share based on revenue.

3.30 In case where subscriber base is used as criteria for determining market share, one has to decide whether subscriber base should be as per Home Location Register (HLR) or Visited Location Register (VLR). As per the existing guidelines on merger and acquisition, the subscriber figure as per the HLR and Exchange Data Ratio (EDR) are taken into account for the purpose of calculating the number of subscribers in a given service area. The spectrum allocation takes into account VLR subscriber base as the criteria.

3.31 Differing views have been expressed by stakeholders in the matter of using HLR or VLR for computation of market share of operators based on subscriber base. These are summarized and given below:-

- Subscriber base should continue to be considered as per the existing Government definition which is based on HLR (in the case of mobile subscriber) and EDR (in the case of fixed line subscriber).
- The definition of Subscriber Base as prescribed by the DoT for monthly reporting by service provider should be applied for determining the dominance.
- The true picture of customer base would be reflected in HLR data and the VLR figures would include the in roamers in the network.

- Since DoT is calculating Subscriber Base as well as Tele-density on mobile segment based on HLR figures and fixed segment on EDR, it is desirable to use the same formula.
- VLR data gives the details of active customers at a given point of time excluding switched off and out of coverage area customers whereas HLR data includes churned out and pre-provisioned customers.
- VLR Data is more appropriate since this indicate the subscribers who are active at a particular point in time. VLR data will be appropriate from the uniformity and transparency angle considering the fact that existing spectrum allocation guidelines of DoT are based on VLR data.
- The orientation of the service providers is towards cellular services or MSC based WLL Services. VLR based subscriber count would be logical. This would also help in checking the tendency of over stating the Subscriber Base.
- VLR data seems better option because it must record actual usage whereas in HLR operators may over stay it subscriber numbers for the purpose of spectrum allotment.

3.32 At present, the M&A guidelines state that the number of wire-line subscribers and fixed wireless subscribers shall be as per the Exchange Data Records (EDR). The subscriber base for limited mobile subscribers and full mobile service is computed based on the data available in the Home Location Register (HLR) and EDR. The practice of counting wireline subscribers using the EDR has been effective and found to be useful in the past, and hence the Authority is of the opinion that this should continue. However, the specific issue at hand is whether to use HLR or Visitor Location Registry (VLR) data in the enumeration of cellular mobile subscribers.

3.33 In the enumeration of wireless subscribers, it is important to keep in view that each of them uses spectrum. At present, DoT allocates spectrum to service providers based on a subscriber base allocation criteria.[21] In this system, the number of subscribers in an operator's VLR determines the amount of spectrum that should be allocated to that operator. There is also a good reason to use VLR data in the calculation of subscriber base especially since it is a current database of subscribers, as opposed to the HLR. The HLR inter alia holds data of users who have even unsubscribed from service. More importantly, the data available with the Authority indicates that HLR subscriber figures are typically 20 per cent higher than VLR data. For purposes of assessing market dominance and for regulating M&A activity, VLR data is considered to be more appropriate than HLR data that might give evaluators an incorrect impression of market structure. Also for purposes of comparison relating to parameters like ARPU, MOU per subscriber, etc. it would be appropriate to take the active subscriber base, which in this case is VLR data, to reflect the market realities in a realistic manner.

3.34 The Authority recommends that M&A guidelines should use Exchange Data Records (EDR) in the calculation of wireline subscribers and VLR data, in the calculation of wireless subscribers for computing market share based on subscriber base.

3.35 As far as the definition of revenue of operators in the relevant market is concerned, the Authority has weighed the pros and cons of taking the gross revenue of operators and the net revenue of operators. After detailed examination of the technical issues arising out of reporting requirements including timeliness, ambiguity in definitions involved, and in

[21] DoT, WPC letter no.: J-14025/200(17)/2004-NT(GSM) and J-14025/200(17)/2004-NT(CDMA) dated 29 March 2006

the interest of arriving at an accurate estimate of the market share and also considering the difficulties involved in making comparison for a relative assessment in a circle, the Authority is of the view that the purpose would be best served if Adjusted Gross Revenue(AGR) which is duly audited and which is used by the licensor for assessment of license fee payable by the operators is taken into account for computing revenue based market share.

3.36 ***Accordingly, the Authority recommends that the duly audited Adjusted Gross Revenue shall be the basis of computing revenue based market share for operators in the relevant market.***

Dominance in the relevant market

3.37 The next stage in the evaluation process of a prospective M&A activity is to define dominance in the relevant market. It is important to note that evidence of market power in terms of dominance so defined, cannot be interpreted as evidence of its abuse. It only implies that combinations of entities resulting in market share in excess of the limits defined for dominance is likely to lead to substantial lessening of competition. It is in this context the Significant Market Power (SMP) or dominance is required to be defined in terms of the market share of the combined entity post merger for purposes of ex-ante regulation after taking into account all the relevant factors and the views of stakeholders.

Stakeholders comments

3.38 While some stakeholders suggested continuation of the prescribed permissible level of market share for a merged company, many stakeholders favoured a lower level in the range of 40 to 50% market share for the merged entity. Various views expressed by stakeholders in this regard are given below:-

- The objective of permitting mergers and acquisitions is to facilitate consolidation of the market without compromising the need for adequate competition. This objective may get defeated if more stringent conditions are prescribed for the merged entity. Present limit of 67% should continue.
- Internationally, in general, a market share of 40 to 50% is indicative of dominance.
- The reference to lower levels of market share being used internationally to indicate dominance is not of much relevance in the Indian context as the competitive scenario in India is very different from what is prevalent internationally.
- In view of the presence of a large number of operators and most of the service areas being highly competitive, the existing criteria of monopoly market share of 67% or above of the subscriber base within a service area of the merged entity is very high.
- The existing limit of 67% of market share with the merged entity can definitely threaten competition and harm the public interest. The higher limit of 67% might have been prescribed in the year 2004 as there were only 3 to 4 operators at that time. In the present situation this limit can come down to even 40%.
- If the combined Subscriber Base is used, the market share cap of 67% as per the existing guidelines can be reduced to 50%.

3.39 The Authority in its Consultation Paper on this subject has reviewed the definitions of dominance as adopted in the MRTP Act, 1969, in the Competition Act, 2002 and in many other jurisdictions like the European Commission and in other markets. In the Consultation Paper, the Authority has also examined the use of concentration ratio and HHI. In its recommendations to Government on Intra-Circle Mergers and Acquisition Guidelines (2004), the Authority had suggested detailed examination of the impact of merger when the market share of merged entity is greater

than 50% and concentration ratio of top two firms (CR2) in a post merged scenario being equal to or greater than 75%. The existing guidelines of the Government has defined monopoly market situation as one where the combined market share of the merged entity exceeds 67% within a given service area.

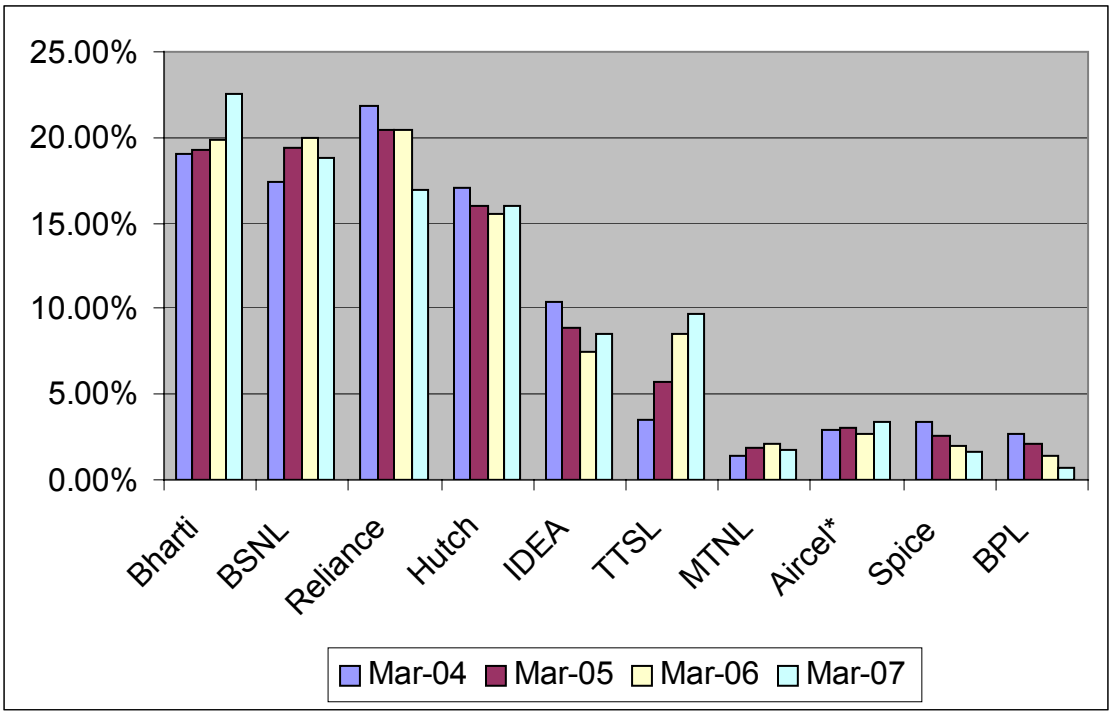
3.40 The Authority also examined the trends in the shift of market share of all licensees in the wireless service market at the circle level and also at the All India level. The Group wise summary of wireless market share for the period 2004-07 based on subscriber base is given below:-

		Subscriber base (Million)				All India Market share				Number of circles in which	
Service Provider		Mar-04	Mar-05	Mar-06	Mar-07	Mar-04	Mar-05	Mar-06	Mar-07	Market share has increased	Market share has declined
Bharti	GSM & CDMA	6.79	11.01	19.60	37.14	19.06%	19.31%	19.82%	22.49%	15	8
BSNL	GSM & CDMA	6.21	11.08	19.74	30.98	17.44%	19.43%	19.96%	18.77%	6	15
Reliance	GSM & CDMA	7.77	11.68	20.21	28.01	21.81%	20.49%	20.44%	16.96%	3	20
Hutch	GSM	6.07	9.15	15.36	26.44	17.03%	16.04%	15.53%	16.01%	9	7
IDEA	GSM	3.72	5.07	7.37	14.01	10.45%	8.89%	7.45%	8.49%	4	7
TTSL	CDMA	1.26	3.29	8.46	16.02	3.53%	5.77%	8.55%	9.70%	19	1
MTNL	GSM & CDMA	0.50	1.08	2.09	2.94	1.41%	1.89%	2.12%	1.78%	2	0
Aircel*	GSM	1.03	1.76	2.61	5.51	2.88%	3.08%	2.64%	3.34%	8	1
Spice	GSM	1.21	1.44	1.93	2.73	3.39%	2.52%	1.96%	1.65%	0	2
BPL	GSM	0.97	1.23	1.34	1.07	2.71%	2.15%	1.35%	0.65%	0	1
STL	CDMA	0.05	0.13	0.06	0.10	0.14%	0.23%	0.06%	0.06%	0	1
HFCL	CDMA	0.05	0.11	0.12	0.15	0.14%	0.19%	0.12%	0.09%	0	1

* includes Dishnet Wireless also

Source: Data provided by service providers to TRAI from time to time.

Table No.9: Group-wise summary of Market share of Wireless Market - All India Trend (2004-07)



Source: TRAI.

3.41 It is evident from the above that the all India market share of major group of operators during the last four years has witnessed mixed trend. Among the major operators, while the market share of Bharti Airtel and BSNL has gone up, that of Reliance and Hutch has witnessed decline from 2004 to 2007. Even for Bharti, which has witnessed a steady increase in market share at the all India level i.e. from 19.06% in end March 2004 to 22.49% in end March 2007, the circle level analysis reveals that it has lost market shares in eight circles and gained in 15 circles. Of the fifteen circles it has gained market share, in four circles it is not a steady growth in the sense the market share has seen fluctuations during the four years. Similarly, BSNL has registered increase in market share at the all India level from 17.44% to 18.77%. However, it has also witnessed loss of market share in 15 circles but gained in 6 circles. Further, be it gain or loss of market share, at the circle level, the trend cannot be said to be steady in respect of BSNL also. Similar trends have also been observed in respect of other operators at circle level.

3.42 It may thus be argued that such fluctuating market shares over time of major operators may be indicative of a lack of market power in the relevant market. Further, circle-wise data analysis also reveals that major operators having significant position in the market is gradually losing market share in certain circles. While these trends may well indicate that the market is becoming more competitive, this by itself shall not preclude a finding of Significant Market Power in the relevant market. In this context, it is relevant to recall the guidelines on market analysis and the assessment of market power issued by European Commission (2002), the extracts of which are reproduced below:-

"Market shares are often used as a proxy for market power. Although a high market share alone is not sufficient to establish the possession of significant market power (dominance), it is unlikely that a firm without a significant share of the relevant market would be in a dominant position. Thus, undertakings with market shares of no more than 25% are not likely to enjoy a (single) dominant position on the market concerned. In the Commission's decision-making practice, single dominance concerns normally arise in the case of undertakings with market shares of over 40% although the Commission may in some cases have concerns about dominance even with lower market share, as dominance may occur without the existence of a large market share. According to established case-law, very large market shares – in excess of 50% – are in themselves, save in exceptional circumstances, evidence of the existence of a dominant position. An undertaking with a large market share may be presumed to have SMP, that is, to be in a dominant position, if its market share has remained stable over time."

3.43 While deciding the level of market share for defining market dominance, an important consideration is to examine the ease of entry in the market. Generally, other things remaining constant, any M&A activity towards consolidation in the market is not likely to enhance market power if entry into that market is easily facilitated. Ease of entry has a number of dimensions

which include the timeliness, likelihood and sufficiency. FTC guidelines in this context state that where an entry passes the tests of timeliness, likelihood and sufficiency, then the merger raises no anti-trust concern and thus does not ordinarily require further analysis.[22] In the current context, entry is essentially an entry into wireless market space in India. Although it is not proposed to recommend placing a cap on the number of service providers in this market by the Authority, the availability of key resource for rolling out wireless network is limited as it is a finite resource. Further, because of its usage by multiple agencies in the country namely defense, space and information and communication technology users, the quantum and timing of the availability of spectrum to wireless telephony service is riddled with uncertainty. Moreover, the future availability of spectrum particularly in the 2G bands is highly uncertain and hence the Authority is of the view that, this is a significant barrier to entry into wireless market. In the views of the Authority, this is a significant entry barrier in the market although theoretically there is no limitation on the number of service providers who can offer wireless access service to provide voice telephony. Competitive concerns on account of market consolidation are likely to arise if potential entry is limited on account of scarcity of spectrum. Keeping this aspect in view, a number of stakeholders comment that there is a strong case to lower the existing threshold of market share from 67% to 30% which has been defined by TRAI as the SMP level in its RIO Regulations.

3.44 Internationally, competition regulators are typically much stricter in the definitions of monopolies and in the thresholds for M&A analysis. In the US, analysis begins if the HHI post-merger crosses 1,800, indicating, at most a 20 per cent market share for the largest of five operators.

3.45 In Australia, if a merger results in a CR4 of 75 per cent or more and the merged firm will supply at least 15 per cent of the relevant market, the [Australian Competition and Consumer] Commission will “want to give

[22] 1992 Horizontal Merger Guidelines, US Department of Justice and Federal Trade Commission.

further consideration to a merger proposal before being satisfied that it will not result in a substantial lessening of competition." Further, "if the merged firm will supply 40 per cent or more of the market the Commission will want to give the merger further consideration."[23] The guidelines issued by IDA in Singapore are similar yet a bit stricter than Australia's. A services-based licensee is a significant participant in a concentrated market if the licensee has a market share of at least 10 percent in the market for any service which IDA has licensed it to provide, and if the three largest participants in that market collectively have a market share in excess of 75 percent.[24] According to Israel's restrictive trade practices law, "the concentration of … more than half of the total provision or acquisition of a service, in the hands of one person… shall be deemed to be a Monopoly."[25] Pakistan's and Japan's laws term any firm with more than a one-third share of a market as a monopoly.[26] Going by these examples, the international norm is to be much stricter in terms of defining monopoly power – in the range of 20 and 50 per cent of a market.[27]

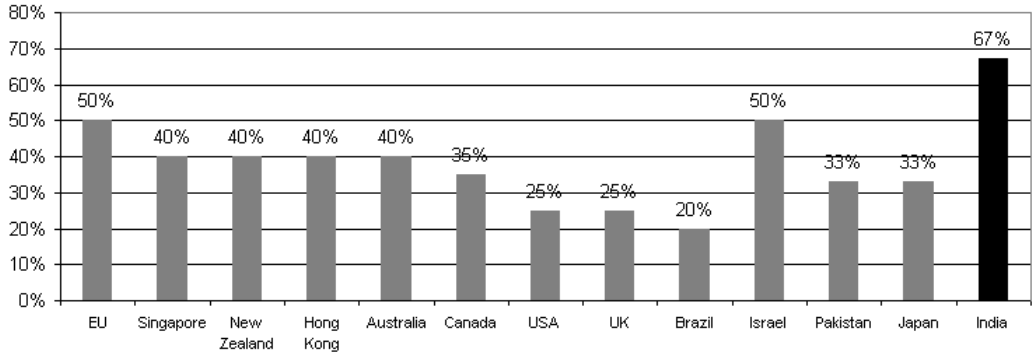


Figure 6: International definitions of monopoly or market

[23] Australian Competition and Consumer Commission, Merger Guidelines, June 1999, ¶5.95
[24] Singapore Telecommunications Act, Chapter 323, Code of practice for competition in the provision of telecommunication services 2005, No. S 87, ¶10.2.1
[25] Restrictive Trade Practices Law 5748 - 1988, ¶26
[26] Pakistan Monopolies and Restrictive Trade Practices (Control and Prevention) Ordinance, 1970 Ordinance No. V Of 1970, as amended up to 30th June, 1983, ¶5(1)(a); Japan Fair Trade Commission Guidelines, (2)(i)(a)
[27] Comments of Spectrum/Value Partners

3.46 Separately, HHI data at circle level **(see Table No. 10)** was analysed on the assumption of merger of top two service providers (other than PSUs).

		Herfindahl-Hirschman Index - HHI		
Circle Category	**Circle**	Pre-merger	On merger of Top2 based on subscriber base	Change
M	**Delhi**	1804	2791	987
M	**Mumbai**	1805	2745	940
M	**Chennai**	1886	2993	1108
M	**Kolkata**	2097	3285	1189
A	**MH**	1802	2695	893
A	**Gujarat**	2224	3360	1136
A	**AP**	1846	2898	1052
A	**Karnataka**	2269	3389	1121
A	**TN**	2021	3068	1047
B	**Kerala**	2025	2749	723
B	**Punjab**	2018	3433	1415
B	**Haryana**	1780	2436	656
B	**UP(W)**	1760	2601	841
B	**UP(E)**	2214	3046	832
B	**Rajasthan**	2004	2830	826
B	**MP**	2265	3553	1287
B	**WB**	2152	3364	1212
C	**HP**	3297	4425	1128
C	**Bihar**	2921	5196	2275
C	**Orissa**	2534	3991	1457
C	**Assam**	2595	4090	1495
C	**North East**	2897	4068	1171
C	**J& K**	4670	5123	453

Table No. 10: Circle-wise analysis of HHI

3.47 This analysis indicates that upon merger of top two service providers (other than PSUs) the HHI goes up by as high as 2275 in Bihar circle. Generally, the incremental value of HHI upon merger of top two service providers ranges from 700 to 1500. Consolidation of firms in the access segment therefore needs to be looked at carefully particularly when such consolidation takes place between top two firms in a circle. Competitive concerns in the views of the Authority are of utmost significance particularly in the context of wireless market in India owing to the fact that spectrum is a scare resource and the availability and timing of allocation of

this resource is uncertain. Utmost caution is therefore necessary to be exercised in this matter.

3.48 The Authority then examined circle-wise data of market shares based on subscriber base and market share based on net revenue of operators for the financial year ending 2006-07 **(see Table at Annex X)**. In this analysis of data, the Authority conducted a simulation exercise of concentration ratio of top two and top three service providers (other than PSUs) to arrive at the implications of the worst case scenario of merger of entities. Table below gives results of CR-2 analysis:-

	≤40%	**≤45%**
Market share based on subscriber base criteria	Two circles	Nine circles
Market share based on net revenue criteria	Four circles	Ten circles

Table No. 11: CR-2 Analysis of top two service providers based on market share of subscriber base and revenue

3.49 CR-2 analysis of subscriber based market share indicates that barring two circles, market share of CR-2 exceeds 40% in all cases. CR-2 merger can happen (in nine circles) if the cut off is raised to 45%. A similar analysis of CR-2 in terms of market share based on net revenue of operators indicates that barring four circles, market share of CR-2 exceeds 40% in all cases. CR-2 merger can happen (in ten circles) if the cut off is raised to 45%. Another noteworthy aspect of the results arising out of the analysis of data is that in 15 circles out of 23 circles, the CR-2 in terms of market share based on net revenue of operators is higher than the CR-2 in terms of market share based on subscriber base. In quite a few of such cases, the difference of CR-2 is significant. Having said this, the fact that should not be lost sight of is that CR-2 analysis explained above is with respect to top 2 service providers other than the PSUs.

3.50 The Authority also considered the fact that 50% upper limit was recommended by it at a time when there were on an average four operators in all major circles and since then at least two more operators have commenced services in each service area taking the average number to six. Keeping the results of these analysis and the submissions made by stakeholders in their written submissions and in the Open House Discussions, the Authority is of the view that the level of dominance has to be defined both in terms of market share of subscriber base and in terms of market share of net revenue of operators in the relevant market and this level be 40%.

3.51 ***Accordingly, the Authority recommends that the market share of merged entity in the relevant market shall not be greater than 40% either in terms*** **of subscriber base or in terms of Adjusted Gross Revenue.**

Minimum number of Wireless Access Providers – Post Merger

3.52 From the Indian perspective, it will be undesirable to see M&A activities that result in a market that has one overly dominant operator. Enhanced competition following the liberalization of the telecom sector has brought benefits to the market, and the Authority is of the view that it must protect the public interest by ensuring that the presence of monopolies or oligopolies in the telecom sector should be restricted. Ensuring that a number of competitive service providers exist in each service area is thus a key concern.

3.53 As per the current M&A guidelines, “merger of licenses will be permitted subject to the condition that there are at least three operators in that service area for that service, consequent upon such merger.” Given that BSNL or MTNL will remain in every service area, offering both wireless and wireline services, it is thus potentially possible that only two private

service providers will actually exist in a service area if the level is kept at three. Hence, it is important to ensure that the minimum number of operators in a service area will ensure continued benefits for the consumers.

3.54 **Response of Stakeholders**:-

- The existing policy of at least three players operating in each LSA post M&A should continue.
- The minimum number of access providers in the context of M&A should be three and this should be ensured in wireless and wire-line segment also.
- In the absence of lower limit on the number of access provider, the market may become highly concentrated amongst few places which may significantly impact competition. There should be at least three access providers in addition to the PSU operator in the context of M&A activities.
- In the context of there having been no intra-circle mergers to date, it would be inappropriate to change the existing guidelines.
- There could be three private players in addition to the Government player, both for fixed and mobile services.
- It is essential that virtual duopolies are not created subsequent to mergers. At the same time for deriving maximum operational efficiencies through a free market mergers should be encouraged. The current lower limit of three operators reasonably ensures these aspects.
- Minimum number of operators due to M&A activity can be four since it is believed that presence of four operators would reduce the risk of market abuse through cartels etc.

3.55 The Authority after examination of data of the growth of wireless service across circles, the shift in the market share of operators in various circles

and other parameters has come to the conclusion that the level of competition needs to be sustained across all circles and also in future. Competitive provision of service is an essential condition for the future growth of the industry. Also it is seen, in some circles the market share of wireless service subscription and revenue is disproportionately concentrated in the hands of one or two operators. Therefore, even if the fifth or sixth operator is said to exist in a circle, it does not necessarily mean the market share is evenly distributed. It is not the case. Uneven distribution of market share is always a source of concern particularly when the key input for the service namely spectrum is limited in supply and its availability has already been allocated to the existing operators. Any further availability and its allocation to existing and potential new entrants is not certain and thus not predictable. In the face of such uncertainty, existing operators with higher market shares may have a competitive advantage over their rivals.

3.56 Data was also collected and examined for a range of markets around the world to compare the HHI and number of operators and gauge the relationship. The findings for cellular operations across 32 countries are summarized in Figure 7, and in the Table 12 that follows.

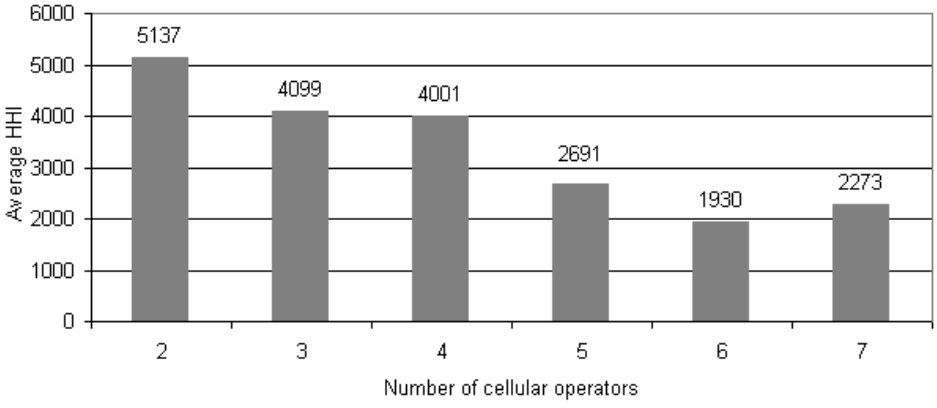


Figure 7: Internationally, a larger number of service providers make a market competitive

Country	Cellular operators	HHI	Country	Cellular operators	HHI
New Zealand	2	5011	Canada	4	2899
Slovakia	2	5077	Greece	4	3240
Luxembourg	2	5323	Germany	4	3335
Poland	3	3343	Australia	4	3490
Singapore	3	3760	Italy	4	3736
Czech Republic	3	3793	Finland	4	3747
Hungary	3	3811	Sweden	4	3760
France	3	3880	Switzerland	4	4496
Spain	3	3887	Turkey	4	5065
Portugal	3	3954	Mexico	4	6245
Belgium	3	3976	UK	5	2282
South Korea	3	4070	Netherlands	5	2604
Korea	3	4134	Austria	5	3188
Japan	3	4490	Norway	5	4348
Ireland	3	4650	Hong Kong	6	1930
Iceland	3	5545	Brazil	7	2273

Table 12: HHI and market structure[28] - International Comparison

3.57 From the analysis of these data, it emerges that for a country of the size of India and in the context of uneven distribution of market share of consumers in different circles, and to ensure that the competition is sustained in the market even after significant M&A activities, the Authority considers it necessary to revise the minimum number of wireless access providers from three to four in a circle.

3.58 A***ccordingly, the Authority recommends that no M&A activity shall be allowed if the number of wireless access service providers reduces below four in the relevant market consequent upon such an M&A activity under consideration.***

Treatment of Spectrum in the Post Merger Scenario

3.59 The demand for spectrum has increased manifold with the proliferation of new technologies and the growing demand for telecommunication services in the country. Efficient utilization of spectrum both technically and economically is therefore of paramount importance. In the context of

[28] Market share data from OECD 2005, analysis by TRAI

overall shortage of spectrum and the uncertainty of its future availability, the value of the spectrum is the key determinant of any market consolidation activity. Capping of spectrum is an issue that acquires importance also from the perspective of competition in the market. It is in this background the Authority reviewed the existing provisions of spectrum cap in the event of a market consolidation like merger and sought the views of stakeholders.

3.60 **Response of Stakeholders**:-

- The amount of spectrum to be held by a merged entity at the time of merger should not exceed 15+15 MHz per service area for all categories of service areas.
- The earlier limit of 15 MHz on spectrum was prescribed when the maximum spectrum allotted to any individual GSM operator was only 10 MHz which has since been revised to maximum of 15 MHz upon achieving pre-defined subscriber milestones. Continuing the earlier limit of 15 MHz would be incorrect and would deter any M&A activity from taking place. Thus, there is a need to prescribe a higher maximum spectrum limit at 22.5 MHz.
- As per international practice in spectrum allotment, average spectrum allotted to a GSM operator is 25 MHz and therefore, the proposed higher limit of 22.5 MHz would be in line with such international practice.
- The suggested revised cap of 22.5 MHz spectrum pertains to 2G spectrum only. The spectrum limit would need to be further revised to include BWA and 3G spectrum once there is clarity on allotments of such spectrum.
- The spectrum limit should be separately prescribed for mergers between GSM/GSM and for mergers between CDMA/CDMA and must follow the ratio of 1 : 2 prescribed and adopted by the Government in its spectrum allotment criteria.

- In the case of a cross technology merger between GSM/CDMA, the merged entity must be required to choose its technology path but may be given some time by the Licensor to migrate all subscribers to its chosen platform. It cannot follow two growth paths under the same license / entity.
- The maximum spectrum limit that could be held by the merged entity should be same as the maximum limit of spectrum permitted to an unmerged entity.
- Any review of the existing prescribed limit at the upward level should be done only when a clear-cut roadmap on spectrum availability is issued by the Government. Therefore, the existing prescribed limit may be retained at present.
- Merged entity should be allowed to retain the entire spectrum held by the two individual companies before merger; subject to the prescribed maximum limit. The present upper limit of 15 MHz for GSM should be revised upwards to 20-25 MHz as per international norms. If the merged entity is required to surrender a part of the spectrum, it will be a disincentive for merger and defeat the objective of permitting intra-circle mergers between the companies.
- The maximum spectrum limit for the merged entity should be capped in order to ensure that the mobile communications market remain competitive, preserve incentives for efficiency and innovation and prevent licensees from hoarding of spectrum. The existing 15 MHz Cap for merged entities should be retained. The upper limit of spectrum allocation in the case of all individual operators should be specified as 10 MHz. The spectrum limits should apply for all sorts of mergers, irrespective of technology.
- The spectrum of the merged entity should be worked out based on the Subscriber Base as on the date of merger. Extra

spectrum available with the entity should be withdrawn within a specified period.

- Cross technology merger should not be permitted. In case such merger is permitted, spectrum requirement should be calculated assuming the combined Subscriber Base and the lower of the two bandwidths should be allowed to the merged entity.
- The maximum limit for the merged entity should be 15 MHz for GSM/GSM Merger and 10 MHz for CDMA/CDMA merger.
- No maximum limit needs to be prescribed as spectrum caps would be arbitrary and an unnecessary layer of restrictions on merger and acquisitions. The 67% monopoly market share test for Mergers and Acquisitions and three licensed access service provider limits are sufficient to ensure healthy competition.
- Subscriber base as a criterion for allocating additional spectrum should be done away with and adequate spectrum be allocated upfront without considerations of the technology being used.
- Any allocations beyond the contracted amount must be paid for. Keeping the technology neutrality principle in mind, CDMA and GSM operators who hold less than 10 MHz should be upfront assigned 10 MHz each.
- The cap in the current M&A guidelines on the spectrum of the merged entity of 15 MHz be retained. Companies belonging to the same group holding different access service licenses in the same circle should be treated as a merged entity.
- Existing cap on spectrum limit for merged entity should be continued. However, certain time period should be allowed to the merged entity for adjustment. In cases of cross technology merger, the merged entity should be asked for growth path only in one technology.

3.61 The guiding principle on matters relating to spectrum allocation and its importance to the sector has been appropriately laid down in the New Telecom Policy (NTP, 1999) the extracts of which are reproduced below:-

"Availability of adequate frequency spectrum is essential not only for providing optimal bandwidth to every operator but also for entry of additional operators….. It is proposed to review the spectrum utilization from time to time keeping in view the emerging scenario of spectrum availability, optimal use of spectrum, requirements of market, competition and other interests of public."

3.62 The importance of efficient utilization of spectrum in its widest sense therefore cannot be minimized. Efficient utilization of a resource which is in short supply can be ensured only when such a resource is made available in a competitive way to the seekers of the resource. As per existing merger guidelines, the maximum spectrum holdings for a merged entity is 2x15 MHz per operator per service area for metros and category A circles and 2x12.4 MHz per operator for service area in category B and category C circles. Thus in the event of mergers between licensees within a circle, it is quite likely that total spectrum holdings of the merged entity will exceed 2x15 MHz cap.

3.63 The Authority examined the pros and cons of revising the spectrum cap placed on the merging entities contained in the existing M&A guidelines. At one level, such a cap as it exists now may appear to be a barrier for consolidation. It is common knowledge that spectrum as a finite resource is short in supply as compared to the multiple demands from a number of user agencies. Available spectrum particularly in the 2G bands stands allocated to existing operators based on certain criteria. Within the class of service providers who can be termed as 'existing operators' the quantum of allocation varies depending upon the time of their entry, the technology used (GSM/CDMA) and the subscriber base that has been acquired by them over a period of time. It is also a fact that there are licensees who are yet to be allocated spectrum which is their initial

entitlement. There is another category of licensees using GSM technology who have been allocated spectrum which is their initial entitlement but are waiting for further allocation to reach the level of contracted amount i.e 6.2 MHz. The last category of operators using GSM technology, who are in various stages of achieving their level of subscriber acquisition as per the existing criteria of allocation and are waiting to acquire their entitled spectrum beyond 6.2 MHz according to the subscriber base criteria. In the case of operators using CDMA technology, in some of the service areas 2.5 MHz of spectrum has been allotted, whereas in certain other service areas 5 MHz has been allotted according to the subscriber base criteria.

3.64 An overwhelming opinion of the stakeholders in general is that subscriber criteria may not reflect accurately the efficiency with which the spectrum is being utilized. There are suggestions to add more criteria like net revenue of the licensees which reflects the economic value of the usage of spectrum instead of simply relying upon one criterion which is subscriber base. Alternatively there are suggestions to make the subscriber criteria more stringent so as to reflect the scarcity of spectrum. The Authority has elsewhere recommended revision of subscriber base criteria for different slabs of spectrum, spectrum charges and additional fee for spectrum beyond 10 MHz.

3.65 Viewpoints generally emerging from the consultation process indicate that such a capping is a barrier to consolidation and should therefore be removed. This point of view is sought to be justified on the ground that the merging entities have after all paid for acquiring the spectrum and upon merger there is no reason why the merged entity shall not hold the allotted spectrum. Also in terms of commercial principles when two entities decide to merge, the assets and liabilities of the merging entities are also to be considered as the one that belong to the merged entity. Further, merging

of two entities also mean that the subscribers of both the entities are required to be served in future also. Therefore, capping or putting a ceiling as it exists now is not only a barrier for consolidation but may in fact adversely affect the ability of the merged entity to service the subscribers of both the networks. As long as the merged entity is prepared to pay the annual spectrum charges based on the existing criteria fixed by the DoT, they should continue to be permitted to hold the combined spectrum of both the entities that have been merged.

3.66 From the perspective of competition also, the issue was examined by the Authority as to whether removal of the existing spectrum cap upon merger of entities would lead to strengthening of market power of the concerned licensee. The analysis of this examination reveals that removal of the spectrum cap on conclusion of an M&A activity is not likely to result in the strengthening of the market power. The basis of this conclusion is primarily on account of the fact that the Recommendations also contain another proposal wherein the existing ex-ante limit for any M&A activity has been brought down from a level 67% to 40% in a circle. Further, the criteria for defining the dominance is also now proposed to be based on the twin criteria of subscriber based market share and revenue based market share. It is therefore quite unlikely that removal of the spectrum cap post merger will give rise to concerns of competition in the relevant market.

3.67 Futuristically speaking, under the same license (UASL), the licensee will be providing a plethora of other access services using mostly wireless technologies. For example, 3G services can also be provided in the present 2G bands. Also, Broadband wireless access service can also be provided by UASL licensee. Therefore, it is neither logical nor practicable to cap spectrum on entities that are merging due to market developments. It is also possible that in future when an operator using multiple technologies may like to discontinue one particular technology and surrender the allotted spectrum. The Authority feels that surrender of

spectrum should always be encouraged and incentivised. Also such surrender would bring down the total allotted spectrum to that operator and thereby bringing to a slab having lower spectrum charges.

3.68 ***Accordingly, the Authority recommends that the existing cap of 2x15 MHz per operator per service area for metros and category A circle and 2x12.4 MHz per operator per service area in category B and C circle applicable for a post merger entity be removed for purposes of regulating M&A activity. However, if the merged entity decides to surrender some chunk/amount of spectrum, it is permitted to surrender. Then the spectrum usage charge will be on the balance spectrum with the merged entity.***

License fee and spectrum charge

3.69 **The annual license fee and the spectrum charge are paid as a certain specified percentage of the AGR of the licensee. On the merger of the two licenses, the AGR of the two entities will also be merged and the license fee will be therefore levied at the specified rate for that service area on the resultant total AGR. Similarly, for the purpose of payment of the spectrum charge, the spectrum held by the two licensees will be added/merged and the annual spectrum charge will be at the prescribed rate applicable on this total spectrum.**

3.70 **As per the existing merger and acquisition guidelines, there is no restriction on merger of two licensees using different access technologies i.e. CDMA and GSM. However, while determining the spectrum charge, the total spectrum held by the merged entity shall be taken. For the purpose of future allocation of spectrum in respective technologies, the licensee shall be given the opportunity for vertical growth. The licensee shall have to maintain separate details of the subscriber base for the purpose of spectrum allocation.**

3.71 Another related issue concerning M&A activity pertains to the applicability of spectrum acquisition fee in a post-merger situation when the total spectrum of the merged entity exceeds 10 Mhz. The one time spectrum acquisition fee recommended in Chapter-2 for any licecee exceeding allocation of 10 Mhz through organic growth will not be applicable for a merged entity when it exceeds 10 MHz, due to the merger/acquisition for the reasons discussed in detail in the paragraphs above. **However, when such an entity seeks to acquire additional spectrum beyond 10 MHz, the one time spectrum acquisition fee as applicable to other licencees will also be applicable to the merged entity. Merged entities shall also have to pay annual spectrum charges in the appropriate slab based on the combined spectrum.**

3.72 One other situation that may arise in this context relates to an M&A activity involving cross-technology merger. In this case also additional one time spectrum acquisition fee will be applicable. **However, in view of the recommendation contained in ¶ 3.70 which envisages vertical growth path in the respective technologies, the merged entity (involving cross-technology) will pay the additional one time spectrum acquisition fee, only when it seeks additional spectrum beyond 10 MHz in GSM technology or 5 MHz in CDMA technology.**

Transfer of Licenses

3.73 As per the provisions of UAS license agreement:

" 6.1 The LICENSEE shall not, without the prior written consent as described below, of the Licensor, either directly or indirectly, assign or transfer this License in any manner whatsoever to a third party or enter into any agreement for sub-license and / or partnership relating to any subject matter of the License to any third party either in whole or in part i.e. no sub-leasing/ partnership/third party interest shall be created.

Provided that the Licensee can always employ or appoint agents and employees for provision of the service.

6.2 Intra service area mergers and acquisitions as well as transfer of licenses may be allowed subject to there being not less than three operators providing Access Services in a Service Area to ensure healthy competition as per the guidelines issued on the subject from time to time.

6.3 Further, the Licensee may transfer or assign the License Agreement with prior written approval of the Licensor to be granted on fulfillment of the following conditions and if otherwise, no compromise in competition occurs in the provisions of Telecom Services:-

i) When transfer or assignment is requested in accordance with the terms and conditions on fulfillment of procedures of Tripartite Agreement if already executed amongst the Licensor, Licensee and Lenders; or

ii) Whenever amalgamation or restructuring i.e. merger of demerger is sanctioned and approved by the High Court or Tribunal as per the law in force; in accordance with the provisions; more particularly Sections 391 to 394 of Companies Act, 1956; and

iii) The transferee / assignee is fully eligible in accordance with eligibility criteria contained in tender conditions or in any other document for grant of fresh license in that area and show its willingness in writing to comply with the terms and conditions of the license agreement including past and future roll out obligations; and

iv) All the past dues are fully paid till the date of transfer / assignment by the transfer or company and its associate(s) / sister concern(s) / promoter(s) and thereafter the transferee company undertakes to pay all future dues inclusive of anything remained unpaid of the past period by the outgoing company."

3.74 **Annexure VII to the licence Agreement contains the provisions for transfer of licence in pursuance of enforcement of security by**

lenders. As per above mentioned clause, the Licensee may transfer or assign the License Agreement with prior written approval of the Licensor to be granted on **fulfilment of one of the two conditions:**

i) The first condition relates to default by the licensee in payment of the loan amount taken from a lender. In that case, as per the prior tripartite agreement executed between the licensor, licensee and the lender, the lender has an option to recommend the transfer of the license to a Selectee.

ii The second condition relates to transfer of the license in the event of restructuring of the company i.e. merger or demerger. The conditions for allowing the merger and acquisition have been extensively dealt in the previous paragraphs.

The Authority while examining the issue of M&A had also deliberated on these terms for the transfer of licenses and has come to the conclusion that the present terms and conditions are adequate and therefore the Authority recommends that it does not require any change in the existing terms.

3.75 Competition in the Indian telecom market has contributed to the explosive growth over the past few years – both in terms of subscriber base and in terms of coverage. For this exponential growth to continue in future, it is essential that a sustainable market structure is allowed to consolidate so as to achieve higher growth through efficient utilization of resource.

3.76 owever, in order to prevent anti-competitive ownership patterns, and to allow for true diversity in the range of choices to the consumer, it is essential that rules be put in place, and enforced, that restrict the ownership levels of different service providers. Simultaneously, these limits should not be such that growth or efficient consolidation in a market is hampered. Hence, a balance needs to be reached between ensuring that a consumer has access to a competitive market, and allowing firms to grow to improve their economic efficiency.

3.77 With the foregoing as the touchstone, the issues of substantial equity clause in the License has been examined by the Authority with the help of the responses received from the stakeholders on the consultation paper, existing provisions in the various acts like the Income Tax Act, the SEBI Act, the Companies Act and the Competition Commission Act and the relevancy of the condition in the present environment.

3.78 The relevant clause (1.4) of the License states that:

The LICENSEE shall also ensure that:

Any changes in share holding will be subject to all applicable Statutory permissions.

No single company/legal person, either directly or through its associates, shall have substantial equity holding in more than one LICENSEE Company in the same service area for the Access Services namely; Basic, Cellular and Unified Access Service. 'Substantial equity' herein will mean 'an equity of 10% or more'. A promoter Company / Legal person cannot have stakes in more than one LICENSEE Company for the same service area.

Note: Clause 1.4(ii) shall not be applicable to Basic and Cellular Licensees existing as on 11.11.2003, and in case one of them migrates to UASL it shall not be necessary to surrender the other License. Further, Basic and Cellular Licensees existing as on 11.11.2003, shall not be eligible for a new UASL in the same service area either directly or through it's associates. Further, any legal entity having substantial equity in existing Basic / Cellular licensees shall not be eligible for new UASL.

3.79 The response of the stakeholders has been overwhelmingly in favour of retaining the substantial equity clause and in continuing 10% as the limit of substantial equity. Several of the stakeholders have also desired that the substantial equity provision should be integrated with M&A guidelines.

3.80 Some of the specific comments are as below:

i. Clause 1.4 was included in the UASL and CMTS Licenses at a time when the telecom sector was at a nascent stage. Since then the significant changes that have come about in the sector viz.,

- Market has become highly competitive with 6-8 service providers in every service area
- The four large operators have a market share ranging from 15-25%
- Introduction of specific guidelines for M&A

ii. For the present, the definition of substantial equity should be retained at the existing level of 10%

iii. Equity holdings beyond the limit of 10% should be permissible, but the same should be made subject to the M&A guidelines on a proportionate basis.

iv. The present limit of 10% should be retained and legal experts should work out the conditions needed in the merger/acquisition guidelines to prevent the possibilities of indirect control.

v. The cross-holding clauses in the license may have served a purpose when the DoT was first licensing Cellular or Basic Services and initially creating a competitive market for access services market and encouraging creation of infrastructure. The cross-holding restriction is no longer necessary to preserve and protect the already established competition when at least 5 to 7 access service providers are existing in any service area and a number of others are awaiting award of license.

3.81 The definitions of substantial equity / interest surveyed in various commercial laws governing business environment in India, give a range from 5% to 25% of paid up share capital of a company. Such definitions have been coined at different points of time for different purposes. Nevertheless, they give an idea of the level at which substantial equity or interest in a company has been viewed.

3.82 The Authority has noted in the consultation paper also that the conditions on Substantial equity in the UASL and CMTS licenses were imposed initially, in the early stages of competition. At that time, there were only 3-4 operators in the sector and the operators were not financially strong and the substantial equity clause served a purpose in ensuring the development of multiple operators. Over time, the market has become competitive with 6-8 service providers in each service area and four large operators having market share in the range of 15-25%. The other important difference between the present and the time this condition was imposed is that now there are specific guidelines on M&A for ensuring healthy competition and avoidance of monopolization of the market through merger and acquisition.

3.83 At present, the Access licenses state that a substantial equity holding is 10 percent of the equity of the licensee company. The higher the holding of an entity in a firm greater is its control over the firm. However, the Authority has noted that so far no serious concerns have come up in respect to competition, growth of the sector and inflow of the investment in the sector. Consequently, the Authority feels that in the interest of reducing the chances of having one entity exercise significant control over a number of different firms, it is essential to keep the limit to a level where the interest of any single entity is not promoted through cross management controls.

3.84 The central question to be addressed is whether there is a need to follow an ex-ante approach to the regulation in the matter of substantial acquisition of stakes by one licensee in the enterprise of another licensee in the same circle. By defining acquisition of stake at 10% and beyond as 'substantial' and by restricting an existing licensee enterprise from acquiring substantial stake in another licensee enterprise in the same license area, an ex-ante regulatory prescription is put in place. However, the present guidelines[29] do contain a clause "while granting permission for merger of licenses. The Licensor may suitably amend/relax/waive the conditions in the respective licenses relating to the clause on holding of 'substantial equity'. "

3.85 It is clear from the above that acquisition up to 9.9% of the equity capital by a licensee company in more than one Licensee Company in the same service area for the access service is permitted by way of automatic route. Beyond that, it can be relaxed/waived by the Licensor while granting permission for merger of licenses on case by case basis.

3.86 Views of experts on the subject matter suggest that market driven moves of corporate alliances may result in overall efficiency. Important consumer benefits arising out of higher levels of efficiency in operations include lower prices, greater choice, higher quality and more innovative products and offerings. Business alliances seeking such consolidations could foster efficiency and thus bring increased benefits to consumers. The technological complexity and rapid pace of innovation in the telecom industry in particular require careful attention to ensure that consumers receive the benefits of a competitive market place. Barriers to efficiency in operation by prohibiting market driven moves for consolidation may not be

[29] DOT's Office Memorandum No.20-232/2004-BS.III dated 21.2.2004.

an appropriate approach particularly seen in the context of growing requirement for capital investment in the telecom sector in India.

3.87 The proponents of retention of 10% rule argue that any case to case relaxation of this clause needs to be carefully examined as it may lead to license squatting or obstruction to competition and may be less transparent. Further, it is argued that it is important to ensure that any company or groups of companies or individuals are not able to exercise indirect powers on the market. Several experts are of the view that there is a need to ensure that the likely impact of market driven business alliances is examined with respect to economic criteria and in the overall interest of competition and consumer benefit.

3.88 Under the present regime of an ex-ante regulation where substantial equity acquisition has been defined to mean 10% and any acquisition by an existing licensee in a service area exceeding the limit having been prohibited, possibility of even examining the likely impact of consolidation stands ruled out. This has been commented by some stakeholders to be too narrow, arbitrary and a barrier for efficient consolidation in the market.

3.89 The Authority in its examination of the state of competition in the relevant market, came to the conclusion that the question of the number of players in the relevant market, permissible limit of market share of merged entity in a post-merger scenario, spectrum availability and its allocation etc. have to be examined in its totality and not seen in isolation. In this context also, the Authority emphasizes the need to have a holistic approach in deciding whether to have an ex-ante approach of a 10% like regime or to have a mix of ex-ante and an ex-post approach to regulation. The Authority has separately recommended a stricter regime of M&A Regulations by reducing the post merger market share of the merged entity from 67% to 40% and the minimum number of players as four. Therefore, it may be

argued that keeping yet another ex-ante standalone stipulation of 10% limit for substantial acquisition would be a barrier for market driven efficient operations of the sector. Hence a balance needs to be maintained between ensuring that the consumer has access to a competitive market and scope for firms to grow to improve their economic efficiency.[30]

3.90 At the same time, the Authority is conscious of the need to ensure that business alliances do not end up in concentration of market power resulting in substantial lessening of competition which has welfare implications for the consumer and society at large. Of utmost importance in this respect relates to putting in place a regime where there is a scope for commercial flexibility and at the same time the regulatory mechanism ensures that consolidations which might impede competitive activity are not permitted.

3.91 In this context, the Authority has surveyed various definitions having relevance for defining limits of restrictions on crossholdings (see Chapter 3 of consultation paper No.7/2007). The purpose of restricting crossholdings could be twofold. One, to allay the fears that complete removal of restrictions and crossholding could lead to one major operator influencing the decision of another licensee enterprise in the same service area and another is the concern expressed in some quarters that such crossholdings in a rival licensee company should not be used to sabotage the growth plans of the target licensee company. Keeping in view these concerns, and also the need to provide for commercial flexibility to ensure efficiency in operations in the sector, the Authority suggests an upper limit of 20% for crossholding by an existing licensee in another licensee company in the same service area. However, the Authority would suggest

[30] Consultation Paper No.7/2007, TRAI 12.6.2007.

a two stage process of clearance in this matter of cross holding. One, the existing limit of less than 10% would continue on an automatic basis as per the present regime and any acquisition of 10% and above and up to 20% will require the prior approval of the licensor.

3.92 The process of such approvals will be governed by the guidelines of Mergers and Acquisition recommended by the Authority as contained in this recommendation.

3.93 The Authority has also noted that the "substantial equity" clause in the license also separately puts a limit on the equity holding of a promoter company. The clause states "A promoter company/ legal person cannot have stakes in more than one LICENSEE Company for the same service area." In response to the consultation paper, a number of stakeholders have suggested doing away with this condition. The Authority also feels that such a condition is too restrictive and is not in consonance with the present telecom environment. Therefore the Authority recommends removal of this condition. The shareholding of a promoter company in more than one LICENSEE Company will also be governed by the substantial equity restriction recommended above.

3.94 Accordingly, the Authority recommends that a mix of ex-ante and ex-post approach for regulating acquisitions of equity stake of one licensee Company/ legal person/promoter company in the enterprise of another licensee in the same license area. The Authority further recommends that acquisition of equity capital up to 10% of the target licensee's enterprise shall be permitted by an automatic route and anything beyond that and up to 20% of the equity holdings of the target licensee company, shall be approved on a case by case basis and the process of such approvals will be based on the M&A guidelines contained in these recommendations.

Chapter 4 Access services using combination of technologies under the same license

4.1 DoT in its letter dated 13th April, 2007 has sought TRAI's recommendation on the use of combination of technologies [CDMA, GSM and/or any other] under the "same license".

4.2 The phenomenon of "convergence" is the driver of the triad- technology market and policy. In a span of about 12 years, radical advances in technology, market institutions, forward looking Government policies and regulatory policy backed with sinews of competition have transformed telecommunications sector. The transition to privatization, liberalization, fierce competition regulatory environment and universal service to take care of socio-economic development has made this sector a show piece of economic liberalization success story. From a very limited and traditional scope of voice communication, telecommunication services today encompass voice, data and video facility. The access provider has to offer "triple play" in order to remain competitive and sustainable as the revenue ratios have gradually tilted in favour of value added services particularly non voice services. ***NTP, 1999 recognized the emergence of convergence and has thus underlined the importance of reorienting the existing framework of policies to suit the needs of the emerging environment. It states that "convergence of both markets and technologies is a reality that is forcing realignment of the industry." One of the key objectives of the NTP 1999 is to 'create a modern and efficient telecommunications infrastructure taking into account the convergence of IT, media, telecom and consumer electronics and thereby propel India into becoming an IT super power.'*** Needless to say, it is necessary on a continuous basis to encourage regulatory framework that fosters innovation, investment and affordable access. Any forward looking analysis in the context of an ongoing convergence must be technologically neutral, given the types of dynamic changes that may result

from future delivery of services based on different technologies. This brief introduction in terms of approach is critical to appreciate what follows.

4.3 Existing licensing framework governing unified access licenses and its provisions relating to allocation of spectrum, etc. have been discussed elsewhere in this recommendation. Entry regulation for access markets in India is governed by the licenses issued to the service providers on payment of the stipulated entry fee. However, spectrum required for offering the access services is given to such licensees without any separate fee for the spectrum. That is to say, eligibility for allocation of spectrum follows the grant of license subject to availability. In many parts of the world, the systems adopted have de-linked the issue of access license and allocation of spectrum. Therefore, there is a legacy issue that needs to be resolved in the interest of growth, competition and innovation in the matter of provision of access services.

4.4. Since November, 2003, after the introduction of Unified Access Service License (UASL) regime both wire-line and wireless services can be offered by UAS licensee. However, it is important to recall the evolution of technology and licenses for an objective evaluation of the Department's intent/objective and also the burden of legacy. Indian telecom sector had the facility of wire-line, i.e. basic telephony as the singular means of service. The services were offered by the Department of Telecom and Mahanagar Telephone Nigam Limited (MTNL), a public sector unit therefore no separate license was issued. In 1994-95 the telecom sector was opened up for cellular mobile telephone services (CMTS). Also the sector was no longer restricted to Government monopoly and private licenses were awarded first in metros followed by other service areas. Around the same time MTNL experimented with CDMA technology which was operational in the 800 MHz band. This service was restricted to local loop, i.e. usage within specified and limited distance. The cellular mobile telecom service licenses were permitted first only in 900 MHz band. The initial CMTS

license was amended by an order dated 01.10.1999 of DoT and the license was made technology neutral. Before the amendment, it was mandatory for the licensees to use the GSM technology.

4.5. In 1997-98, licenses were awarded to private service providers to offer fixed services. Initially the Basic service operators (BSOs) were permitted to use WLL technology for fixed wireless access only in addition to traditional wireline technology. However, in 2001, they were also permitted to offer limited mobility services within Short Distance Charging Area (SDCA). As per their license, the BSO's were assigned spectrum in the 800 MHz and 1800-1900 MHz band. Subsequently, Unified Access Services License (UASL) regime was introduced in November, 2003 which permitted the licensee to offer both fixed and/or mobile services using any technology. All the BSOs except BSNL and MTNL migrated to the UASL regime. Since November, 2003 no CMTS or BSO license is being issued to new applicants and the new access services licensee can only be UASL.

Currently there are three category of Unified Access Licenses as given below:

i. UAS license after migration from basic service license;
ii. UAS license after migration from CMTS;
iii. New UAS license.

4.6 The license conditions though significantly same have important and critical framework in terms of technology choice. The technological neutrality is being effectively pursued in terms of freedom to choose any technology by the licensee. However, the specific mention of certain spectrum bands reveals the framework of license as structured by the Department.

4.7 In the Unified Access Service License Agreement under "Part IV Technical Conditions" in clause 23.1, it is stated that the licensee can provide any

digital technology based on standards issued by ITU/TEC or any other international standards organization/bodies/industry. It also states that the licensee shall provide the details of the technology proposed to be deployed for operation of the service.

4.8 UASL agreement clause 23.5 states, “The frequencies shall be assigned by WPC from the designated bands prescribed in National Frequency Allocation Plan 2002 (NFAP 2002) as amended from time to time”.

4.9 Clause 43.5 of the UAS License reverts to the choice of technology in terms of frequency band. It provides “initially accumulative maximum of up to 4.4 MHz+4.4 MHz shall be allocated in the case of TDMA based systems [@ 200 KHz per carrier or 30 KHz per carrier] or a maximum of 2.5 MHz+2.5 MHz shall be allocated in the case of CDMA based systems [@1.25 MHz per carrier] on case by case basis subject to availability”. Thus, it clearly lays down an allocative principle for GSM or CDMA technology depending on the choice of the licensee.

4.10 It has been argued by few stakeholders with reference to the clause “for making available appropriate frequency spectrum for roll out of services under the license, the type [s] of systems to be deployed are to be indicated” [Clause 43.5(i) of UASL]. And “[s]” is being flagged as the enabler for selecting/offering more than one technology. It is crucial to understand that the reference is to the system and not technology and has to be understood in the context of network for offering services. In fact, in the migrated UAS licenses, Clause 43.5 (ii) immediately reverts to a situation requiring licensee to provide services in “already allocated/ contracted spectrum”. It is therefore, amply clear that both legacy, past practices, related performance obligations and other provisions in the license echo the expectation that the telecom licensee having chosen a technology will offer services in the spectrum specific to that technology.

Initially, Department of Telecommunication has envisaged spectrum ceiling of 4.4 MHz+ 4.4 MHz in case of TDMA systems and a maximum of 2.5MHz + 2.5 MHz in case of CDMA systems. This ceiling was specifically relaxed in the new UAS license. Clause 43.5(ii) gives additional spectrum only up to 5MHz + 5 MHz in respect of CDMA system or 6.2 MHz+ 6.2 MHz in respect of TDMA base system. Here again, the reference is not "and" but "or" which would distinctly establish that the licensee could either be a CDMA or GSM operator and accordingly the beneficiary of the additional spectrum. Clause 43.5(ii) has specified the bands which would be considered for spectrum allocation. These bands also restrict the scope of technology choice. This is established by a composite reading of various terms and conditions of License and other related documentation. As per existing License Regime, applicant company first acquires the License upon payment of a specified entry fee and then exercises its technology choice. Thus, when a License is acquired, the same is technology neutral and the licensee has the freedom to choose either the GSM or the CDMA platform to offer his mobile services. But the authorization that is granted by WPC is based on the technology choice that is exercised by the licensee for granting "appropriate frequency bands". Thus, a technology choice has to be made by the licensee so as to be able to get the appropriate spectrum from WPC.

4.11 Thus clearly the spectrum that is allotted/assigned has to be from the "designated bands prescribed in NFAP-2002" as amended from time to time. Further, the use of the words 'usage' and 'justification' clearly specify a legacy baggage and linked to the initial technology choice that is exercised by the licensee in Clause 23. The fact that the licensee can get spectrum based upon its technology choice is further reinforced by Clause 43.5 (ii). The allotment of additional spectrum is linked to technology choice exercised vide Clause 43.5(ii) as it will consider additional allotments based on the optimal use of the existing allotments which

clearly indicates that additional allotments can only be made pursuant to and inconsonance with the initial allotments as per Clause 43.5(i).

4.12 A close reading of the License also does not contemplate more than one technology choice being made by the licensee. The UAS Licensee by clearly acquiring license and technology choice at the outset and then linking both initial as well additional spectrum allotments to the same, clearly rules out any scenario where a licensee can acquire spectrum for both technologies in a single license. This embargo on cross-over allotments of spectrum is further endorsed by the fact that there are technology specific spectrum allotment guidelines as also spectrum usage charges.

4.13 It is important to examine the guidelines issued for Unified Access Service License on 11th November, 2003. The guidelines reiterated that the service providers migrating to Unified Access Service License will continue to provide wireless services in already allocated and contracted spectrum. It echoes licensing clause 43.5(ii). It is abundantly clear that continuity of technology in providing telecom services is the foundation of the UAS license conditions and also spectrum allocation. Thus the guidelines provide freedom to use any technology without any restriction but it gets conditioned by the specific bands of spectrum and allocative principles. Freedom thus exercised once, becomes the base for offering telecom services and building of the edifice.

4.14 The comments of the stakeholders received on the issue have been duly considered and the gist of those comments is as fellows:

- The UAS License contemplates only one single network to be set up by the Licensee for provision of Mobile Service. In case of cross over of allotment of spectrum, the same would tantamount to the Licensee running and operating two independent networks for provision of Mobile Service one GSM and another CDMA, which is not permissible under the UAS license.
- It is our firm view that crossover allotment of spectrum is not permissible under the present UAS license, i.e. a Unified Access Licensee

offering Mobile services under CDMA based systems cannot be allotted GSM spectrum also to offer Mobile Services, under the same UAS license and vice versa.

- The subscriber linked spectrum allotment guidelines prescribed by the Government lays down two very separate and distinct paths for allotment of spectrum to GSM and CDMA operators as it contemplates different tranches of spectrum allotment for GSM and CDMA operators
- Although the licensing regime for UASL has now been made technology neutral, because of the legacy of the past and the fact that GSM and CDMA operators were given initial frequency allocation from separate frequency bands namely 800 MHz for CDMA, and 900MHz for GSM, the growth path for these two technologies are separate and at present based on subscriber numbers. Therefore licensee using one technology should not be assigned additional spectrum meant for the other technology to avoid legal complications
- No, any attempt to even consider a cross allocation of spectrum would offer parties a backdoor entry to create another network (without obtaining a new license). This would have the potential to destroy the structure of the sector.
- The UAS License is for providing access services and need have no bearing with the technology used. Two technologies CDMA and TDMA have been quoted in this question whereas there is no reason why a service provider will not use WiMax or a hybrid OFC and WiFi or any other solution. This issue has clearly arisen because of the perceived shortage of spectrum existing today for CDMA and GSM technologies due to the inability to get more spectrum vacated in time. Thus, there should be no bar for a given licensee of UASL to provide access services using any technology.
- The technology neutrality and flexibility available in the license helps the operators to adopt emerging technologies.
- A change in technology should be permitted to any operator. However, if an operator makes a claim for spectrum it should be in the same

queue as other operators seeking the same spectrum. Claims for any specific part of spectrum should be decided strictly in order of their being made. An operator must not be able to claim its subscriber base in GSM or CDMA spectrum to justify priority in spectrum allocation for CDMA or GSM services respectively.

- The UAS License permits to provide all types of access services using any technology. Any other interpretation of the license is illegal and also not in the interest of promoting competition, innovation or efficiency and would also be against the interest of consumer.
- The license permits use of any technology to provide wireless access services and therefore question of permitting or not permitting does not arise.
- A licensee using one technology may be assigned, on request, additional spectrum meant for the other technology under the same license. For the spectrum so assigned, the licensee should pay the charges applicable for the additional spectrum as per the current UASL norms.

4.15 In wireless the two major technologies at present in use for providing 2G/2.5G services are categorized as CDMA and TDMA. The equipment for both the technologies is available in different spectrum band and as such the spectrum can be allocated by the WPC on the basis of technology specified by the licensee. The licensee after allotment of spectrum shall provide the services as per the roll out obligation stated in the license agreement.

4.16 Thus, the licensee is given the option of choosing technology of its own. However, he has to indicate the technology mainly because of specific spectrum bandwidth requirement for each technology. In the entire license agreement it is only stated that the licensee shall provide the details of technology proposed to be deployed for operation of the service. Accordingly, the growth path of the licensee is confined to the technology chosen at the early stage.

4.17 Best practice guidelines adopted in many parts of the world in the matter of entry regulation and policy thereof require a constant reassessment of the existing framework so that barriers to competition and innovation are removed and policies are updated in tune with the fast changing technology/market environment. In this context, it may be appropriate to recall that the Authority in its Recommendations dated 27.10.2003 had envisaged de-linking the issue of spectrum with the license (see ¶7.2 of TRAI Recommendations on Unified Licensing Regime). Further, one of the key objectives of the Unified Licensing Regime as stated by the Authority in 2003 is to ensure 'flexibility and efficient utilization of resources keeping in mind the technological developments.'

4.18 Clause 2.2 (a)(iii) of the UAS License envisages triple play, i.e., voice, video and data. In order to offer these services the relevance of 3G and spectrum identified for broadband wireless access is paramount. Thus the same license is envisaging allocation of spectrum for different technologies in bands other than 800, 900 and 1800 MHz bands. It is self-evident that UAS license is not restrictive in terms of future growth path. It is equally significant in the context of "digital divide" problem. The dynamics of technological and economic efficiency would demand greater freedom to the licensees in terms of mobile networks and newer end-to-end fiber based networks. The cost implications will have to be left to the telecom operator. Moreover, in the scenario of new emerging technologies it would not be appropriate to stop the march of technology and as forward looking Regulator it should be the endeavour to allow unhindered growth path.

4.19 Risks are inherent in any choice of technology and telecom access market is no exception. Admittedly, such risks have to be borne by the operators concerned. Provisions in the policies to cover such situations in the interest of overall sector development, investment, consumer protection etc may have to be thought of in a dynamic setting where technologies become redundant due to a variety of reasons. However what is required to be ensured is that by offering an alternative platform to operators who

have chosen a particular technology to provide mobile access service the level playing field is not disturbed in any manner to any set of players particularly with respect to the existing and potential players.

4.20 Certain developments are now universal. In connection with above interpretation, let us look into the international practice. In the countries where the spectrum is auctioned, the successful bidder has to select the technology for providing telecom services on the basis of the spectrum obtained by him through auction. In case he is interested in providing any other technology he has to work within that spectrum obtained by him under the bidding process. If it is not possible to provide the additional proposed technology in the spectrum available with him, the alternative available for him is to wait for the availability of that spectrum band and whenever the spectrum is available, he has to participate in the bidding process. If he is successful in getting the spectrum he can provide the technology. Thus he has to pay auction/market charges for the additional technology proposed by him. The technology kit is no longer on rigid stand alone basis and there is over whelming influence of evolving technology on the range of services offered through electronic communication. Therefore, a regulatory policy in isolation displaying rigidity is not found to be appropriate. Accordingly it is necessary that an effort is to be made to shake a loosely knit consensus reflecting emerging global trends.

4.21 The concept of technology neutrality is one of the core principles underlying the new regulatory framework for Electronic Communications Networks and Services of the European Union. This has been quickly adopted across a number of markets for various purposes including selection criteria for investments in electronics communication infrastructure. Technology neutrality has not been explicitly stated in the licensing policy governing access service in India but the fact remains that the license permits provision of basic and or cellular service using any technology in a defined service area. This has been subjected to different

interpretations by different people to suit their own interests. What is needed however for adopting a consistent approach to the application of the neutrality concept to achieve policy goals is to ensure that competition in the market is increased and not decreased.

4.22 The present UASL guidelines also allow use of any technology based on standards issued by ITU/TEC or any other International Standards Organization/bodies/Industry[31]. However, while laying down guidelines for spectrum allocation, only TDMA, CDMA and micro-cellular technologies have been mentioned[32]. **The Authority recommends that in case a licensee wishes to deploy any other advanced and efficient technology for providing mobile service, than the DoT should allocate spectrum subject to its availability.**

4.23 Internationally, there are countries where the same service provider is providing services with different technologies. However, this issue did not enter into the regulatory domain as most of the developed countries have de-linked the spectrum allocation from the license. Many countries have free auction policy of spectrum rather than pre-determined imposition of technology. In our national debate we have often restricted our vision with reference to technologies CDMA and TDMA. We have not envisaged a situation with WiMax, hybrid OFC, WiFi and many other solutions that can now be harnessed for offering cheaper telecom services. The controversy has been further aggravated because of the spectrum which is being perceived as inadequate by existing licensees.

4.24 However, such treatments in mid-course of the growth path are riddled with implications for competition in the market. Therefore it is important to ensure that the level playing field is not disturbed. Accordingly the Authority would like to adopt a policy prescription where flexibility is recommended to be pursued but at the same time such flexibility will come

[31] ¶35 of Guidelines for UASL
[32] ¶37,38 &39 of Guidelines for UASL

at a cost to such of those operators who are desirous of changing the technology path chosen by them initially. After all, commercial risks when insured have a cost attached to it. Commercial enterprises when run into technology risks should have the option to spread the risks by letting them operate under alternative technology path. Thus while the path is being opened for such entities, concerns arising out of competitive situations need to addressed.

4.25 As per the existing licensing regime, there are three sets of financial contribution made by the licensees to the national exchequer. The applicant company first gets the license on payment of a specified entry fee. The licensee makes an annual payment based on certain percentage of Adjusted Gross Revenue (AGR) towards license fees. Thirdly, the licensee also pays for usage of spectrum in the form of spectrum usage charges which are presently linked with AGR on the basis of quantum of spectrum allocated. The Authority has separately examined the issue of number of licenses in a service area. In chapter 2, the Authority has come to conclusion that there is perhaps greater wisdom in leaving it free to the market forces. Market is the best judge. Investor knows his interests better. Therefore, it is conceivable that a promoter of a licensee company could structure a legal framework where a new license with new technology is obtained. This would only encourage practices which are less transparent. As discussed, there is a need to introduce greater clarity on this issue since new technologies are emerging and over a period of time existing licensees are inevitably likely to adopt the latest/alternate technologies available in the market. It is, therefore, imperative for a regulatory regime to recognize the basic requirement of existing licensing and regulatory environment to enable licensees to accordingly prepare their future business plans.

4.26 In view of above, if similar facility as available in international scenario is to be extended to Indian licensees the solution has to be thought in the light of rules and regulations available in the Indian environment. As per

Indian environment the entry fee is to be paid for taking a license and accordingly spectrum for the technology specified by the licensee. Therefore, to import this flexibility to wireless operators in India who prefer to accept growth path in the technology of their choice a special provision may have to be made in regard to permitting the existing licensee to pay an additional entry fee for the alternative that may be required for this purpose.

4.27 In fact as per the addendum to the NTP 99 issued by DoT on 11.11.2003, the UAS Licensee can provide basic and/or cellular services using any technology in a defined service area. In the interest of transparency, it may perhaps be appropriate if the existing licensees are permitted to use other technologies on a payment of specified amount. **Therefore, the Authority recommends that a licensee using one technology may be permitted on request, usage of alternative technology and thus allocation of dual spectrum. However, such a licensee must pay the same amount of fee which has been paid by existing licensees using the alternative technology or which would be paid by a new licensee going to use that technology.** An argument will be made that how can there be two rounds of entry fee. It is legally tenable to charge additional fee for allocation of dual set of spectrum. This would also pass the test of level playing field. As per clause 43.5 (iv) of UAS License, the licensor has right to modify and/or amend the procedure of spectrum allocation. This could be incorporated through an amendment in the same license. Also it has to be ensured that condition of roll out obligation applicable in the case of a specific technology would become applicable for the licensee who has adopted the technology. This would cover issues such as roll out obligation and spectrum charges. However, the growth path will be vertical and all criteria would be made applicable as has been prescribed in other cases.

4.28 Given the very nature of the telecom sector where change is the only constant factor and new developments and technological advancements

are the order of the day, regulation and the licensing conditions must act as enablers rather than deterrents. In such a scenario and in the interest of overall growth and development of the sector, the Authority is of the view that there is a need to address the issue of spectrum allocation rather than to restrict the choice of the technology the licensee wishes to deploy. The licensee who has invested in the network and in subscriber acquisition would naturally attempt to deploy the technology that is more cost effective to him and allows him to improve the quality of service, and/or allows him to introduce service or features that give him a competitive edge. In order to allow him greater flexibility and in the wider interest of ensuring further development of the sector and introduction of latest technology to achieve better teledensity figures, there is a case for allowing the existing licensees to deploy any technology or even multiple technologies under the same license. The ultimate objective of the licensor and the regulator is to ensure penetration of telecom services and subscriber receiving wide variety of services with good quality of service. These goals can be achieved when the service providers are supported and encouraged to invest in the best available technologies as chosen by the licensee. Therefore the facility after payment of fee is both fair and progressive measure.

4.29 For such licensees who are seeking to change in favour of multiple technology in providing mobile access under the UASL framework and within the spectrum bands specified in the UASL, the Authority recommends levy of a specified amount of fee which should be, at least, equal to the entry fee for UAS licence. Further, for purposes of assessment of market power in the context of competition analysis in the market, the combined market share arising out of service provision through both the technologies will be taken into account and obligations if any to be imposed on such dominant operators as and when necessary in future will be done with reference to combined market power of such licensees.

4.30 **Presently, the additional spectrum after the initial allocation is given based on a certain criterion laid down by DoT. As the licensee will be using multiple technologies [GSM, CDMA and or any other], the Authority is of the view that for spectrum allocation in respective technologies, the licensee should be given the opportunity for vertical growth, i.e., same treatment as accorded to a merged entity from the merger of two licensees using different technologies. It must be noted that the licensee will maintain separate detail of the subscriber number data for the purposes of spectrum allocation but the AGR will be the combined AGR of multiple technologies. It is the combined AGR which will be the base for the license fee.**

4.31 The other issue related to the spectrum charges/fee payable by such operators who have opted for use of multiple technologies for providing access services. Here again, the spectrum charges/fee will be governed by the combined total of spectrum allocated in different technology specific bands, i.e. the slab of spectrum charge/fee would be determined by the combined total of spectrum.

4.32 However, there is one major difference between a merged entity and an operator who has opted for multiple technologies for providing access services under one license. Such an operator will start deployment after the allocation of spectrum. It will be unfair to demand higher spectrum charges on grounds of combined total of spectrum without enrolling new subscribers. It would destabilize the financial working of such an operator. **Therefore, it is fair to grant a moratorium of one year from the date of allocation of spectrum, after payment of specified fee, for the levy of spectrum charges based on the combined total of spectrum allocated. This would mean that the operator would pay spectrum charges/fee on the basis of allocated spectrum in respective technologies for one year before graduating to a slab earmarked for**

the combined total of spectrum. The one year will be counted from the date of allocation of spectrum for the second technology.

4.33 The approach outlined here is new, liberal, innovative and recognizes the market related developments in the context of technology.

4.34 Another linked issue is the inter se priority for spectrum allocation. As the existing licensee becomes eligible for allocation of additional spectrum specific to the new technology, such a licensee has to be treated like any other existing licensee in the queue and the inter se priority of allocation should be based on the criteria that may be determined by the Department of Telecommunications for the existing licensee.

4.35 Once there is clarity in the concept that a Service Provider should be allowed to provide services using any technology or even a combination of technologies, the question that needs to be resolved, relates to the mode of allocation of spectrum for the dual technology. The complexity in this issue surfaces on account of the fact that on payment of the initial entry fee, 5+5 MHz is the contracted spectrum allocation for CDMA technology, and 6.2+6.2MHz is the Spectrum allocation for mobile licensees using GSM technology. **The Authority is of the view that if an existing licensee wishes to provide services using another technology then he must be treated as per the norms of spectrum allocation in bands for alternate technologies. On payment of the specified fee for the Service area for which the LICENSEE wishes to provide plurality of technologies, the licensee may be given additional spectrum equal to the initial spectrum allowed in the license for that technology. The Authority further recommends that in order to ensure that this additional spectrum is efficiently and properly utilized in a timely**

manner; the licensee should also be required to fulfill the contingent roll out obligation.

4.36 The recommendation recognizes that the regulatory regime must function as an enabling regime ensuring level playing field. We are of the view that both the conditions are met in this recommendation.

Chapter 5 Roll out obligations

5.1 In a country with more than one billion population spread from Kashmir in north to Kanyakumari in south, Kutch in west to Arunachal Pradesh in east and having more than 600,000 villages, the telecom service providers have the daunting task of taking telecom infrastructure to every nook and corner of the country. The roll-out obligation incorporated in the license condition recognizes the urgency of expanding communication networks in a defined timeframe. It also promotes efficient usage of spectrum by not leaving the precious asset unused and encourages competition through expansion of infrastructure. Though the licensing conditions underwent change and rural roll out obligation is no longer included but the message is still loud and clear that the telecom operators should not remain confined to the high revenue urban areas only. Roll out obligation is not unique to this country only. The licensor/regulator has imposed roll out obligation in majority of the countries not just for 2G services but has even extended to the 3G operations.

UASL license provisions

5.2 As per the UAS licensing regime, the licensee has to fulfill the following roll out obligations[33]:

The LICENSEE shall make every endeavour to cover the entire Service Area at an early date and notify on quarterly basis the areas not covered by the licensee's System. In Metros, 90% of the service area shall be covered within one year of the effective date. In Telecom Circles, at least 10% of the District Headquarters (DHQs) will be covered in the first year and 50% of the District Headquarters will be covered within three years of effective date of Licence. The licensee shall also be permitted to cover any other town equally important in a

[33] Clause 34.2 of the UAS license agreement

District in lieu of the District Headquarters. Coverage of a DHQ/town would mean that at least 90% of the area bounded by the Municipal limits should get the required street as well as in-building coverage. The District Headquarters shall be taken as on the effective date of Licence. The choice of District Headquarters/towns to be covered and further expansion beyond 50% District Headquarters/towns shall lie with the Licensee depending on their business decision. There is no requirement of mandatory coverage of rural areas.

NLD & ILD license provisions

5.3 Earlier the National Long Distance Operators (NLDO) had to pay an entry fee of Rs.1000 million and the licenses stipulated mandatory provision of setting up of a point of presence in each long distance charging area. However, in November 2005, the entry fee of NLD license was reduced to Rs. 25 million by DOT (the licensor) and the roll out obligations on NLD licenses were removed.

5.4 Similarly, as per clause. no. 9.3 of the old International Long Distance(ILD) license, the licensee had to establish a minimum of four Points of Presence (POPs) i.e. one in each Region of the country -. Eastern, Western, Northern & Southern. Delivery of traffic to all the countries in the World was to be ensured through at least four Direct Routes i.e. one each to North America, Gulf Region, Europe and any one location in South East Asia, Far East and Oceania. However, while reducing the entry fee from Rs. 250 million to Rs. 25 million, the Licensor also relaxed the mandatory roll out obligations on ILD licensees to having at least one switch in India. This obligation/compliance was inbuilt in the start up operation.

5.5 The main issues raised by TRAI in the consultation paper are the following:

- Should present roll out obligations be continued in the present form and scale for the access service providers[34] or should the roll out obligations be removed?
  - How to ensure compliance to roll out obligations and what should be the penalties on non-compliance to roll out obligations?
  - Existing provisions of license specifies LD charges upto certain period and then cancellation of license. Should it continue or should liquidated damages be enhanced till roll out obligations are met.
  - What should be NLD & ILD roll out obligations?
  - Is there a case for doing away with Performance Bank Guarantee (PBG) or should it be retained at existing levels
  - Should additional roll out especially in rural areas be specified on existing licensees and what should be the criterion for verification of roll out obligations?
  - Incentives and penalties w.r.t rural roll obligations?
  - Date from which the time for roll out should be reckoned.

5.6 In reply to the consultation paper, most of the service providers barring few have opined that roll out obligations and linked performance bank guarantee (PBG) should be removed. Their main argument was that the telecom sector today has sufficient competition and therefore the objective of coverage and reach is being automatically achieved as the telecom operators are venturing into newer areas to seek business. The advocate for status quo strongly emphasized the urgency of infrastructure and effective coverage. It was also pointed out that the objective of USO Fund and roll out obligation are not similar and present level of development necessitates retention of roll out obligation.

[34] Basic, Cellular and Unified Access service providers

5.7 Internationally, number of countries have imposed roll out obligations on the licensees while awarding 2G/3G licenses. In Europe, nearly all European member states included roll-out/coverage conditions in the license contract for 2G and 3G licenses. They are generally related to population coverage. In Austria the obligation for 3G licenses required the licensee to cover 50% of the population by the end of 4th year, in Denmark 80% of the population is required to be covered by the end of 7th year, in UK and Ireland 80% of the population is required to be covered by the end of 7th year[35]. International practice on Roll out obligations for 2G/3G licenses in some countries is provided in **Annex XI**.

5.8 The Authority in its recommendation on "Allocation and Pricing of Spectrum for 3G Services and Broadband Wireless Access" dated 27th Sept. 2006 had also opined that roll out obligations should be set in order to encourage operators to deploy networks and provide service quickly. The Authority also recommended specific rural area roll out obligations. The roll out obligations recommended for 2.1 GHz band and for BWA services are provided in table 13 and 14.

Category of circle	At the end of 3 yrs	At the end of 5 years
Metros	-	90% of metro area
A, B and C	30% of the DHQs or cities in the circle out of which at least 10% should be rural SDCAs	50% of the DHQs or cities in the circle out of which 15% should be rural SDCAs

Table 13: Roll out obligations in the 2.1 GHz band

[35] Comments received from COAI.

Timeline	Metros	Category A, B & C circles	Local operators/captive networks
2 years	-	25% rural SDCAs area coverage	
5 years	90% area coverage	50% rural SDCAs area coverage	90% area coverage

Table 14: Roll out obligations for BWA services

The Authority had expressed similar view in its recommendations on Unified Licensing Regime dated 27th Oct. 2003 & 13th January 2005.

5.9 The present teledensity is only around 20% and network roll out has mainly concentrated in urban and high revenue pockets. Although, there are six to nine access service providers in most of the service areas but the loci of competition is still inclined towards urban areas and it has not penetrated into semi-urban and rural areas. The geographic coverage is only around thirty nine percent[36]. As on March 2007, the urban teledensity is around 48% and rural teledensity is only around 6%[37] and the country is witnessing a widening gap between urban and rural teledensity. Though the telecom operators are increasing their coverage into semi urban and rural areas, but the pace of deployment is not commensurate with the growth of mobile telephony in the country.

5.10 The Authority has seriously evaluated/examined the need for continuance or otherwise of roll out obligations.

[36] Source: COAI data as on July 2006.
[37] Rural teledensity takes into consideration Rural DELs and rural mobile connections. Rural population is taken as 70% of total population as on 31st March 2007 (1129.87 million).

5.11 The roll out obligations is justified in terms of stability and level playing field. DoT has recently granted new UAS licenses and the telecom operators/licensees have yet to initiate/complete roll out obligations. A non-discriminatory treatment would require that all the licensees are subjected to similar obligations as it has cost implications in addition to other financial and technical considerations.

5.12 The stipulation of roll out obligation reduces the scope for spectrum hoarding. It is particularly relevant as the existing UAS license has inbuilt arrangement for allocation of first tranche of spectrum in a specified band. The roll out obligation discourages non-serious players and promotes well dispersed efficient usage of spectrum. It also avoids cherry picking, ensures faster spread of telecom infrastructure and discourage concentration in lucrative pockets thus bridging the digital divide.

5.13 The Authority also examined the existing provisions of roll out obligations for the NLDO and ILDO. Majority of the telecom operators did not favour any change in the existing provisions. Ideally the roll out obligations should have been contemplated for NLDOs as well. It would have ensured better long distance connectivity across the country. Today, the NLDOs are concentrating on the high traffic routes and the issue of connectivity in the far-flung areas has lower priority. However, the Authority is not recommending re-imposition of roll out obligations for NLDOs in the interest of policy stability and hope that the competition through increasing number of NLDOs would meet the expectation of deeper penetration.

5.14 Keeping the above in view, the Authority recommends that the present provisions of roll out obligations should not be changed for

all the access service providers. The rural roll out obligation has been discussed separately.

What reforms can be introduced in the certification process for roll out obligations?

5.15 One of the most critical aspects of the roll out obligation relates to the verification/certification of the coverage area. The service providers are required to offer the DHQs/towns for coverage testing to Telecom Engineering Center (TEC) and get the certification. TRAI had sought compliance reports in this regard. It was disturbing to note that most of the service providers are in default and the TEC certificate has not been issued. On an in depth analysis it has emerged that the following issues need serious consideration:

- The procedure for certification;
- The commencement date for counting the period of obligation;
- The date to be reckoned for calculating liquidated damage charges in case the licensee fails to bring the service or any part thereof into commission i.e. fails to meet the required coverage criteria/network roll out obligations within the prescribed period;
- The relationship with SACFA clearance;
- Technical standards for verification of coverage.

5.16 In order to appreciate the significance of the above issues and for suggesting measures to improve the system, they have been clubbed together. TEC vide its letter dated 20.03.2007 has simplified the certification procedure. In the revised system, the service provider after commissioning of the network would approach the TEC along with the requisite technical documents and testing reports for conducting the service test. TEC has the discretion to revisit or re-test any BTS before issuing test certificate. However, TEC is handicapped due to limited

manpower and facilities and it may not be feasible to conduct the prescribed tests within the stipulated time frame. It is apprehended that even the revised procedure may also meet the same fate unless matching machinery is put in place to handle the workload generated. Till the TEC is capable of handling the load, the Authority as an interim measure recommends that once a service provider submits its certification report, **then TEC should give the required certificate of compliance or any other report of inadequacy within 90 days. This time limit should start from the date when the application complete in all respect has been submitted to TEC.** In case the TEC does not confirm to the limit of 90 days in issuing the certificate, the service provider can take it as a deemed acceptance.

5.17 However this position cannot be allowed to continue and a permanent workable solution has to be evolved. In case it is not practical to provide full staff strength then the TEC may consider outsourcing this work to technically qualified organizations. TEC may consider involving VTM cells of DOT, CDOT and technical institutes like IITs to take up this job on their behalf and they may be suitably compensated by way of fee prescribed by DoT. In order to inspire confidence in the service providers and ensuring transparency, it is also recommended that a forum may be established where service providers can appeal in cases where they can appeal against rejection of their certificates or test reports**.** The telecom service providers should have the window for an appeal or seeking retest by a joint team in case earlier test has led to determination of inadequacy or non-compliance.

5.18 The present roll out obligation clause states that “coverage of a DHQ/Town would mean that at least 90% of the area bounded by the municipal limits should get the required street as well as in building coverage”.

5.19 As per the test schedule of TEC for verifying compliance of roll out obligation, the signal strength required for in building coverage is defined as ≥ –75dBm at street level. During the discussions with TEC and the service providers, it was informed that one of the reasons for not meeting out the roll out obligation is the requirement of meeting in-building coverage. Both the Associations i.e. COAI & AUSPI have argued that the telecom sector is highly competitive and therefore the stipulation of indoor coverage should be left to the market forces. Internationally also, where the operators are mandated to fulfill roll out obligation, the coverage applies only to street coverage. The Authority is aware that the basic objective of roll out obligation is to ensure that the licensee does not remain confined to the high revenue areas and the growth of telecommunication is evenly spread. Moreover, in-building coverage is required only in places where there is sufficient number of high rise buildings i.e. primarily in urban areas and the operators usually provide it as a part of their business plan/on demand. TEC, in the relevant GR, has also defined different parameters for areas with different characteristics. Therefore, the Authority is of the opinion that in-building coverage may not be insisted upon for compliance of roll out obligation. However, in order to ensure that adequate coverage is available, the Authority recommends that the street level signal strength should be >= -85dbm for at least 90% of the area. The service quality tests conducted by TEC would certify that the laid down street coverage parameters are achieved and is satisfactory.

5.20 While recommending the above, the Authority wishes to clarify that the modified condition in the roll out obligation is only from the point of meeting this obligation. However, once the service is commissioned, the Quality of Service parameter specified in the Regulation of TRAI would have to be met. The benchmarks for service coverage in the network

performance parameter will remain unchanged and all the service providers would have to comply with the same.

5.21 The delay in getting SACFA clearance is another serious flaw in the entire chain. It is accepted fact that delayed SACFA clearance also contributes to substantially to delay in TEC certification. The Authority is of the view that the SACFA clearance sought for must be accorded at the earliest and preferably in a time bound manner. The Authority in its recent recommendations on infrastructure sharing dated April 11th, 2007 had recommended that DoT should initiate steps to computerize SACFA clearance procedures. TRAI had recommended that SACFA clearance needs to be given in a stipulated time frame and if no communication is received in the prescribed time frame, then the concept of deemed acceptance may be thought of. The authority would again reiterate and recommend **that SACFA clearance should be given in a stipulated period of 60 days. Any delay beyond 60 days should be treated as a case of deemed acceptance. The time limit of 60 days will start from the date of submitting the complete application. A system therefore needs to be put in place to acknowledge the receipt of application and on line submission will itself be treated as proof.**

5.22 The determination of date for the purpose of roll out obligation is another critical and also contentious issue. Given the facts that the issue of license and allocation of spectrum is not co-terminus it is necessary that the period for roll out obligation is reckoned from the date of spectrum allocation. **The Authority elsewhere in these recommendations has recognized that the UAS licensees can start wire-line telecom services without the roll out obligation. Presently, the time for roll out is reckoned from the effective date of license. In the past there have been many cases where there was a huge time lag between the effective date of license and the date for allocation of initial spectrum. There have been delays in the past in the allocation of spectrum as it is subject to availability. As per**

clause. 23.5 of UAS licensing regime, based on usage, justification and availability, spectrum may be considered for assignment, on case by case basis. If the UAS licensee plans to provide mobile services then it would not be possible for him to start rolling out his network without spectrum. Therefore, without spectrum allocation, fulfillment of roll out obligation is not possible, if the date is reckoned from the effective date of license. Moreover, main growth is happening in the wireless segment and the growth in fixed services subscriber base is stagnant. Therefore, if spectrum is not allocated to the licensee who is interested in offering only wireless services then it would not be reasonable to expect from him to roll out using wire line network.

5.23 The Authority therefore recommends that for licensees interested in offering mobile services, the time for roll out should be reckoned from the effective date of license or date of spectrum allocation, whichever is later. **It is also now accepted that the effective date for the compliance of roll out obligation is the date of submission of self-certified test results/reports unless found defective or wrong. The date for estimating the liquidated damages should now be reckoned from the date of submission of self certification. However, any wrong submission of compliance should notify severe liquidated damages which could be 1.5 times of the amount which is presently provided in the license.**

Are there sufficient reasons for abolition of Performance Bank Guarantee (PBG)?

5.24 Presently, a UAS licensee has to furnish PBG for an amount equal to Rs. 200, 100 and 20 million for category A, B and C service areas respectively. On completion of one year from the effective date of the license and the stipulated coverage criteria of the first year, the PBG stands reduced by 50%. A self-certification by the licensee is sufficient for accepting fulfillment of performance obligation for the first year.

Thereafter on fulfillment of the roll out obligations supported by certificate issued by TEC in respect of coverage the balance PBG is released. In the event of breach in the terms and conditions of the license with respect to roll out obligations, the licensor may encash PBG as provided in the license agreement. On careful consideration of the scheme of PBG, it emerges that this is in the nature of a guarantee obtained from the service provider to motivate and encourage fulfilling the roll out obligations. Non-fulfillment of contractual terms results in forfeiture of PBG and envisages penal provisions. As imposition of condition of PBG acts as a deterrent for a non-performer in meeting his roll out obligation, it is therefore considered to retain this more particularly if the rural urban gap has to be bridged. We may also not mix up **Financial Bank Guarantee** (FBG) with PBG. PBG is for ensuring contractual performance, whereas FBG is for securing the interest of ex-chequer in case of defaulting parties The Financial Bank Guarantee and the Performance Bank Guarantee have different purpose and benchmark to trigger the encashment of guarantee amount and therefore the Authority do not agree with the suggestion that one comprehensive bank guarantee would serve the purpose. Even if the suggestion is accepted, it would only mean that the guaranteed amount would be further increased which will mean an additional financial cost to the telecom operator. **Therefore, it is recommended that the present provision of PBG should continue.**

The nature of penalty provisions in case of non-compliance of roll out obligation.

5.25 Presently, if a licensee fails to meet the required coverage criteria / network roll out obligation, then he has to pay the liquidated damages (LD) charges. The LD charges are different for CMTS and UASL licenses. The relevant clauses 37.2 and 35.2 of CMTS and UAS license agreements respectively are reproduced below:

CMTS license agreement

" *37.2 In case the Licensee fails to bring the Service or any part thereof into commission (i.e., fails to deliver the service or to meet the required coverage criteria) within the period prescribed for the commissioning, the Licensor shall be entitled to recover Rs. 5 Lakh (Rupees: Five Lakhs) for each week of the delay or part thereof, subject to maximum Rs. 100 Lakhs (Rupees: One Hundred Lakhs). For delay of more than 20 weeks the Licence shall be terminated under the terms and conditions of the Licence agreement. The week shall means 7 Calendar days from (from midnight) Monday to Sunday; both days inclusive and any extra day shall be counted as full week for the purposes of recovery of liquidated damages."*

UAS license agreement

"*35.2 In case the LICENSEE fails to bring the Service or any part thereof into commission (i.e., fails to deliver the service or to meet the required coverage criteria/ network roll out obligations) within the period prescribed for the commissioning, the Licensor shall be entitled to recover LD charges @ Rs. 5 Lakh (Rupees: Five Lakhs) per week for first 13 weeks; @ Rs 10 lakhs for the next 13 weeks and thereafter @ Rs. 20 lakhs for 26 weeks subject to a maximum of Rs. 7.00 crores. Part of the week is to be considered as a full week for the purpose of calculating the LD charges. For delay of more than 52 weeks, the License may be terminated under the terms and conditions of the License agreement. The week shall means 7 Calendar days from (from midnight) Monday to Sunday; both days inclusive and any extra day shall be counted as full week for the purposes of recovery of liquidated damages."*

5.26 The issue of continued non-compliance has serious ramifications. As per the UAS license condition, for a delay of more than 52 weeks, the license may be terminated. **The Authority is of the view that this provision has negative overtones with serious implications**. Presently, if the termination route is not adopted, for continued default, there could be an unnecessary controversy on intent or objection coming from audit wing.

On the other hand, the termination of license would mean that all the investment for deployment of infrastructure would go waste. It also entails disruption in service which would hurt the subscriber. At the same time the licensor could not be a passive spectator to perpetual non-compliance of roll out obligations. Therefore, the Authority recommends the following:

5.27 Without any change in the provision of LD, in case the roll out obligation is not met even after 52 weeks of the period prescribed for completing roll out obligations, the Authority recommends that the reference to termination of license in Cl. 35.2 of UASL may be replaced by the following

i. **The performance bank guarantee be forfeited and the service provider may be asked to resubmit PBG of the same amount.**

ii. **No additional spectrum may be allocated to licensee till he does not fulfill the roll out obligations.**

iii. **Such a licensee should not be eligible to participate in any spectrum auction till the roll out obligation is met.**

iv. **Any proposal of permission of merger and acquisition should not be entertained till the roll out obligation is met.**

5.28 It is hoped that these will be serious deterrent and any linkage with termination of license in case of default in roll out obligation in respect of coverage should be done away with.

5.29 The Authority also recommend that the existing service providers who are in non-compliance of roll out obligation and do not possess the requisite TEC certificate may be given six months grace time as

one time relief in present case only to comply with new certification scheme and imposition of penalty on earlier default will not be waived.

5.30 As mentioned earlier, the rural teledensity is only around 6% as compared to urban teledensity of around 48%. Till some time back penetration of mobile services in rural areas was insignificant and mostly incidental.

5.31 The Universal Service Support Policy came into effect from 1.4.2002. Presently all the Telecom Service Providers except the pure value added service providers like Internet, Voice Mail, E-Mail service providers etc. are contributing 5% of the Adjusted Gross Revenue (AGR) towards USOF. Till some time back USOF was supporting only fixed services. However, the mobile services in Rural and remote areas have also been brought into the ambit of USOF with the amendment of Indian telegraph Act in 2006. After that a scheme has been launched by the Government to provide support for setting up and managing 7871 number of infrastructure sites spread over 500 districts for provision of mobile services including other Wireless Access Services like Wireless in Local Loop (WLL) using Fixed/ Mobile terminals in the specified rural and remote areas of the country, where there is no existing fixed wireless or mobile coverage.

5.32 During the consultation process, most of the stakeholders had opined that no additional rural roll out obligations should be imposed. One of the suggestion was that roll out conditions must be prescribed for the rural areas in terms of coverage of all the villages. The Authority feels that though the USOF is making efforts to increase rural penetration but as noted earlier, the digital divide is increasing and needs to be urgently bridged. It is also a fact that in the past when the operators were mandated to go to un-remunerative areas, they preferred to pay the penalty instead of complying with the obligation. Therefore to provide further impetus to the penetration of telecom services in rural and remote

areas of the country where more than 700 million people live, the Authority is of the view that incentives in the form of reduction in contribution towards USOF may be given to the licensees who roll out there network in specified areas.

5.33 The Authority is of the view that any reintroduction of rural roll out obligation may pose legal issues including test of level playing field. Therefore, it recommends a scheme of financial incentive for the spread of infrastructure in the rural areas. As per this framework the licensee who covers 75% of development blocks with 90% street coverage in any service area (excluding the four Metro service areas) should be eligible for a payment at a reduced scale towards Universal Service Obligation fee. Such a licensee shall be required to pay 3% instead of present 5% contribution to the Universal Service Obligation Fund (USOF). The verification should be based on installation of identified physical infrastructure in the development blocks. It is natural that this financial incentive should come from the USOF as the scheme basically serves the objective of rural coverage only.

Chapter 6 Summary of recommendations

The Authority recommends the following:

6.1 No cap be placed on the number of access service providers in any service area.

6.2 DoT should examine the issue early and specify appropriate license fee for UAS licensees who do not wish to utilize the spectrum.

6.3 The Authority is of the opinion that there is a need to tighten the subscriber criteria for all the service areas so as to make it more efficient form the usage and pricing point of view. Further, in the category A,B and C service areas the subscribers are widely distributed in the service area and therefore the amount of spectrum required in these areas for the same number of subscriber as in a metro will be comparatively lower.

6.4 In order to frame a new spectrum allocation criteria, a multi-disciplinary committee may be constituted consisting of representatives from DoT/TEC, TRAI, WPC wing, COAI & AUSPI. The committee may be headed by an eminent scientist/ technologist from a national level scientific institute like Indian Institute of Science, Bangalore. However, it is necessary to enhance the present subscriber norms as an adhoc measure so that the task of spectrum allocation is not stalled. The suggested revision is given below:-

GSM subscriber base criteria (millions of subscribers)

Service Area	2 x 6.2 MHz	2 x 8 MHz	2 x 10 MHz	2 x 12.4 MHz	2 x 15 MHz
Delhi/Mumbai	0.5	1.5	2	3.0	5
Chennai/Kolkata	0.5	1.5	2	3.0	5
A	0.8	3	5	8	10
B	0.8	3	5	8	10
C	0.6	2	4	6	8

CDMA subscriber base criteria (millions of subscribers)

Service Area	3rd carrier (2 x 3.75 MHz)	4th carrier (2 x 5 MHz)	5th carrier (2 x 6.25 MHz)	6th carrier (2 x 7.5 MHz)
Delhi/Mumbai	0.5	2	3.0	5
Chennai/Kolkata	0.5	2	3.0	5
A	0.8	5	8	10
B	0.8	5	8	10
C	0.6	4	6	8

6.5 GSM operators and CDMA operators may be given additional spectrum beyond 2X4.4 MHz and 2X2.5 MHz respectively after the operators achieve the required subscriber base and also report compliance of roll-out obligation.

6.6 Any licensee who seeks to get additional spectrum beyond 10 MHz in the existing 2G bands i.e. 800,900 and 1800 MHz after reaching the specified subscriber numbers shall have to pay a onetime spectrum charge at the above mentioned rate on prorata basis for allotment of each MHz or part thereof of spectrum beyond 10 MHz.

Service Areas	Price (Rs.in million) for 2X5 MHz
Mumbai, Delhi and Category A	800
Chennai, Kolkatta and Category B	400
Category C	150

For one MHz allotment in Mumbai, Delhi and Category A service areas, the service provider will have to pay Rs. 160 million as one time spectrum acquisition charge.

6.7 In future all spectrum excluding the spectrum in 800, 900 and1800 bands should be auctioned so as to ensure efficient utilization of this scarce resource.

6.8 The revenue share spectrum charges as given in table below: may be adopted.

Spectrum	**Current**	**Proposed**
Upto 2X4.4 MHz	2%	No Change
Upto 2X6.2MHz/2x5 MHz	3%	No Change
Upto 2X8MHz	4%	No Change
Upto 2X10MHz	4%	5.00%
Upto 2X12.5MHz	5%	6.00%
Upto 2X15 MHz	6%	7.00%
Beyond 2X15 MHz	-	8.00%

6.9 The relevant service market be defined as wire line and wireless services. Wireless service market shall include fixed wireless as well.

6.10 The relevant geographic market shall be licensing service area as it exists today.

6.11 For determination of market power, market share of both subscriber base and adjusted gross revenue of licensee in the relevant market shall be considered to decide the level of dominance for regulating the M&A activity.

6.12 M&A guidelines should use Exchange Data Records (EDR) in the calculation of wireline subscribers and specifically VLR data, in the calculation of wireless subscribers for the purpose of computing market share based on subscriber base.

6.13 The duly audited Adjusted Gross Revenue shall be the basis of computing revenue based market share for operators in the relevant market.

6.14 The market share of merged entity in the relevant market shall not be greater than 40% either in terms of subscriber base or in terms of Adjusted Gross Revenue.

6.15 No M&A activity shall be allowed if the number of wireless access service providers reduces below four in the relevant market consequent upon such an M&A activity under consideration.

6.16 The existing cap of 2x15 MHz per operator per service area for metros and category A circle and 2x12.4 MHz per operator per service area in category B and C circle applicable for a post merger entity be removed for purposes of regulating M&A activity.

6.17 The annual license fee and the spectrum charge are paid as a certain specified percentage of the AGR of the licensee. On the merger of the two licenses, the AGR of the two entities will also be merged and the license fee will be therefore levied at the specified rate for that service area on the resultant total AGR. Similarly, for the purpose of payment of the spectrum charge, the spectrum held by the two licensees will be added/merged and the annual spectrum charge will be at the prescribed rate applicable on this total spectrum.

6.18 A mix of ex-ante and ex-post approach for regulating acquisitions of equity stake of one licensee Company/ legal person/promoter company in the enterprise of another licensee in the same license area. Acquisition of equity capital up to 10% of the target licensee's enterprise shall be permitted by an automatic route and anything beyond that and up to 20% of the equity holdings of the target licensee company, shall be approved

on a case by case basis and the process of such approvals will be based on the M&A guidelines contained in these recommendations.

6.19 The Authority while examining the issue of M&A had also deliberated on these terms for the transfer of licenses and has come to the conclusion that the present terms and conditions are adequate and therefore the Authority recommends that it does not require any change in the existing terms.

6.20 In case a licensee wishes to deploy any other advanced and efficient technology for providing mobile service, than the DoT should allocate spectrum subject to its availability.

6.21 A licensee using one technology may be permitted on request, usage of alternative technology and thus allocation of dual spectrum. However, such a licensee must pay the same amount of fee which has been paid by existing licensees using the alternative technology or which would be paid by a new licensee going to use that technology.

6.22 Levy of a specified amount of fee which should be, at least, equal to the entry fee for UAS licence. Further, for purposes of assessment of market power in the context of competition analysis in the market, the combined market share arising out of service provision through both the technologies will be taken into account and obligations if any to be imposed on such dominant operators as and when necessary in future will be done with reference to combined market power of such licensees.

6.23 Regarding inter se priority for spectrum allocation, when the existing licensee becomes eligible for allocation of additional spectrum specific to the new technology, such a licensee has to be treated like any other existing licensee in the queue and the inter se priority of allocation should

be based on the criteria that may be determined by the Department of Telecommunications for the existing licensee.

6.24 The licensee will maintain separate detail of the subscriber number data for the purposes of spectrum allocation but the AGR will be the combined AGR of both the technologies. It is the combined AGR which will determine the license fee.

6.25 There is one major difference between a merged entity and an operator who has opted for multiple technologies for providing access services under one license. Such an operator will start deployment after the allocation of spectrum. It will be unfair to demand higher spectrum charges on grounds of combined total of spectrum without enrolling new subscribers. It would destabilize the financial working of such an operator. Therefore, it is fair to grant a moratorium of one year from the date of allocation of spectrum, after payment of specified fee, for the levy of spectrum charges based on the combined total of spectrum allocated. This would mean that the operator would pay spectrum charges/fee on the basis of allocated spectrum in respective technologies for one year before graduating to a slab earmarked for the combined total of spectrum. The one year will be counted from the date of allocation of spectrum for the second technology.

6.26 In order to ensure that the additional spectrum is efficiently and properly utilized in a timely manner; the licensee should also be required to fulfill the contingent roll out obligation.

6.27 The present provisions of roll out obligations should not be changed for all the access service providers.

6.28 TEC should give the required certificate of compliance or any other report of inadequacy within 90 days. This time limit should start from the date when the application has been submitted to TEC.

6.29 The present position of monitoring compliance of roll out obligation cannot be allowed to continue and a permanent workable solution has to be evolved. In case it is not practical to provide full staff strength to TEC then the TEC may consider outsourcing this work to technically qualified organizations. TEC may consider involving VTM cells of DOT, CDOT and technical institutes like IITs to take up this job on their behalf and they may be suitably compensated by way of fee prescribed by DoT.

6.30 SACFA clearance should be given in a stipulated time frame of 60 days. In case no communication is received in this prescribed time frame, the application will be deemed to be approved.

6.31 Without any change in the provision of LD, in case the roll out obligation is not met even after 52 weeks of the period prescribed for completing roll out obligations, the Authority recommends that the reference to termination of license in clause no. 35.2 of UASL may be replaced by the following:

i. The performance bank guarantee be forfeited and the service provider may be asked to resubmit PBG of the same amount.

ii. No additional spectrum may be allocated to licensees till he does not fulfill the roll out obligations.

iii. Such a licensee should not be eligible to participate in any spectrum auction till the roll out obligation is met.

iv. Any proposal of permission of merger and acquisition should not be entertained till the roll out obligation is met.

6.32 It is hoped that these will be serious deterrent and any linkage with termination of license in case of default in roll out obligation should be done away with.

6.33 The existing service providers who are in non-compliance of roll out obligation and do not possess the requisite TEC certificate may be given six months grace time as one time relief in present case only to comply with new certification scheme and imposition of penalty on earlier default will not be waived.

6.34 Any reintroduction of rural roll out obligation may pose legal issues including test of level playing field. Therefore, a scheme of financial incentive for the spread of infrastructure in the rural areas may be considered. As per this framework the licensee who covers 75% of development blocks in any service area (excluding the four Metro service areas) should be eligible for a payment at a reduced scale towards Universal Service Obligation fee. Such a licensee shall be required to pay 3% instead of present 5% contribution to the Universal Service Obligation Fund (USOF). The verification should be based on installation of identified physical infrastructure in the development blocks. It is natural that this financial incentive should come from the USOF as the scheme basically serves the objective of rural coverage only.

Annexure I. DoT's letter dated 13th April 2007 seeking TRAI's recommendations

No. 16-3/2004-BS-II
Government of India
Ministry of Communications
Department of Telecommunications
Sanchar Bhawan, 20, Ashoka Road, New Delhi – 110 001

Dated: 13th April 2007

To

The Secretary
TRAI
MTNL Exchange Building
Jawaharlal Nehru Marg, Minto Road
New Delhi

Sir,

The policy on Unified Access Service Licensing was finalized in November 2003 based on the recommendations of TRAI. As on date, 159 licenses have been issued for providing Access Services (CMTS/UASL/Basic) in the country. Generally, there are 5-8 Access Service Providers in each service area. The Access Service Providers are mostly providing services using the wireless technology (CDMA/GSM). As per the present policy, any Indian company fulfilling the eligibility criteria can apply for UAS license. These are increasing the demand on spectrum in a substantial manner. The government is contemplating to review its policy. A suggested option can be to put a limit on the number of Access Service Providers in each service area, in view of the fact that spectrum is a scarce resource and to ensure that the adequate quantity of spectrum is available to the licenses to enable them to expand their services and maintain the Quality of Service.

2. Fast changes are happening in the Telecommunication sector. In order to ensure that the policies keep pace with the changes/developments in the Telecommunication sector, the government is contemplating to review the following terms and conditions in the Access Provider (CMTS/UAS/Basic) license.

i) Substantial equity holding by a company/legal person in more than one license company in the same service area (clause 1.4 of UASL agreement).
ii) Transfer of licenses (clause 6 of the UASL)
iii) Guidelines dated 21.02.2004 on Mergers and Acquisitions. TRAI in its recommendations dated 30.01.2004 had opined that the guidelines may be reviewed after one year.
iv) Permit service providers to offer access services using combination of technologies (CDMA, GSM and / or any other) under the same license.
v) Roll-out obligations (Clause 34 of UASL).
vi) Requirement to publish printed telephone directory.

Certain issues are applicable to other licenses (NLD/ILD etc.) also.

3. TRAI is requested to furnish their recommendations in terms of clause 11 (1) (a) of TRAI Act 1997 as amended by TRAI Amendment Act 2000, on the issue of limiting the number of Access providers in each service area and review of the terms and conditions in the Access provider license mentioned in para 2 above.

-Sd-
(N. Parameswaran)
DDG (Access Services)
Tel: 23716874
Fax: 23372201

Annex II DoT's Guidelines for merger of licences in a service area

Government of India
Ministry of Communications and Information Technology
Department of Telecommunications
Sanchar Bhawan, 20 Ashok Road, New Delhi-110 001.

No.20-232/2004-BS.III Dated, the 21st February, 2004.

OFFICE MEMORANDUM

Sub: Guidelines for merger of licences in a service area.

In keeping with the policy of bringing in sustained reforms in the Telecom sector in India for making the service available in the most efficient and affordable manner, Government have decided, after due consideration of the recommendations of Telecom Regulatory Authority of India, the following Guidelines for merger of Basic, Cellular and Unified Access Service licences in a given Service Area for proper conduct of Telegraphs and Telecommunication services, thereby serving the public interest in general and consumer interest in particular: -

1. Merger of licences shall be restricted to the same service area.

2. Merger of licence consequent to mergers/acquisitions or restructuring of the operations shall be permitted in the following category of licences:

(i) Cellular Licence with Cellular Licence;
(ii) Basic Service Licence with Basic Service Licence;
(iii) Unified Access Services Licence (UASL) with Unified Access Services Licence;
(iv) Basic Service Licence with Unified Access Services Licence;
(v) Cellular Service Licence with Unified Access Services Licence;

In case of a merger of a basic service license with UASL, the basic service licensee shall pay, at the time of application for merger, the difference of amount of the entry fee, if any, as per the Guidelines for migration to UASL dated 11.11.2003.

3. Merger of licences will be permitted subject to the condition that there are at least three operators in that service area for that service, consequent upon such merger. It is clarified that Unified Access Service Licensee will be counted for Basic as well as

Cellular service separately while deciding the number of operators in a given service area.

4. Prior approval of the Department of Telecommunications will be necessary for merger of the licence. The findings of the Department of Telecommunications would normally be given in a period of about four weeks from the date of submission of application.

5. Any merger, acquisition or restructuring, leading to a monopoly market situation in the given Service Area, shall not be permitted. Monopoly market situation is defined as market share of 67 per cent or above within a given Service Area, as on the last day of previous month. Subscriber base shall be criteria for computing the market share. For example, if an application is made on the 10th January, the market share as on 31st December of the previous year, shall be taken into account. For this purpose, the market will be classified as fixed and mobile separately. The category of fixed subscribers shall include wire-line subscribers and fixed wireless subscribers. The number of subscribers shall be as per the Exchange Data Records. The category of mobile subscribers shall include limited mobile subscribers and full mobile subscribers. The subscriber figure, as per the Home Location Register (HLR) and Exchange Data Record shall be taken into account for the purpose of calculating the number of mobile subscribers in a given Service Area. Further, the Department is at liberty to verify these figures from any other source. In case of merger of two Unified Access Service Licences, the total subscriber base of each will be taken into account.

6. Consequent upon the Merger of licences, the merged entity shall be entitled to the total amount of spectrum held by the merging entities, subject to the condition that after merger, the amount of spectrum shall not exceed 15 MHz per operator per service area for Metros and category 'A' Service Areas, and 12.4 MHz per operator per service area in category 'B' and category 'C' Service Areas. Subject to these limits, the merged spectrum will remain with the merged entity and would be treated as a starting point for further allocation and revision, as per the detailed Spectrum Guidelines to be issued separately. The guidelines on efficient utilization of spectrum and its pricing shall be applicable.

7. The spectrum utilization charges beyond 10 + 10 MHz for GSM based system and 5 + 5 MHz for CDMA/ETDMA based systems shall be prescribed separately. The merged entity will have to pay the prescribed charges from the date of merger of licences.
8. Discretion to choose the band to surrender the spectrum beyond the ceiling will be of the new entity.
9. All dues, if any, relating to the licence of the merging entities in that given service area, will have to be cleared by either of the two parties before issue of the permission for merger of licences.
10. Subject to the orders of the Telecom Disputes Settlement and Appellate Tribunal (TDSAT), in Appeal No. 11/2002 (BSNL Vs. TRAI) it may be noted that TRAI has already classified an operator having market share greater or equal to 30% of the relevant market as one having "Significant Market Power" (SMP) in its Reference Interconnect

Offer (RIO). In case the merged entity becomes an SMP post merger, then the extant rules & regulations applicable to SMPs would also apply to the merged entity.

11. The dispute resolution shall lie with Telecom Dispute Settlement and Appellate Tribunal as per TRAI Act 1997 as amended by TRAI (Amendment) Act 2000.

12. While granting permission for merger of licences, the Licensor may, suitably amend / relax/waive the conditions in the respective licences relating to the Clause on holding of 'substantial equity'.

13. LICENSOR reserves the right to modify these guidelines or incorporate new guidelines considered necessary in the interest of national security, public interest and for proper conduct of telegraphs.

14. These Guidelines can be reviewed after a period of one year, or earlier if warranted.

(Sukhbir Singh)
Director (BS.III)

Government of India
Ministry of Communications and Information Technology
Department of Telecommunications
Sanchar Bhawan, 20 Ashok Road, New Delhi-110 001.

No.20-232/2004-BS.III Dated, the 17th March, 2004.

MEMORANDUM

Sub: Guidelines for merger of licences in a service area – Clarification regarding effective date.

In continuation of this office O.M. even number dated 21st February, 2004 on the above mentioned subject, it is clarified that the duration of licence of the merged entity will be equal to the duration of Licence of acquiring company. For example, if licence `B' is merging with Licence `A', then the duration of Licence `A' will be applicable for merged entity.

(Govind Singhal)
Director (BS.III)

Annex III Number of wireless service provider in each service area along with their market share

Service Area	Operator		Total subscriber base as on June 2007 (in million)	Market Share (in %)
	GSM	CDMA		
Delhi	Bharti		3.28	25.73
	Hutch		2.60	20.42
	MTNL		1.12	8.77
	Idea Cellular Ltd		1.58	12.36
	Aircel Ltd*			
		MTNL	0.08	0.60
		Reliance Infocomm	1.73	13.56
		Tata Teleservices	2.36	18.55
			12.75	**100.00**
Mumbai	BPL		1.09	10.30
	Hutch		2.67	25.23
	MTNL		1.49	14.11
	Bharti		1.99	18.85
	Aircel Ltd*			
	Idea Cellular Ltd*			
		MTNL	0.12	1.13
		Reliance Infocomm	1.95	18.46
		Tata Teleservices	1.26	11.92
			10.57	**100.00**
Chennai	Aircel Cellular Ltd		1.33	25.77
	Bharti		1.18	22.87
	BSNL		0.82	15.83
	Hutchison		0.81	15.65
		BSNL	0.04	0.70
		Reliance Infocomm	0.68	13.21
		Tata Teleservices	0.31	5.98
			5.15	**100.00**
Kolkata	Bharti		1.22	21.75
	Hutchison East		1.41	25.19
	BSNL		0.66	11.84
	Reliable Internet		0.27	4.82
	Dishnet Wireless Ltd*			

Service Area	Operator		Total subscriber base as on June 2007 (in million)	Market Share (in %)
	GSM	CDMA		
		BSNL	0.03	0.61
		Reliance Infocomm	1.06	19.04
		Tata Teleservices	0.94	16.76
			5.59	**100.00**
MH	Hutch(BPL)		1.38	9.62
	Idea Cellular Ltd		3.30	22.98
	BSNL		2.33	16.23
	Bharti		2.91	20.25
	Aircel Ltd*		0.00	
		BSNL	0.36	2.53
		Reliance Infocomm	2.17	15.13
		Tata Teleservices	1.90	13.25
			14.35	**100.00**
GUJ	Fascel(Hutch)		4.66	37.63
	Idea Cellular Ltd		1.88	15.17
	BSNL		1.29	10.41
	Bharti		1.72	13.88
	Aircel Ltd*		0.00	
		BSNL	0.16	1.31
		Reliance Infocomm	1.88	15.19
		Tata Teleservices	0.79	6.41
			12.37	**100.00**
AP	Idea Cellular Ltd		2.11	14.50
	Bharti		4.11	28.28
	BSNL		1.89	12.99
	Hutchison		1.73	11.89
	Aircel Ltd*		0.00	
		BSNL	0.15	1.06
		Reliance Infocomm	2.78	19.15
		Tata Teleservices	1.76	12.12
			14.52	**100.00**
KTK	Bharti		4.83	38.62
	Spice		1.06	8.45
	BSNL		1.70	13.59
	Hutch		1.92	15.37
	Aircel Ltd*			
		BSNL	0.20	1.58

Service Area	Operator		Total subscriber base as on June 2007 (in million)	Market Share (in %)
	GSM	CDMA		
		Reliance Infocomm	1.84	14.68
		Tata Teleservices	0.97	7.72
			12.52	**100.00**
TN	Hutch(BPL)		1.43	11.80
	Aircel Ltd		3.44	28.25
	BSNL		2.08	17.09
	Bharti		2.40	19.72
		BSNL	0.35	2.92
		Reliance Infocomm	1.95	16.07
		Tata Teleservices	0.50	4.15
			12.16	**100.00**
Kerala	Idea Communications Ltd		1.80	21.34
	Hutch(BPL)		1.11	13.15
	BSNL		1.97	23.30
	Bharti		1.12	13.32
	Dishnet Wireless Ltd*		0.00	
		BSNL	0.41	4.91
		Reliance Infocomm	1.49	17.72
		Tata Teleservices	0.53	6.26
			8.44	**100.00**
Punjab	Spice		2.11	23.10
	Bharti		2.74	29.91
	BSNL		1.23	13.48
	Hutchison		1.36	14.85
	Dishnet Wireless Ltd*			
		BSNL	0.09	1.01
		Reliance Infocomm	0.73	8.02
		HFCL Infocom	0.15	1.64
		Tata Teleservices	0.73	8.00
			9.15	**100.00**
Haryana	Idea Communications Ltd		0.89	17.49
	Aircel Diglink(Hutch)		0.96	18.98
	BSNL		1.14	22.55
	Bharti		0.81	16.03
	Dishnet Wireless Ltd*		0.00	
		BSNL	0.10	1.99
		Reliance	0.55	10.86

Service Area	Operator		Total subscriber base as on June 2007 (in million)	Market Share (in %)
	GSM	CDMA		
		Infocomm		
		Tata Teleservices	0.61	12.09
			5.08	**100.00**
UP-W	Idea Communications Ltd		1.75	19.49
	Bharti		1.22	13.56
	BSNL		1.54	17.15
	Hutch South		1.97	21.90
	Dishnet Wireless Ltd*		0.00	
		BSNL	0.14	1.57
		Reliance Infocomm	1.48	16.46
		Tata Teleservices	0.89	9.87
			8.99	**100.00**
UP-E	Aircel Diglink(Hutch)		3.19	28.02
	BSNL		2.85	25.04
	Bharti		1.83	16.06
	Idea Telecommunications Ltd		0.47	4.16
	Dishnet Wireless Ltd*		0.00	
		BSNL	0.23	2.01
		Reliance Infocomm	2.05	18.01
		Tata Teleservices	0.76	6.70
			11.40	**100.00**
Raj	Aircel Diglink(Hutch)		1.81	19.52
	Hexacom(Bharti)		2.26	24.42
	BSNL		2.16	23.36
	Idea Telecommunications Ltd		0.44	4.71
	Dishnet Wireless Ltd*			
		BSNL	0.23	2.49
		Reliance Infocomm	1.20	12.98
		Shyam Telelink	0.10	1.06
		Tata Teleservices	1.06	11.46
			9.26	**100.00**
MP	Idea		1.89	22.59
	Reliance		0.87	10.45
	BSNL		1.33	15.94
	Bharti		1.72	20.55
	Dishnet Wireless Ltd*			
		BSNL	0.37	4.39
		Reliance	1.65	19.77

Service Area	Operator		Total subscriber base as on June 2007 (in million)	Market Share (in %)
	GSM	CDMA		
		Infocomm		
		Tata Teleservices	0.53	6.31
			8.35	**100.00**
WB&A&N	Reliance		0.51	8.60
	BSNL		1.07	17.99
	Bharti		1.12	18.82
	Hutch South		1.74	29.20
	Dishnet Wireless Ltd		0.20	3.31
		BSNL	0.12	2.06
		Reliance Infocomm	0.76	12.81
		Tata Teleservices	0.43	7.21
			5.97	**100.00**
HP	Bharti		0.64	39.66
	Reliance		0.19	11.94
	BSNL		0.49	30.12
	Idea Telecommunications Ltd		0.03	2.05
	Dishnet Wireless Ltd		0.02	0.96
	Essar Spacetel Pvt. Ltd (Hutch)*			
		BSNL	0.06	3.60
		Reliance Infocomm	0.10	6.40
		Tata Teleservices	0.09	5.27
			1.62	**100.00**
Bihar	Reliance		1.06	14.44
	BSNL		1.24	16.84
	Bharti		2.82	38.32
	Dishnet Wireless Ltd		0.10	1.36
	Essar Spacetel Pvt. Ltd (Hutch)*		0.00	
	Aditya Birla Telecom Ltd (Idea)*		0.00	
		BSNL	0.22	2.96
		Reliance Infocomm	1.31	17.73
		Tata Teleservices	0.61	8.35
			7.37	**100.00**
Orissa	Reliance		0.49	14.21
	BSNL		0.77	21.98
	Bharti		1.15	33.12

Service Area	Operator		Total subscriber base as on June 2007 (in million)	Market Share (in %)
	GSM	CDMA		
	Dishnet Wireless Ltd		0.31	8.84
	Essar Spacetel Pvt. Ltd (Hutch)*			
		BSNL	0.13	3.82
		Reliance Infocomm	0.34	9.80
		Tata Teleservices	0.29	8.23
			3.48	**100.00**
Assam	Reliance		0.54	19.64
	BSNL		0.60	21.88
	Bharti		0.69	25.05
	Dishnet Wireless Ltd		0.83	30.36
	Essar Spacetel Pvt. Ltd (Hutch)*			
		BSNL	0.08	3.07
			2.75	**100.00**
NE	Reliance		0.20	13.85
	Bharti		0.32	21.67
	BSNL		0.46	31.18
	Dishnet Wireless Ltd		0.43	29.31
	Essar Spacetel Pvt. Ltd (Hutch)*			
		BSNL	0.06	3.99
			1.47	**100.00**
J&K	BSNL		0.81	49.19
	Bharti		0.63	38.44
	Dishnet Wireless Ltd		0.13	7.72
	Essar Spacetel Pvt. Ltd (Hutch)*			
		BSNL	0.08	4.64
		Reliance Infocomm	0.00019	0.01
			1.64	**100.00**
* Yet to start their services				

Annex IV WPC spectrum allocation criteria

As per WPC Letter Nos. J-14025/200(17)/2004-NT(GSM) and J-14025/200(17)/2004-NT(CDMA) dated 29 March 2006

GSM subscriber base criteria (millions of subscribers)

Service Area	2 x 6.2 MHz	2 x 8 MHz	2 x 10 MHz	2 x 12.4 MHz	2 x 15 MHz
Delhi/Mumbai	0.3	0.6	1	1.6	2.1
Chennai/Kolkata	0.2	0.4	0.6	1	1.3
A	0.4	0.8	1.4	2	2.6
B	0.3	0.6	1	1.6	2.1
C	0.2	0.4	0.6	0.9	1.2

CDMA subscriber base criteria (millions of subscribers)

Service Area	3rd carrier (2 x 3.75 MHz)	4th carrier (2 x 5 MHz)	5th carrier (2 x 6.25 MHz)	6th carrier (2 x 7.5 MHz)
Delhi/Mumbai	0.3	1	1.6	2.1
Chennai/Kolkata	0.2	0.6	1	1.3
A	0.4	1.2	2	2.6
B	0.3	1	1.6	2.1
C	0.15	0.5	0.9	1.2

Annex V Comparison of WPC's criteria subscriber threshold with the actual subscriber base

Service Area	Operator		Total subscriber base as on June 2007 (in million)	80% of total subscribers as VLR figure (in million)	Spectrum Allotted (in MHz)	Sub req as per per present criteria (in million)	Actual Vs Criteria
	GSM	CDMA					
Delhi	Bharti		3.28	2.62	10.00	1.6	1.64
	Hutch		2.60	2.08	10.00	1.6	1.30
	MTNL		1.12	0.89	8.00	1.0	**0.89**
	Idea Cellular Ltd		1.58	1.26	8.00	1.0	1.26
	Aircel Ltd*						
		MTNL	0.08	0.06	3.75	1.0	**0.06**
		Reliance Infocomm	1.73	1.38	5.00	1.6	**0.86**
		Tata Teleservices	2.36	1.89	5.00	1.6	1.18
			12.75	**10.20**			
Mumbai	BPL		1.09	0.87	10.00	1.6	**0.54**
	Hutch		2.67	2.13	10.00	1.6	1.33
	MTNL		1.49	1.19	8.00	1.0	1.19
	Bharti		1.99	1.59	9.20	1.6	1.00
	Aircel Ltd*		0.00				
	Idea Cellular Ltd*		0.00				
		MTNL	0.12	0.10	2.50	0.3	**0.32**
		Reliance Infocomm	1.95	1.56	5.00	1.6	**0.98**
		Tata Teleservices	1.26	1.01	5.00	1.6	**0.63**
			10.57	**8.45**			
Chennai	Aircel Cellular Ltd		1.33	1.06	8.60	0.6	1.77
	Bharti		1.18	0.94	8.60	0.6	1.57
	BSNL		0.82	0.65	8.00	0.6	1.09
	Hutchison		0.81	0.65	8.00	0.6	1.08
		BSNL	0.04	0.03	2.50	0.2	**0.15**
		Reliance Infocomm	0.68	0.54	5.00	1.0	**0.54**
		Tata Teleservices	0.31	0.25	3.75	0.6	**0.41**
			5.15	**4.12**			
Kolkata	Bharti		1.22	0.97	8.00	0.6	1.62
	Hutchison East		1.41	1.13	9.80	1.0	1.13
	BSNL		0.66	0.53	6.20	0.4	1.32
	Reliable Internet		0.27	0.22	6.20	0.4	**0.54**

Service Area	Operator		Total subscriber base as on June 2007 (in million)	80% of total subscribers as VLR figure (in million)	Spectrum Allotted (in MHz)	Sub req as per per present criteria (in million)	Actual Vs Criteria
	GSM	CDMA					
	Dishnet Wireless Ltd*			0.00	4.4		
		BSNL	0.03	0.03	2.50	0.2	**0.14**
		Reliance Infocomm	1.06	0.85	5.00	1.0	**0.85**
		Tata Teleservices	0.94	0.75	3.75	0.6	1.25
			5.59	**4.47**			
MH	Hutch(BPL)		1.38	1.10	6.20	0.8	1.38
	Idea Cellular Ltd		3.30	2.64	10.00	2.0	1.32
	BSNL		2.33	1.86	8.00	1.4	1.33
	Bharti		2.91	2.32	6.20	0.8	2.91
	Aircel Ltd*		0.00	0.00			
		BSNL	0.36	0.29	2.50	0.4	**0.73**
		Reliance Infocomm	2.17	1.74	5.00	2.0	**0.87**
		Tata Teleservices	1.90	1.52	5.00	2.0	**0.76**
			14.35	**11.48**			
GUJ	Fascel(Hutch)		4.66	3.72	9.80	2.0	1.86
	Idea Cellular Ltd		1.88	1.50	6.20	0.8	1.88
	BSNL		1.29	1.03	7.40	0.8	1.29
	Bharti		1.72	1.37	6.20	0.8	1.72
	Aircel Ltd*		0.00	0.00			
		BSNL	0.16	0.13	2.50	0.4	**0.32**
		Reliance Infocomm	1.88	1.50	3.75	1.2	1.25
		Tata Teleservices	0.79	0.63	3.75	1.2	**0.53**
			12.37	**9.90**			
AP	Idea Cellular Ltd		2.11	1.68	8.00	1.4	1.20
	Bharti		4.11	3.29	8.80	1.4	2.35
	BSNL		1.89	1.51	8.00	1.4	1.08
	Hutchison		1.73	1.38	6.20	0.8	1.73
	Aircel Ltd*		0.00	0.00			
		BSNL	0.15	0.12	2.50	0.4	**0.31**
		Reliance Infocomm	2.78	2.22	5.00	2.0	1.11
		Tata Teleservices	1.76	1.41	5.00	2.0	**0.70**
			14.52	**11.62**			
KTK	Bharti		4.83	3.87	10.00	2.0	1.93
	Spice		1.06	0.85	6.20	0.8	1.06
	BSNL		1.70	1.36	8.00	1.4	**0.97**

Service Area	Operator		Total subscriber base as on June 2007 (in million)	80% of total subscribers as VLR figure (in million)	Spectrum Allotted (in MHz)	Sub req as per per present criteria (in million)	Actual Vs Criteria
	GSM	CDMA					
	Hutch		1.92	1.54	8.00	1.4	1.10
	Aircel Ltd*		0.00	0.00			
		BSNL	0.20	0.16	2.50	0.4	**0.40**
		Reliance Infocomm	1.84	1.47	5.00	2.0	**0.74**
		Tata Teleservices	0.97	0.77	3.75	1.2	**0.64**
			12.52	**10.01**			
TN	Hutch(BPL)		1.43	1.15	6.20	0.8	1.43
	Aircel Ltd		3.44	2.75	10.00	2.0	1.37
	BSNL		2.08	1.66	8.00	1.4	1.19
	Bharti		2.40	1.92	6.20	0.8	2.40
		BSNL	0.35	0.28	2.50	0.4	**0.71**
		Reliance Infocomm	1.95	1.56	5.00	2.0	**0.78**
		Tata Teleservices	0.50	0.40	2.50	0.4	1.01
			12.16	**9.73**			
Kerala	Idea Communications Ltd		1.80	1.44	8.00	1.0	1.44
	Hutch(BPL)		1.11	0.89	6.20	0.6	1.48
	BSNL		1.97	1.57	8.00	1.0	1.57
	Bharti		1.12	0.90	6.20	0.6	1.50
	Dishnet Wireless Ltd*		0.00	0.00			
		BSNL	0.41	0.33	2.50	0.3	1.10
		Reliance Infocomm	1.49	1.20	5.00	1.6	**0.75**
		Tata Teleservices	0.53	0.42	3.75	1.0	**0.42**
			8.44	**6.75**			
Punjab	Spice		2.11	1.69	8.00	1.0	1.69
	Bharti		2.74	2.19	8.00	1.0	2.19
	BSNL		1.23	0.99	6.20	0.6	1.64
	Hutchison		1.36	1.09	6.20	0.6	1.81
	Dishnet Wireless Ltd*			0.00			
		BSNL	0.09	0.07	2.50	0.3	**0.25**
		Reliance Infocomm	0.73	0.59	3.75	1.0	**0.59**
		HFCL Infocom	0.15	0.12	2.50	0.3	**0.40**
		Tata Teleservices	0.73	0.59	3.75	1.0	**0.59**
			9.15	**7.32**			

Service Area	Operator		Total subscriber base as on June 2007 (in million)	80% of total subscribers as VLR figure (in million)	Spectrum Allotted (in MHz)	Sub req as per per present criteria (in million)	Actual Vs Criteria
	GSM	CDMA					
Haryana	Idea Communications Ltd		0.89	0.71	6.20	0.6	1.18
	Aircel Diglink(Hutch)		0.96	0.77	6.20	0.6	1.28
	BSNL		1.14	0.92	6.20	0.6	1.53
	Bharti		0.81	0.65	6.20	0.6	1.08
	Dishnet Wireless Ltd*		0.00	0.00			
		BSNL	0.10	0.08	2.50	0.3	**0.27**
		Reliance Infocomm	0.55	0.44	3.75	1.0	**0.44**
		Tata Teleservices	0.61	0.49	3.75	1.0	**0.49**
			5.08	**4.06**			
UP-W	Idea Communications Ltd		1.75	1.40	8.00	1.0	1.40
	Bharti		1.22	0.98	6.20	0.6	1.63
	BSNL		1.54	1.23	8.00	1.0	1.23
	Hutch South		1.97	1.58	6.20	0.6	2.63
	Dishnet Wireless Ltd*		0.00	0.00			
		BSNL	0.14	0.11	2.50	0.3	**0.38**
		Reliance Infocomm	1.48	1.18	5.00	1.6	**0.74**
		Tata Teleservices	0.89	0.71	3.75	1.0	**0.71**
			8.99	**7.20**			
UP-E	Aircel Diglink(Hutch)		3.19	2.56	8.00	1.0	2.56
	BSNL		2.85	2.28	9.60	1.6	1.43
	Bharti		1.83	1.46	6.20	0.6	2.44
	Idea Telecommunications Ltd		0.47	0.38	6.20	0.6	**0.63**
	Dishnet Wireless Ltd*		0.00	0.00			
		BSNL	0.23	0.18	2.50	0.3	**0.61**
		Reliance Infocomm	2.05	1.64	5.00	1.6	1.03
		Tata Teleservices	0.76	0.61	3.75	1.0	**0.61**
			11.40	**9.12**			
Raj	Aircel Diglink(Hutch)		1.81	1.45	6.20	0.6	2.41
	Hexacom(Bharti)		2.26	1.81	6.20	0.6	3.01
	BSNL		2.16	1.73	8.00	1.0	1.73
	Idea Telecommunications		0.44	0.35	6.20	0.6	**0.58**

Service Area	Operator		Total subscriber base as on June 2007 (in million)	80% of total subscribers as VLR figure (in million)	Spectrum Allotted (in MHz)	Sub req as per per present criteria (in million)	Actual Vs Criteria
	GSM	CDMA					
	Ltd						
	Dishnet Wireless Ltd*			0.00			
		BSNL	0.23	0.18	2.50	0.3	**0.61**
		Reliance Infocomm	1.20	0.96	3.75	1.0	**0.96**
		Shyam Telelink	0.10	0.08	2.50	0.3	**0.26**
		Tata Teleservices	1.06	0.85	3.75	1.0	**0.85**
			9.26	**7.40**			
MP	Idea		1.89	1.51	8.00	1.0	1.51
	Reliance		0.87	0.70	6.20	0.6	1.16
	BSNL		1.33	1.06	6.20	0.6	1.77
	Bharti		1.72	1.37	6.20	0.6	2.29
	Dishnet Wireless Ltd*			0.00			
		BSNL	0.37	0.29	2.50	0.3	**0.98**
		Reliance Infocomm	1.65	1.32	5.00	1.6	**0.83**
		Tata Teleservices	0.53	0.42	5.00	1.6	**0.26**
			8.35	**6.68**			
WB&A&N	Reliance		0.51	0.41	6.20	0.6	**0.68**
	BSNL		1.07	0.86	6.20	0.6	1.43
	Bharti		1.12	0.90	4.40	0.3	3.00
	Hutch South		1.74	1.39	4.40	0.3	4.65
	Dishnet Wireless Ltd		0.20	0.16	4.40	0.3	**0.53**
		BSNL	0.12	0.10	2.50	0.3	**0.33**
		Reliance Infocomm	0.76	0.61	3.75	1.0	**0.61**
		Tata Teleservices	0.43	0.34	2.50	0.3	1.15
			5.97	**4.77**			
HP	Bharti		0.64	0.51	6.20	0.4	1.28
	Reliance		0.19	0.15	6.20	0.4	**0.39**
	BSNL		0.49	0.39	6.20	0.4	**0.97**
	Idea Telecommunications Ltd		0.03	0.03	4.40	0.2	**0.13**
	Dishnet Wireless Ltd		0.02	0.01	4.40	0.2	**0.06**
	Essar Spacetel Pvt. Ltd (Hutch)*			0.00			
		BSNL	0.06	0.05	2.50	0.2	**0.31**
		Reliance	0.10	0.08	2.50	0.2	**0.55**

Service Area	Operator		Total subscriber base as on June 2007 (in million)	80% of total subscribers as VLR figure (in million)	Spectrum Allotted (in MHz)	Sub req as per per present criteria (in million)	Actual Vs Criteria
	GSM	CDMA					
		Infocomm					
		Tata Teleservices	0.09	0.07	2.50	0.2	**0.45**
			1.62	**1.29**			
Bihar	Reliance		1.06	0.85	8.00	0.6	1.42
	BSNL		1.24	0.99	6.20	0.4	2.48
	Bharti		2.82	2.26	8.00	0.6	3.76
	Dishnet Wireless Ltd		0.10	0.08	4.40	0.2	**0.40**
	Essar Spacetel Pvt. Ltd (Hutch)*		0.00	0.00			
	Aditya Birla Telecom Ltd (Idea)*		0.00	0.00			
		BSNL	0.22	0.17	2.50	0.2	1.16
		Reliance Infocomm	1.31	1.04	5.00	0.9	1.16
		Tata Teleservices	0.61	0.49	3.75	0.5	**0.98**
			7.37	**5.89**			
Orissa	Reliance		0.49	0.40	6.20	0.4	**0.99**
	BSNL		0.77	0.61	6.20	0.4	1.53
	Bharti		1.15	0.92	8.00	0.6	1.54
	Dishnet Wireless Ltd		0.31	0.25	4.40	0.2	1.23
	Essar Spacetel Pvt. Ltd (Hutch)*		0.00	0.00			
		BSNL	0.13	0.11	2.50	0.2	**0.71**
		Reliance Infocomm	0.34	0.27	3.75	0.5	**0.55**
		Tata Teleservices	0.29	0.23	2.50	0.2	1.53
			3.48	**2.79**			
Assam	Reliance		0.54	0.43	6.20	0.4	1.08
	BSNL		0.60	0.48	6.20	0.4	1.20
	Bharti		0.69	0.55	6.20	0.4	1.38
	Dishnet Wireless Ltd		0.83	0.67	4.40	0.2	3.33
	Essar Spacetel Pvt. Ltd (Hutch)*			0.00			
		BSNL	0.08	0.07	2.50	0.2	**0.45**
			2.75	**2.20**			
NE	Reliance		0.20	0.16	4.40	0.2	**0.81**
	Bharti		0.32	0.25	4.40	0.2	1.27
	BSNL		0.46	0.37	6.20	0.4	**0.92**
	Dishnet Wireless Ltd		0.43	0.34	4.40	0.2	1.72
	Essar Spacetel Pvt. Ltd (Hutch)*			0.00			
		BSNL	0.06	0.05	2.50	0.2	**0.31**

Service Area	Operator		Total subscriber base as on June 2007 (in million)	80% of total subscribers as VLR figure (in million)	Spectrum Allotted (in MHz)	Sub req as per per present criteria (in million)	Actual Vs Criteria
	GSM	CDMA					
			1.47	**1.17**			
J&K	BSNL		0.81	0.64	8.00	0.6	1.07
	Bharti		0.63	0.50	6.20	0.4	1.26
	Dishnet Wireless Ltd		0.13	0.10	4.40	0.2	**0.51**
	Essar Spacetel Pvt. Ltd (Hutch)*			0.00			
		BSNL	0.08	0.06	2.50	0.2	**0.41**
		Reliance Infocomm	0.00019	0.00	2.50	0.2	**0.00**
			1.64	**1.31**			
* Yet to start their services							

Annex VI List of cities with over a million population

Circle	Service Area	Area ('00 sq km)	Cities	Area ('00 sq km)	2006 Population in Millions	Population Density / '00 sq km (in million)
Metros	Delhi	14.8	Delhi	**14.8**	17.98	1.21
	Mumbai	4.4	Mumbai	**4.4**	17.68	4.02
	Chennai	1.7	Chennai	**1.7**	6.75	3.97
	Kolkata	1.9	Kolkata	**1.9**	14.01	7.37
Circle B	MH	3077.1	Pune	**1.46**	4.06	2.78
			Nashik	**2.59**	1.24	0.48
			Nagpur	**2.17**	2.29	1.06
	GUJ	1960.2	Ahmedabad		4.88	
			Surat	**1.12**	3.04	2.71
			Rajkot	**0.69**	1.08	1.57
			Vadodra	**1.49**	1.61	1.08
	AP	2750.6	Hyderabad		5.92	
			Vishakapatnam	**1.11**	1.42	1.28
			Vijaywada		1.08	
	KTK	1917.9	Bangalore	**2.24**	6.03	2.69
	TN	1300.5	Coimbatore	**1.05**	1.52	1.45
			Madurai	**0.51**	1.25	2.45
	Kerala	388.6	Kochi	**2.75**	1.42	0.52
	Punjab	503.6	Amritsar	**0.50**	1.08	2.16
			Ludhiana	**1.34**	1.49	1.11
	Haryana	442.1				
	UP-W	2944.1	Meerut		1.28	
	UP-E		Lucknow	**3.10**	2.49	0.80
			Kanpur	**2.60**	2.96	1.14
			Allahabad		1.15	
			Varanasi	**0.83**	1.33	1.60
			Agra	**0.38**	1.45	3.82
	Raj	3423.9	Jaipur	**0.64**	2.53	3.95
	MP	4434.9	Jabalpur		1.23	
			Bhopal	**2.85**	1.60	0.56
			Indore	**1.65**	1.80	1.09
	WB&A&N	969.9	Asansol	**1.27**	1.18	0.93
Circle C	HP	556.7				
	Bihar	1738.7	Dhanbad		1.16	
			Jamshedpur		1.21	
			Patna	**1.07**	1.84	1.72
	Orissa	1557				
	Assam	784.3				
	NE	1766.3				
	J&K	2222.3				

Annex VII Subscriber number possible to serve with spectrum amounts

Weighted Average Method of Calculation of spectrum allocation

Scenerio1 :- When 6.2 Mhz spectrum is allotted			
Number of BTSs* installed	**1000**		
Freq Reuse Pattern-4/12			
		Subscribers	**Remark**
BTS Configuration-			
2+2+2	10%	**1475700**	**1Carrier reserved for IBS**
4+4+4	90%		
Assuming traffic 40m Erl/Subscriber			
Traffic=Weighted Avg erl/0.04	1475.70		
	Rounded Off	**15 lakh**	
Hence with allotment of 6.2 Mhz the operator should reach to 15 lakh subscribers figure before he is allotted further spectrum (8Mhz)			

Scenerio 2:- When 8 MHz spectrum is allotted			
Number of BTSs* installed	**1400**		
Freq Reuse Pattern-5/15			`
		Subscribers	**Remark**
BTS Configuration-			
4+4+4	60%	**2224110**	**2TS/Sector reserved for Data(GPRS & EDGE) and 3 Carriers for IBS**
5+4+5	40%		
Assuming traffic 40m Erl/Subscriber			
Traffic=Weighted Avg erl/0.04	1588.65		
	Rounded Off	**20 lakh**	
Hence with allotment of 8 Mhz the operator should reach to 20 lakh subscribers figure before he is allotted further spectrum (10MHz)			

*** Only Macro BTS have been considered. Additional in building solution/micro BTS will vary based on the requirement.**

Weighted Average Method of Calculation of spectrum allocation

Scenerio 3 :- When 10 MHz spectrum is allotted			
Number of BTSs* installed	**1800**		
Freq Reuse Pattern-5/15			
		Subscribers	**Remark**
BTS Configuration-			
4+4+4	50%	**3475845**	**1 carrier reserved for GPRS/EDGE & 4 carriers for IBS**
5+5+5	30%		
6+6+6	20%		
Assuming traffic 40m Erl/Subscriber			
Traffic=Weighted Avg erl/0.04	1931.03		
	Rounded Off	**30 lakh**	
Hence with allotment of 10 MHz the operator should reach to 30 lakh subscribers figure before he is allotted further spectrum (12.4MHz)			

Scenerio 4 :- When 12.4 MHz spectrum is allotted			
Number of BTSs* installed	**2300**		
Freq Reuse Pattern-5/15			
		Subscribers	**Remark**
BTS Configuration-			
4+4+4	30%	**5490675**	**4Carriers reserved for IBS and 1 carrier for Data & Misc**
5+5+5	20%		
6+6+6	30%		
8+8+8	20%		
Assuming tarffic 40m Erl/Subscriber			
Traffic=Weighted Avg erl/0.04	2387.25		
	Rounded Off	**50 lakh**	
Hence with allotment of 12.4 Mhz the operator should reach to 50 lakh subscribers figure before he is allotted further spectrum			

*** Only Macro BTS have been considered. Additional in building solution/micro BTS will vary based on the requirement.**

Annexure VIII: Some of the Countries where Spectrum is managed by Regulator

S.No	Name of the country	Name of the regulator
1	Albania	Telecommunication Regulatory Entity
2	Argentina	Comision Nacional de Comunicaciones (CNC)
3	Australia	Australian Communications and Media Authority (ACMA)
4	Bangladesh	Bangladesh Telecommunication Regulatory Commission (BTRC)
5	Belgium	Belgian Institute for Postal Services and Telecommunications
6	Brazil	Agencia Nacional de Telecomunicacoes do Brasil (Anatel)
7	Bulgaria	Communications Regulation Commission
8	Chile	Subsecretaria de Telecomunicaciones
9	Egypt	National Telecommunication Regulatory Authority (NTRA)
10	Finland	Finnish Communications Regulatory Authority
11	Germany	Federal Network Agency for Electricity, Gas, Telecommunication, Post and Railway (Section 115)
12	Ghana	National Communications Authority
13	Greece	National Telecommunications and Post Commission, Greece (EETT)
14	Hungary	National Communications Authority
15	Iran (I.R.)	Communications Regulatory Authority
16	Jordan	Telecommunications Regulatory Commission (TRC)
17	Kenya	Communications Commission of kenya
18	Malaysia	Malaysian Communications and Multimedia Commission
19	Morocco	Agence Nationale de Reglementation des Telecommunications (ANRT)
20	Oman	Telecommunication Regulatory Authority
21	Pakistan	Pakistan Telecommunication Authority (PTA)
22	Singapore	Infocomm Development Authority of Singapore
23	Sri Lanka	Telecommunications Regulatory Commission of Sri Lanka
24	United Kingdom	Office of Communications (OFCOM)
25	United States	Federal Communications Commission

Annex IX Market share of operators
Circle-wise Trends in the Market Share of Wireless Subscriber Base

Circle Category	Group	SP	Circle	GSM/CDMA	Market share			
					Mar-04	Mar-05	Mar-06	Mar-07
M	Bharti	Bharti	Delhi	GSM	31%	27%	23%	25%
M	Hutch	Hutch	Delhi	GSM	27%	24%	21%	20%
M	MTNL	MTNL	Delhi	GSM & CDMA	6%	9%	11%	12%
M	IDEA	IDEA	Delhi	GSM	11%	10%	10%	12%
M	Reliance	Reliance	Delhi	CDMA	20%	21%	20%	14%
M	Tata	Tata	Delhi	CDMA	5%	9%	14%	18%
M	BPL	BPL	Mumbai	GSM	25%	22%	16%	11%
M	Hutch	Hutch	Mumbai	GSM	29%	27%	25%	25%
M	MTNL	MTNL	Mumbai	GSM & CDMA	7%	10%	13%	15%
M	Bharti	Bharti	Mumbai	GSM	15%	14%	15%	19%
M	Reliance	Reliance	Mumbai	CDMA	19%	19%	21%	18%
M	Tata	Tata	Mumbai	CDMA	5%	8%	10%	12%
M	Aircel	Aircel	Chennai	GSM	21%	24%	22%	25%
M	Bharti	Bharti	Chennai	GSM	25%	21%	21%	22%
M	Hutch	Hutch	Chennai	GSM	12%	9%	13%	15%
M	BSNL	BSNL	Chennai	GSM & CDMA	10%	17%	19%	18%
M	Reliance	Reliance	Chennai	CDMA	26%	20%	17%	13%
M	Tata	Tata	Chennai	CDMA	7%	9%	8%	6%
M	Bharti	Bharti	Kolkata	GSM	27%	25%	18%	21%
M	Hutch	Hutch	Kolkata	GSM	40%	32%	29%	25%
M	BSNL	BSNL	Kolkata	GSM & CDMA	4%	14%	13%	13%
M	Reliance	Reliance	Kolkata	GSM & CDMA	29%	27%	26%	23%
M	Tata	Tata	Kolkata	CDMA	0%	3%	14%	17%
A	Hutch	BPL	MH	GSM	12%	12%	10%	9%
A	IDEA	IDEA	MH	GSM	34%	27%	24%	22%
A	Bharti	Bharti	MH	GSM	12%	14%	18%	20%
A	BSNL	BSNL	MH	GSM & CDMA	22%	22%	18%	20%
A	Reliance	Reliance	MH	CDMA	18%	18%	19%	16%
A	Tata	Tata	MH	CDMA	2%	8%	11%	13%
A	Hutch	Hutch	Gujarat	GSM	35%	30%	33%	37%
A	IDEA	IDEA	Gujarat	GSM	15%	16%	15%	15%
A	Bharti	Bharti	Gujarat	GSM	8%	12%	13%	14%
A	BSNL	BSNL	Gujarat	GSM & CDMA	18%	17%	15%	11%
A	Reliance	Reliance	Gujarat	CDMA	18%	17%	15%	15%
A	Tata	Tata	Gujarat	CDMA	5%	9%	9%	7%
A	IDEA	IDEA	AP	GSM	17%	15%	12%	14%

Circle Category	Group	SP	Circle	GSM/CDMA	Market share			
					Mar-04	Mar-05	Mar-06	Mar-07
A	Bharti	Bharti	AP	GSM	22%	22%	24%	28%
A	Hutch	Hutch	AP	GSM	7%	9%	11%	11%
A	BSNL	BSNL	AP	GSM & CDMA	22%	21%	18%	15%
A	Reliance	Reliance	AP	CDMA	22%	21%	23%	19%
A	Tata	Tata	AP	CDMA	10%	11%	12%	13%
A	Bharti	Bharti	Karnataka	GSM	32%	32%	31%	38%
A	Spice	Spice	Karnataka	GSM	13%	8%	6%	7%
A	Hutch	Hutch	Karnataka	GSM	13%	14%	16%	15%
A	BSNL	BSNL	Karnataka	GSM & CDMA	16%	20%	21%	17%
A	Reliance	Reliance	Karnataka	CDMA	20%	17%	16%	15%
A	Tata	Tata	Karnataka	CDMA	6%	9%	10%	8%
A	Hutch	BPL	TN	GSM	13%	11%	8%	10%
A	Aircel	Aircel	TN	GSM	34%	33%	28%	28%
A	Bharti	Bharti	TN	GSM	11%	9%	15%	19%
A	BSNL	BSNL	TN	GSM & CDMA	20%	27%	27%	23%
A	Reliance	Reliance	TN	CDMA	19%	15%	15%	16%
A	Tata	Tata	TN	CDMA	2%	4%	6%	5%
B	IDEA	IDEA	Kerala	GSM	25%	20%	16%	20%
B	Hutch	BPL	Kerala	GSM	16%	14%	9%	11%
B	Bharti	Bharti	Kerala	GSM	11%	12%	12%	13%
B	BSNL	BSNL	Kerala	GSM & CDMA	26%	32%	37%	31%
B	Reliance	Reliance	Kerala	CDMA	21%	20%	20%	18%
B	Tata	Tata	Kerala	CDMA	0%	2%	6%	7%
B	Spice	Spice	Punjab	GSM	35%	30%	28%	23%
B	Bharti	Bharti	Punjab	GSM	35%	34%	31%	31%
B	BSNL	BSNL	Punjab	GSM & CDMA	12%	13%	9%	15%
B	Hutch	Hutch	Punjab	GSM	0%	4%	12%	14%
B	HFCL	HFCL	Punjab	CDMA	2%	3%	2%	2%
B	Reliance	Reliance	Punjab	CDMA	15%	15%	13%	8%
B	Tata	Tata	Punjab	CDMA	0%	2%	6%	8%
B	IDEA	IDEA	Haryana	GSM	19%	15%	14%	19%
B	Hutch	Hutch	Haryana	GSM	9%	15%	17%	17%
B	Bharti	Bharti	Haryana	GSM	22%	21%	19%	17%
B	BSNL	BSNL	Haryana	GSM & CDMA	30%	28%	25%	24%
B	Reliance	Reliance	Haryana	CDMA	19%	18%	14%	10%
B	Tata	Tata	Haryana	CDMA	0%	2%	11%	13%
B	IDEA	IDEA	UP(W)	GSM	33%	29%	21%	20%
B	Bharti	Bharti	UP(W)	GSM	16%	17%	13%	13%
B	BSNL	BSNL	UP(W)	GSM & CDMA	34%	28%	24%	19%
B	Hutch	Hutch	UP(W)	GSM	0%	7%	14%	21%
B	Reliance	Reliance	UP(W)	CDMA	16%	18%	20%	16%
B	Tata	Tata	UP(W)	CDMA	0%	1%	7%	10%

Circle Category	Group	SP	Circle	GSM/CDMA	Market share			
					Mar-04	Mar-05	Mar-06	Mar-07
B	Hutch	Hutch	UP(E)	GSM	39%	34%	26%	27%
B	BSNL	BSNL	UP(E)	GSM & CDMA	37%	35%	34%	30%
B	Bharti	Bharti	UP(E)	GSM	0%	9%	12%	16%
B	IDEA	Escorts	UP(E)	GSM	0%	0%	0%	3%
B	Reliance	Reliance	UP(E)	CDMA	25%	22%	23%	18%
B	Tata	Tata	UP(E)	CDMA	0%	1%	5%	7%
B	Hutch	Hutch	Rajasthan	GSM	14%	17%	14%	18%
B	Bharti	Bharti	Rajasthan	GSM	28%	26%	25%	22%
B	BSNL	BSNL	Rajasthan	GSM & CDMA	30%	25%	32%	28%
B	IDEA	Escorts	Rajasthan	GSM	0%	0%	0%	4%
B	Reliance	Reliance	Rajasthan	CDMA	22%	22%	21%	14%
B	STL	STL	Rajasthan	CDMA	5%	7%	1%	1%
B	Tata	Tata	Rajasthan	CDMA	0%	2%	7%	12%
B	IDEA	IDEA	MP	GSM	27%	25%	20%	22%
B	Reliance	Reliance	MP	GSM & CDMA	38%	36%	39%	29%
B	Bharti	Bharti	MP	GSM & CDMA	13%	13%	14%	19%
B	BSNL	BSNL	MP	GSM & CDMA	23%	24%	21%	22%
B	Tata	Tata	MP	CDMA	0%	2%	6%	7%
B	Reliance	Reliance	WB	GSM & CDMA	43%	33%	26%	22%
B	BSNL	BSNL	WB	GSM & CDMA	57%	39%	33%	24%
B	Bharti	Bharti	WB	GSM	0%	14%	13%	16%
B	Hutch	Hutch	WB	GSM	0%	14%	21%	28%
B	Aircel	Dishnet	WB	GSM	0%	0%	1%	3%
B	Tata	Tata	WB	CDMA	0%	0%	6%	8%
C	Bharti	Bharti	HP	GSM	47%	55%	49%	39%
C	Reliance	Reliance	HP	GSM & CDMA	8%	11%	12%	15%
C	BSNL	BSNL	HP	GSM & CDMA	45%	32%	36%	39%
C	IDEA	Escorts	HP	GSM	0%	0%	0%	1%
C	Aircel	Dishnet	HP	GSM	0%	0%	0%	1%
C	Tata	Tata	HP	CDMA	0%	1%	4%	6%
C	Reliance	Reliance	Bihar	GSM & CDMA	50%	43%	34%	31%
C	BSNL	BSNL	Bihar	GSM & CDMA	50%	40%	33%	23%
C	Bharti	Bharti	Bihar	GSM	0%	15%	27%	36%
C	Aircel	Dishnet	Bihar	GSM	0%	0%	0%	0%
C	Tata	Tata	Bihar	CDMA	0%	2%	5%	9%
C	Reliance	Reliance	Orissa	GSM & CDMA	48%	34%	27%	24%
C	BSNL	BSNL	Orissa	GSM & CDMA	52%	47%	39%	30%
C	Bharti	Bharti	Orissa	GSM	0%	17%	27%	31%
C	Aircel	Dishnet	Orissa	GSM	0%	0%	2%	7%

Circle Category	Group	SP	Circle	GSM/CDMA	Market share			
					Mar-04	Mar-05	Mar-06	Mar-07
C	Tata	Tata	Orissa	CDMA	0%	2%	5%	9%
C	Reliance	Reliance	Assam	GSM	59%	37%	23%	17%
C	BSNL	BSNL	Assam	GSM & CDMA	41%	63%	48%	29%
C	Bharti	Bharti	Assam	GSM	0%	0%	21%	26%
C	Aircel	Dishnet	Assam	GSM	0%	0%	8%	29%
C	Reliance	Reliance	North East	GSM	22%	18%	18%	12%
C	Bharti	Bharti	North East	GSM	0%	0%	9%	23%
C	BSNL	BSNL	North East	GSM & CDMA	78%	82%	59%	40%
C	Aircel	Dishnet	North East	GSM	0%	0%	13%	26%
C	BSNL	BSNL	J& K	GSM & CDMA	100%	60%	65%	58%
C	Bharti	Bharti	J& K	GSM	0%	40%	32%	36%
C	Aircel	Dishnet	J& K	GSM	0%	0%	3%	6%
C	Reliance	Reliance	J& K	CDMA	0%	0%	0%	0%

Annex X Circle-wise analysis of Concentration Ratios of Wireless Market shares

Circle Category	Circle	Concentration Ratio of Top2 Service providers (other than PSUs) based on subscriber base	Concentration Ratio of Top2 Service providers (other than PSUs) based on Net Revenue
M	Delhi	45%	57%
M	Mumbai	44%	53%
M	Chennai	47%	49%
M	Kolkata	49%	53%
A	MH	42%	47%
A	Gujarat	52%	55%
A	AP	47%	45%
A	Karnataka	52%	59%
A	TN	47%	43%
B	Kerala	38%	31%
B	Punjab	54%	60%
B	Haryana	36%	38%
B	UP(W)	41%	42%
B	UP(E)	42%	47%
B	Rajasthan	41%	45%
B	MP	51%	53%
B	WB	50%	44%
C	HP	53%	62%
C	Bihar	68%	60%
C	Orissa	54%	52%
C	Assam	55%	40%
C	North East	48%	33%
C	J& K	42%	42%

Annex XI International practice on roll out obligations for 2G/3G licenses

S.No	Country	2G / 3G Licences	Roll-out Obligations Criteria
Asia Pacific Countries			
1	Pakistan	2G Licence	The new cellular Licences issued last year requires the licensees to provide: **1.** Coverage within 70% Tehsil headquaters in 4 years. **2.** Coverage has to be minimum 10% of Tehsil headquaters in each province.
2	Malaysia	2G Licence	Nothing has been stipulated
3	Thailand	2G Licence	There is no such requirement in terms of coverage percentage for operators in Thailand.
Middle Eastern Countries			
4	Bahrain	2G Licence	Must achieve coverage of not less than 95% of population in licenced area by 31/12/2003
5	Israel	2G Licence	The licence covers coverage of 99% of the population
African Countries			
6	Nigeria	2G Licence	Obligation to built network capacity to support 100,000 users by end of year 1, expanding to 750,000 users by year 3
7	South Africa	2G Licence	**1.** Rolll-out requirements of 8% geographical coverage & 60 % population coverage within five years & **2.** 52000 community telephones in under-served areas within seven years

Europe Over View:		**1.** Nearly all European Member States included Roll-out/Coverage conditions in the license contract. This is valid for 2G and 3G licenses.**<u>They are generally related to population coverage</u>** (Sweden is an exception, they require also area coverage up to more than 90% for the whole country – therefore the operators deployed a new infrastructure sharing model). **2.**The general criterion for the Roll-out **<u>obligations in European countries is to reach 25 – 50% population coverage within 2-3 years from the date of the licence</u>**. In Europe the majority of the Member States have 25-30% pop coverage written in the licenses. **<u>3. In-building coverage was never a roll-out/coverage requirement. The regulators always left it on the market to decide. This is also still the case today</u>. 4**. In-building coverage is generally an outdoor - to – indoor Base Station transmit case. Practically seen, indoor BS-sites are not deployed in Europe, except in Exhibition Halls for Conferences and fairs, this means always a deployment for special cases (radio plannings specifically for the events) where the regulator is involved, but more from the technical side (e.g. maximum field strength etc.).	
8	Austria	3G Licence	**1.** 25% of the population by the end of 2003 **2.** 50% by the end of 2005
9	Belgium	3G Licence	All deadlines have been postponed. New deadlines are as follows:· 30% of population by Jan. 1, 2006; 40% by Jan. 1, 2007;· 50% by Jan. 1, 2008;· 85% by March 13, 2009. The last step (85%) can be revised by Royal Decree.
10	Bosnia & Herzegovina	2G Licence	Full provision of licenced GSM service to be ensured to: **a.** 80% of the population of Bosnia & Herzegovina
11	Denmark	3G Licence	**1.** 30% of population by end of 2004 **2.** 80% by end of 2008

12	Finland	3G Licence	**1.** No specific coverage requirements in original 3G licences. **2.**On April 15, 2004 the government decided to ease the terms of 3G licences in mainland Finland. Licensees are allowed to construct a part of the networks together. **3.** However, each licensee's own network must provide 35% of the population coverage ('own coverage area'). **4.** The ministry will assess the network roll out in 2005 based on the reports submitted by the licensees. (No results published by Aug. 2005).
13	France	3G Licence	**1.**Voice: 25% > 2 years , & 80% > 8 years **2.** Data: 20% > 2 years, 60% > 8 years (% of population coverage only)
14	Germany	3G Licence	1. 25% by end 2003 2. 50% by end 2005 (% of population coverage only)
15	Greece	3G Licence	**1.** 25% by end 2003 **2.** 50% by end 2006 **3.**There is no specific requirements in relation to in-building coverage. (% of population coverage only)
16	Ireland	3G Licence	**1**. 53% by Aug31, 2005 **2.** 80% by Dec, 31, 2007 (% of population coverage only)
17	Italy	3G Licence	**1,** Coverage of regional capitals by une 30, 2004 **2.** Provincial Coverage by Dec 31, 2006
18	Netherlands	3G Licence	**1.** By Jan. 1, 2007 coverage of:· all cities with more than 25K inhabitants;· all main routes (roads, railways and waterways) between these cities, motorways to Germany and Belgium and around major airports (Schiphol, Maastricht, Rotterdam).
19	Luxembourg	3G Licence	**1.** No coverage obligation imposed by the State but the commitments made by the applicants during the beauty contest were incorporated in their licences 2. **I**ndividual commitments are not available yet but the ranges are:· between 15% and 92% of the territory and between 60% and 97% of the population by 2004; and· between 64% and 98% of the territory and between 95% and 98% of the population by 2010.

20	Norway	3G Licence	Depends on the commitments made by the operators. **Telenor Mobil**· **1.** During first year (by Nov. 30, 2001): 10% of population in the 12 biggest towns in terms of population.· **2.** During first three years (by Nov. 30, 2003): 90% of population in each town with more than 2,800 inhabitants. In addition, coverage of areas outside these towns so that the total population covered is 2.8m.· **3.**During first five years (by Nov. 2005): 90% of population in each town with more than 200 inhabitants. In addition, coverage outside towns so that the total population covered is 3.75m (the total population of Norway is 4.3m).
	Norway	3G Licence	**NetCom**· **1**. During first year (by Nov. 30, 2001): 90% of population of the 12 biggest towns (in terms of population).· **2**. During the second year (by Nov. 30, 2002): 75.7% of total population.· **3.** During the third year (by Nov. 30, 2003): 76.5% of total population.
21	Portugal	3G Licence	**1.** Deadlines have been postponed. **2.** The starting date was the date of issue of the licence and is now the commercial launch date. · **a.** 20% of population after 1 year from commercial launch;· **b.** 40% after 3 years from commercial launch;· **c**. 60% after 5 years from commercial launch
22	Spain	3G Licence	The operators' licences in June 2004 (see Big Five Update No 49).For Telefónica Móviles and Vodafone, the target is coverage of 95% of the population by 2009 (five years after commercial launch). For Amena and Xfera, the 95% coverage deadline has also been extended to five years after commercial launch. (Only Xfera has not started to provide UMTS commercial services).
23	Switzerland	3G Licence	50% by 2004 (% of population coverage only)
24	UK	3G Licence	80% by end 2007 (% of population coverage only)
25	Cyprus		Minimum geographical coverage of 50% within two years and 75% within 4 years

26	Sweden	3G Licence	**1.** D25Full coverage (8.86m people) by the end of 2003 following the commitments made by operators. **2.** On June 28, 2004 TeliaSonera, Tele2, Hi3G, and Vodafone lodged a joint application to PTS for altered 3G coverage requirements:· An amended timetable for network construction, i.e. coverage of at least 7m people by Dec. 31, 2004; 8m by Dec. 31, 2005; 8.5m by Dec. 31, 2006 and 8.86m by Dec. 31, 2007.
Sources: COAI			