Telecom Regulatory Authority of India

Recommendations

on

Spectrum Management and Licensing Framework

11th May, 2010

Mahanagar Doorsanchar Bhawan

Jawahar Lal Nehru Marg,

New Delhi – 110002

Preface

In a world increasingly dependent on communications – man to man, man to machine and machine to machine, the need for spectrum cannot be overemphasised. We in India are in the throes of a rapid change in the telecom services, not only in terms of reach of voice communication but also in the induction of new technologies and expanding array of applications. Telecommunications will doubtless continue to play a vital role in the economic and social sphere. Given that wireless services continue to dominate the Indian telecom sector, the need for spectrum will only grow.

The next five years mark a decisive phase for the Indian Telecommunication Sector. The challenges before us are many, both in terms of making additional spectrum available for commercial use and to ensure that spectrum assigned is efficiently managed. Spectrum management, always a delicate task, assumes significance more than ever. The licensing framework is equally critical in that it should enable the service providers to be able to perform in conditions of predictability and transparency.

The issues, referred to TRAI in July, 2009 pertain to some very fundamental issues of spectrum management. The Authority has tried to handle them in a holistic manner and find reasonable solutions. All the stakeholders who have very handsomely responded to the consultation process and have given us adequately of their time, experience and expertise deserve our grateful thanks.

(Dr.J.S.Sarma)
Chairman, TRAI

CONTENTS

Executive Summary

1. In July 2009, the Department of Telecommunications sought this Authority's recommendations on the recommendations/comments of the committee on "Allocation of Access (GSM/CDMA) spectrum and pricing" of May 2009. It also sought this Authority's recommendations on the policy of no capping on the number of access service providers in terms of the pending applications for grant of new UAS licences from 26.9.2007 to 01.10.2007. A clarification was also sought relating to auctioning of spectrum other than 800, 900 and 1800 MHz bands.

2. The Authority issued a consultation paper in October 2009 and also held open house discussions in November-December 2009. These recommendations have been formulated keeping in view the comments received as well as the discussions held during the consultation process.

3. The recommendations are divided into five chapters. The **first chapter** deals with the issues of spectrum requirement and availability. An assessment of the demand for spectrum involves both an assessment of the number of subscribers and the nature of telecommunication services in the next five years. Going by the growth trends, the availability of services as well as the emerging trends relating to urbanisation and teledensity in both urban and rural areas, it is estimated that the number of subscribers by the year 2014/15 would be of the order of 1000 million.

4. Simultaneously, the nature of Telecommunications itself is undergoing considerable change from provision of only voice communication to increasing provision of data as well as of applications. The next five years are going to see the spread of 3G as well as the introduction of 4G services enabling subscribers to benefit from data and application services. An increasing availability of smartphones with significant processing capacity and a wide array of applications is resulting in higher requirements of spectrum. It is estimated that the total requirement of spectrum in the next five years would be of the order of 500 to 800 MHz including 275MHz for voice services alone. On the other hand, the availability of spectrum is only to the tune of about 287 to 450 MHz.

5. There is, therefore, need to bring in additional spectrum for commercial telecom services. In this direction, the Authority recommends that it should be entrusted with the task of carrying out a review of the present usage of spectrum available with the Government agencies so as to identify the possible areas where spectrum can be refarmed, and to draw up a suitable schedule. The Authority also recommends that a specific fund for spectrum refarming be created. The Authority would undertake regular spectrum audit to oversee the efficient utilisation of spectrum by the service providers.

6. The **second chapter** deals with licensing issues. The question before the Authority was to determine whether the number of service providers in a service area should be capped. In dealing with this issue, it was felt necessary to address first the question of committed spectrum, so as to determine whether any scope exists

for additional service providers. After due examination of the provisions of licences issued from time to time and related factors, the Authority concludes that the committed spectrum is 6.2 MHz in respect of GSM and 5 MHz in respect of CDMA.

7. Having settled this issue, the Authority examined the requirement of spectrum for the existing licensees to meet the contractual obligations and has arrived at the conclusion that keeping in view the scarcity of spectrum, no more UAS licence linked with spectrum should be awarded. In respect of the pending 343 applications received between 26.9.2007 and 01.10.2007, the Authority would like the Government to note that the above recommendation is subject to court decisions in this regard.

8. Currently, the only access services licence that can be given is the Unified Access Services (UAS) licence which is bundled with spectrum. There may however be some service providers who wish to provide services without using spectrum. In order to make provision for such service providers, the Authority recommends that spectrum should be delinked from the licences to be issued in future and that the future licence be unified licence. Since spectrum availability is no longer the consideration, the Authority recommends that there need not be any cap on the number of access service providers in a service area.

9. The Authority then proceeded to examine the licence conditions of the existing UAS licences. Insofar as licence fee is concerned, currently it is not uniform across licences and service areas. The differential licence fee gives rise to arbitrage opportunities which have been identified over the years. The Authority recommends

that there should be uniform licence fee across all Telecom licences and service areas. With about 2,60,000 towers, the Telecom Tower companies, who hold the IP-I licence (infrastructure providers-I) have a turnover of nearly Rs. 20,000 crore and this is expected to register a growth of 15% over the next few years. The tower companies are often an arm of the Telecom companies. Currently, the infrastructure providers are not covered under any license but hold registration. The Authority recommends bringing of all IP-I into the fold of licensing regime.

10. Internet Service Providers (ISP) hold a licence but pay a licence fee of only Re.1, except in those offering Internet telephony. It is noteworthy that the unified access services licence holders (Telecom companies) account for the major share of revenues from the Internet service provision. The Authority's recommendation is to charge licence fee from the infrastructure service providers as well as the Internet service providers in a graded manner beginning with 4% in the year 2010-11, to reach 6% in the year 2012-13. Currently, access service providers (Telecom companies) are charged a license fee of 10% in the Metros and category 'A' areas, 8% in category 'B' areas and 6% in category 'C' areas. The Authority recommends that this license fee be brought down progressively from the existing rates to a uniform rate of 6% by the year 2013-14.

11. As per the unified access services licence, the licensee is expected to cover at least 10% of the district headquarters in the first year and 50% of the district headquarters within three years of the effective date of licence. The licensee is also permitted to cover any other town in a district in lieu of the district headquarters. In the

Metro areas, the licensee is required to provide street coverage of 90% of the service area. The Authority is of the opinion that the present roll out obligations are very lenient besides being urban centric. The result is that even 15 years after the introduction of mobile service in the country, the rural teledensity is below 25%. Spectrum being a scarce resource, service providers are expected to use it optimally and provide coverage and service in the entire service area including the rural areas. The importance of telecommunications in the development of rural areas is well known. The Authority accordingly recommends that the following roll out obligation of coverage, in a phased manner, of habitations having a population of more than 2000 be imposed on the licensees.

Time	**Habitation >10000**	**Habitation 5000-10000**	**Habitation 2000-5000**
2 years from effective date	100%	50%	-
3 years from effective date	100%	100%	50%
4 years from effective date	100%	100%	100%

In the above roll out obligations, coverage of 90% or above habitations will be taken as compliance of the obligation.

12. The existing licensees, who have already completed more than four years may be given one more year to complete the roll out in required number of habitations. Failure on the part of a service provider to fulfil the proposed roll out obligations would entail penalty in the form of additional spectrum usage charges. For those service providers who cover 50% of the habitations with a

population of 500 to 2000, the Authority recommends that they be given the reduction of 0.5% in the annual licence fee for coverage of 50% of the habitations and 2% in case 100% of such habitations are covered (coverage of 90% and above is to be treated as 100%).

13. One of the issues referred to the Authority relates to the term of the licence and the renewal of licences. The current provision is that the licence is valid for 20 years from the date of issue and can be renewed for 10 years at one time. The Authority's recommendation is that the provisions of the existing licensing regime be maintained. A licensee must apply for renewal 30 months before its expiry and the licensor must convey its decision preferably within three months but not later than six months from the date of application. On renewal, the licensee will be required to pay a renewal fee which is equivalent to that of the entry fee for the proposed unified licence.

14. Spectrum will not be bundled with this licence at the time of renewal and must be applied for separately. However, keeping in view that a licensee would have a reasonable expectation that spectrum would be reassigned and also that, otherwise, service to millions of subscribers would be affected, the Authority recommends that while renewing the licence, Government should reassign spectrum but only upto the prescribed limits or the amount of spectrum assigned to the licensee before the renewal, whichever is less. Spectrum assigned to the licensee in excess of the prescribed limit, if any, shall be withdrawn. The spectrum will be assigned at the 'current price' (current price being recommended, at present, as the price discovered through the auction for 3G services).

15. Some service providers, largely those who have been given licences in the year 1994/95 and 1997, hold spectrum in the 900 MHz band. Currently, efforts are underway in different countries to refarm the 900 MHz spectrum in view of its value for providing 3G services and for future technologies. Accordingly, the Authority recommends that on renewal of the licence, spectrum held by a licensee in the 900 MHz band shall be replaced by assignment of equal amount of spectrum in 1800 MHz. The Authority will work out the details through a separate consultation process.

16. In so far as future licences are concerned, it has already been indicated that it would be not bundled with spectrum. The licences to be issued would be (a) unified licence, covering various access services, NLD/ILD, Internet, IP-I; (b) class licence covering V-Sat services; (c) licensing through authorisation; and (d) broadcasting licences. Insofar as unified licence is concerned, it can either be a national level licence a service area-wise licence. The entry fee would be nominal at Rs.20 crore for a nation-wide unified licence and Rs. 2 crore/1 crore/0.5 crore for service area-wise licence in category A/B/C service areas respectively. There will be no roll out obligations for such licences but the licensee will be required to pay licence fee at the applicable rate, subject to a minimum of 10% of the entry fee.

17. The **third chapter** relates to spectrum assignment and pricing. In chapter II, the Authority has established that the committed spectrum is of the order of 6.2 MHz/5 MHz (GSM/CDMA). While a licensee is entitled to be given the committed spectrum, the issue requiring a decision is the amount of spectrum that a licensee can be assigned beyond the contractual obligation and the criteria for

assignment of such additional spectrum. Having studied various parameters, the Authority came to the conclusion that the amount of spectrum required in GSM is 6.2 MHz for most of the areas in the country, 8 MHz for districts having cities with a population of 1 million or more and 10 MHz for the Metro service areas of Delhi and Mumbai. Similarly for CDMA, not more than 5 MHz is required in the whole of the country except in the Metro service areas of Delhi and Mumbai where 6.25 MHz of spectrum will be required. However, keeping in view the issues of level playing field both now and in future, the Authority recommends that the 'Prescribed limit' of spectrum i.e. the amount of spectrum that can be assigned by the Government to a licensee would be 8 MHz/5 MHz (GSM/CDMA) in the whole of the country except in the metro service areas of Delhi and Mumbai where it would be 10 MHz/6.25 MHz. However, spectrum assigned beyond contracted amount of 6.2/5 MHz (GSM CDMA) will be paid for at the Current price.

18. In so far as the criteria for assignment is concerned, the choice before the Authority was subscriber linked criteria, auction method or any other criteria. The Authority found that the subscriber linked criteria have the disadvantage of not taking into account factors like subscriber base density across service areas. With the advent of several new packages and dual SIM phones, the number of connections does not truly reflect the number of subscribers. The Authority accordingly recommends that the subscriber linked criteria be done away with for assignment of spectrum. Insofar as auction is concerned, this is a popularly accepted method and ideally would be a useful instrument to discover the market price when the number of contenders is large. But considering that the amount of spectrum that is available after meeting the obligation of

contracted spectrum is very limited and also considering that at any given time, the number of claimants for additional spectrum would be extremely few (since they would be meeting the eligibility requirements at different times), the Authority concludes that it is not feasible to subject the spectrum in 800/900/1800 MHz bands to auction process. As and when spectrum in 800/900 MHz band is refarmed, the same should be put to auction for 3G services or other future technologies.

19. On the other hand, the Authority favours the linkage of assignment of additional spectrum with the fulfilment of roll out obligations. For assignment of spectrum beyond 2.5 MHz and upto 3.75 MHz of CDMA, the service providers should have made the commercial launch and have covered 25% of the district headquarters or any other town in the district in lieu thereof. For assignment of spectrum beyond 4.4 MHz and up to 6.2 MHz in respect of GSM as well as beyond 3.75 MHz and up to 5MHz in respect of CDMA, the service provider should have covered at least 50% of the District headquarters or any other town in a District in lieu of the District Headquarters. The assignment is subject to the condition that the service provider will complete the prescribed roll out obligations for 2 years, within a period of 6 months from the date of assignment of additional spectrum. For assignment of spectrum from 6.2 to 8 MHz in respect of GSM and from 5 MHz to 6.25 MHz in respect of CDMA, the service providers should have completed the two years' roll-out target. The assignment is subject to the condition that the service providers will complete the roll-out target prescribed for three years within a period of one year from the date of assignment of additional spectrum. In Delhi and Mumbai, the service provider would be entitled for additional GSM spectrum beyond 4.4 MHz

upto 6.2 MHz on achievement of 90% street coverage of the Metro service area. Achievement of 5% and 10% of market share in the Metro service area would entitle the service provider for spectrum of 8 MHz and 10 MHz respectively. In respect of CDMA, the commercial launch and 90% street coverage would be the entitlement for spectrum from 2.5 MHz upto 3.75 MHz, and achievement of 5% and 10% of the market share in the Metro service area for 5 MHz and 6.25 MHz respectively.

20. The Authority's view is that adequate spectrum must be made available to the existing operators to enable them to perform their operations efficiently and also to be able to provide a level playing field to all the operators. Keeping this principle in view, the Authority recommends that the order of priority for assignment of spectrum shall be as follows: licensees who were given the initial start-up spectrum and are waiting to receive the committed spectrum; licensees who were assigned the committed spectrum and are awaiting to be assigned spectrum upto the prescribed limit; followed by those who are waiting to receive the initial start up spectrum.

21. In July 2009, the Department of Telecommunications sought a clarification regarding assignment of spectrum in bands other than 800/900/1800 MHz bands for non-commercial use. The Authority recommends that spectrum in such bands would be considered for non-commercial use only on a case by case basis after due reference to and recommendations from TRAI. However, such assignment will be done very sparingly.

22. The Authority then considered the question of pricing of spectrum. Several parameters were examined and the Authority concluded that the 3G prices could be adopted as the 'current price' of spectrum in the 1800 MHz band. At the same time, the Authority is conscious that there are conflicting views about the applicability of the price of 2100 MHz band to the 1800 MHz band. Keeping this in view, the Authority is separately initiating an exercise to further study this subject and would apprise the Government of its findings. Insofar as the spectrum in 900 MHz band is concerned, it will be valued at 1.5 times that of spectrum in 1800 MHz band.

23. The Authority has considered the question of treatment of excess spectrum and recommends that service providers should pay an additional one-time charge for the spectrum they hold beyond the committed spectrum. This will be paid at the current price for spectrum up to 8 MHz beyond which it will be charged at 1.3 times the current price.

24. The Authority is conscious of a concern that assignment of spectrum beyond 4.4 to 6.2 MHz is likely to be perceived as resulting in loss of revenue to the Government, particularly in the context of the current price of spectrum. At the same time, the licence conditions stipulate the contracted spectrum, as detailed in chapter II. Besides, several incumbent operators have received spectrum beyond the contracted limits free of cost and have benefited from the same over several years. The Authority would like the Government to take a well considered decision in this regard keeping all factors in view. The detailed position in this regard has been brought out in Paras 3.105 to 3.109.

25. In so far as spectrum usage charges are concerned, the Authority does not favour the levy of uniform spectrum charges. The

Authority, on the other hand, favours a continuation of the differential spectrum usage charges, with the operators having larger spectrum paying a higher percentage as compared to those with lesser spectrum. Accordingly, the Authority recommends that spectrum usage charges, both for GSM and CDMA spectrum, should be at the rate of 0.5% for every MHz up to the contracted spectrum and at the rate of 1% for every MHz in respect of spectrum beyond the contracted quantity, subject to a limit of 10% in respect of GSM and 7% in respect of CDMA. The Authority recommends that the changes effected on 25.2.2010 be suitably modified.

26. The **fourth chapter** relates to consolidation of spectrum. Considering the large number of service providers in each service area, and the position relating to availability of spectrum, the Authority believes that measures to consolidate spectrum should be facilitated. These measures include mergers & acquisitions (M&A), spectrum sharing and spectrum trading. The Authority examined the existing guidelines in this regard and recommends that merger/acquisition be allowed subject to there being a minimum of six service providers, post-merger. The market share of the Resultant entity should not be more than 30% of the total subscriber base and/or the AGR in licensed service area. The distinction between wireline and wireless service is proposed to be removed and the entire access market treated as the relevant market.

27. Consequent upon the merger of licences, the total spectrum held by the Resultant entity shall not exceed 14.4 MHz/10 MHz (GSM/CDMA). Excess spectrum if any beyond these limits shall be returned. The Authority also recommends that the Resultant entity

should be entitled to only one tranche of contracted spectrum i.e.6.2 MHz/5 MHz (GSM/CDMA) and for the balance spectrum, either of the merging parties should pay the spectrum price i.e. the difference between the current price and the sum already paid for the contracted spectrum. In addition, a transfer charge, amounting to 5% of the difference between the transaction price and the total spectrum price shall be payable before permission is granted. The duration of licence of the Resultant entity will be equal to the higher of the two periods on the date of merger. While a fresh licence will be issued in the name of the Resultant entity, the Wireless operating licences will be issued separately for the two sets of spectrum, retaining the respective validity.

28. The current UAS license conditions do not allow Spectrum sharing. The Authority recommends that spectrum sharing be allowed, between two service providers so long as each of them does not hold more than 4.4/2.5 MHz of spectrum (GSM/CDMA). Leasing of spectrum is not to be permitted. Parties sharing the spectrum will be deemed to be sharing their entire spectrum and sharing of partial spectrum is not to be permitted. Both the entities will pay the pro-rated current price of spectrum beyond 6.2/5 MHz in the ratio of spectrum held by them individually. Permission for spectrum sharing will be given for a maximum of 5 years. Both the entities will pay the spectrum usage charges on the combined spectrum.

29. The Authority considered the issue of Spectrum trading. In countries where spectrum trading is permitted, the spectrum is normally assigned through a market mechanism, i.e. auction, which is not the case except for 3G/BWA spectrum. Secondly, it is possible that allowing spectrum trading at this juncture might

result in anti-competitive conduct through consolidation/hoarding of spectrum or through an incumbent precluding the newcomers from providing service by buying out the spectrum necessary for such services. Thirdly, spectrum has only been assigned on a "right to use" basis for a fixed period to the service provider. A licensee has no ownership right to enable it to 'trade' in it. For these reasons, the Authority does not recommend spectrum trading, at least at this stage. This will be re-examined at a later date.

30. The **fifth chapter** deals with issues of spectrum management in the context of the need to balance the available spectrum with the existing and emerging requirements arising from various factors that have been listed in chapter I. It underlines the need for the regulator to be strengthened in the performance of its tasks in ensuring the observance of licence conditions and effective management of spectrum. Simultaneously, it also advocates the strengthening of the WPC wing of the Department of Telecommunications.

INTRODUCTION

1. Department of Telecommunications (DoT), vide its letter no. 20-100/2007-AS-I (vol-II) dated 7th July 2009 **(Annexure I),** sought this Authority's recommendations on the Recommendations /comments of the Committee on "Allocation of Access (GSM/CDMA) spectrum and pricing" of May 2009. In addition, the Authority has also been requested to furnish its recommendations on the terms and conditions of existing UAS/CMTS licence for extending validity of these licences perpetually or otherwise vis-à-vis 2G spectrum (GSM and/or CDMA) allocated and/or 3G spectrum owned by existing licensees, as the case may be.

2. Vide another letter dated 7th July 2009 **(Annexure II)**, DoT sought this Authority's clarification on auctioning of all spectrum other than 800, 900 and 1800 MHz bands as stated in para 2.79 of TRAI's recommendations dated 28.8.2007 on "Review of license terms and conditions and capping on number of access providers".

3. Vide a letter dated 22nd July 2009 **(Annexure III)**, DoT sought this Authority's recommendations on the policy of no capping on the number of Access Service providers in each service area in terms of pending applications for grant of new UAS licenses received from 26.9.2007 to 01.10.2007.

4. All the issues referred to above being inter-related and requiring a treatment in a holistic manner, TRAI issued a consultation paper on 16th October, 2009. All stakeholders were requested to give their comments as well as their counter comments, if any. After duly posting these on TRAI's website (as and when received), open house discussions were held with all stakeholders. Subsequently, a

few service providers also gave Presentations on the issue of spectrum requirement in different areas.

5. Vide its letter dated 2nd December, 2009 **(Annexure IV)**, DoT requested TRAI to furnish its recommendations on removing the arbitrage from the prevailing license fee structures across various service providers with due consideration of the revenue receipts of the Government and the growth of telecom services in India. This issue had already formed part of the consultation process.

Telecom scenario in India

6. The issues raised by the Department of Telecommunications pertaining to management of Spectrum and other policy issues need to be viewed in the context of the developing telecom scenario in the country. It is common knowledge that the telecom industry in the country has witnessed a phenomenal growth in the last decade. With 584 million mobile phone connections at the end of March 2010, India is today the second largest and the fastest growing telecom market in the world in terms of number of wireless connections. It continues to grow at an average rate of 17.82 million connections a month. It is noteworthy that the Indian Mobile subscriber base grew ten-fold in just 4 years (from 7.56 million subscribers in December 2001 to 75.94 million in December 2005) and then 7-fold over the next 4 years (from 75.94 million subscribers in December 2005 to 525.94 million in December 2009). A significant part of this growth in now taking place in smaller cities and rural areas.

7. Besides growth, what is significant is that the world and India are currently witnessing a fast technological evolution. Though over

the last decade, mobility has been primarily driven by voice usage and narrow band internet services, the latest networks support a wide range of broadband applications. The 2G wireless networks were primarily designed for voice services and the data throughput was limited. However, with the introduction of third generation networks, users experience true broadband speeds and Mobile operators are already registering notable volumes of data traffic on their networks. As per Ericsson[1], mobile data surpassed voice on a global basis in December 2009, and the crossover occurred at approximately 140,000 terabytes per month in both voice and data traffic. It is estimated that data traffic globally grew 280% during each of the last two years, and is forecast to double annually over the next five years. As per Cisco VNI Forecasts[2], globally, mobile data traffic will grow at a Compounded Annual Growth Rate (CAGR) of 108 percent between 2009 and 2014 and nearly 66% percent of the world's mobile data traffic will be video by 2014.

8. The roll out of HSPA+ mobile networks by a number of operators and introduction of smartphones in the market has given a fillip to the use of data applications by the users. There is a huge surge in the use of smartphones, with computer and Internet capability, that can run a wide range of data applications. With rising volumes and economies of scale, they are becoming more affordable. Studies show that iPhone users are five times more likely to use the mobile Internet than the average mobile consumer. Global sale of smartphones was 172.4 million in 2009 which amounts to a growth of 23.6% over the 2008 sales of smartphones[3] and 14% of

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[1] Mobile data traffic surpasses: Ericsson press report 23 March 2010

[2] http://www9.cisco.com/en/US/solutions/collateral/ns341/ns525/ns537/ns705/ns827/white_paper_c11-520862.html

[3] http://www.gartner.com/it/page.jsp?id=1306513

the total mobile sales of about 1.2 billion. In India too, smartphone penetration is expected to increase manifold by 2014.

9. Increasingly, the mobile phone is becoming a converged device to fulfil all communication needs of the user - voice, data, music, entertainment and information. Some of the key applications that appear to be driving mass-market adoption of wireless broadband include mobile video, social networking, enterprise productivity, user-generated content, instant messaging, and location-based services. Users, particularly younger ones, expect the same Internet experience on their mobile devices as that available on desktop systems and vendors are responding. Using next-generation infrastructure enhancements such as IP Multimedia Subsystem (IMS), operators will be able to make data services even more attractive. Mobile phones are also being put to innovative use in the delivery of health care, education, agriculture, commerce, governance etc. Mobile enabled machine-to-machine technologies are already assisting roll-out of smart grids with efficient power routing, smart buildings which optimise energy use for air conditioning and lighting and traffic management systems to maintain smooth traffic flow and reducing carbon emissions.

10. The emerging mobile applications are however data intensive. While mobile voice call typically consumes 6 – 13 kbps, enhanced high-speed mobile Internet access may consume up to 5 Mbps. The data requirement in some of the applications is given in the table below[4]:-

[4] http://www.linktionary.com/b/bandwidth.html

Data requirement of various applications

Database text query	Up to 1 Mbit/sec
Digital audio	1 to 2 Mbits/sec
Access images	1 to 8 Mbps
Compressed video	2 to 10 Mbps
Medical transmissions	Up to 50 Mbps
Document imaging	10 to 100 Mbps
Scientific imaging	Up to 1 Gbps
Full-motion video	1 to 2 Gbps

Table 1

With data applications consuming far more bandwidth than voice and with an increasing number of mobile users engaging in such applications, assignment of additional spectrum is imperative to continue expanding and upgrading the country's wireless internet and broadband networks. Changing pace of modern lifestyle, economic growth and technical developments, greater device sophistication and new bandwidth hungry applications will continue to drive demand for mobile services and spectrum.

11. Radio spectrum being a scarce and non-reproducible natural resource, spectrum management policies play a vital role in ensuring the efficient use of spectrum for the maximum good. The past decade has witnessed an impressive growth in Indian telecommunications. This has been possible largely due to the policy and regulatory framework, the efforts of the Indian entrepreneurs and the ready support given by the populace that in turn benefited handsomely from the communication explosion. Spectrum has always been and continues to be the underlying resource in all this effort. A rapidly changing world with increasing

demands on spectrum necessitates a review of the spectrum management policies as well as various issues in the management of the Telecom sector.

12. The Authority has approached this consultation exercise keeping in view the requirements of the Indian Telecom sector over the next five years. The recommendations on different issues, which are presented in the following pages, have been grouped under five Chapters. Issues related to spectrum demand, its availability and refarming for commercial usage are discussed in Chapter I. Chapter II deals with licensing related issues which include separating spectrum from license, limiting the number of service providers in a service area, framework for the future licenses, renewal of licences, etc. Chapter III covers issues related to spectrum assignment and pricing. Finally, issues related to consolidation of spectrum by means of M&A, spectrum sharing etc are dealt with in Chapter IV. Chapter V deals with certain issues of spectrum management.

CHAPTER I: Spectrum requirement and availability

A- Assessment of Spectrum Requirement

Number of subscribers

1.1 With the implementation of new technologies, high bandwidth applications and increasing users' requirement to have ubiquitous mobile network, significant amount of additional licensed spectrum will be required in future to fulfil the consumers' needs. A clear roadmap would enable the planning process to meet these requirements and to draw up suitable policies to manage the same. In this chapter, an attempt has been made to analyze the demand for spectrum for next 5 years and the measures required to fulfil the same.

1.2 For assessing the requirement of spectrum for the next five years, it is first necessary to estimate the number of subscribers of telecom services by 2014/15. In the consultation paper, the Authority projected that the wireless subscriber base figures by March 2014 will be over 1000 million subscribers. Several stakeholders agreed with this projection. One of the stakeholders submitted that the subscriber base projections made by COAI and TRAI are more or less the same and accordingly, the TRAI projections appear to be in order. Another stakeholder was of the opinion that it would be necessary to project Broadband (and in particular, Wireless Broadband) subscribers also, so that appropriate spectrum related decisions are taken to enable growth.

1.3 Those who were not in agreement with TRAI's subscriber base projections held the view that the projections based on CAGR of the previous years may not hold good for the future considering the limited scope for growth in some circles. It was felt that with 41.6% of the total Indian population earning less than $1 (PPP) per day, a mobile density of 86.66 was too optimistic. The likely implication of this is that beyond a certain number, growth may taper off and that as against the projected numbers, the number of actual subscribers may realistically be around 700 million. Estimates given by other respondents varied around 700 million, 839 million, 903 Million and 931 million subscribers by March 2014.

1.4 The Authority has examined the issue, keeping in view the demographic data as well as the trend of growth of telecom in the country in the last few years. The Authority estimates that by 2014, total number of users for voice services would be around 1000 million, in view of the factors cited below.

- As evident from Table-1.1, we are currently adding, on an average, 17.82 million new wireless subscribers every month. Even accounting for multiple SIMs and the assumption that over a period of time, this rate of growth will come down on account of increased teledensity, addition of around 450-500 million subscribers in next 4 years, translating into just 9-10 million subscribers per month, appears well within the realm of possibility.

Monthly growth of wireless subscribers

Month	Subscriber (In millions)	Addition during the month (in millions)
August '09	456.74	14.99
September'09	471.72	14.98
October '09	488.39	16.67
November'09	506.04	17.65
December'09	525.09	19.05
January'10	545.05	19.90
February'10	563.73	18.75
March'10	584.32	20.59
Average Addition		**17.82**

Table 1.1

- The large number of service providers, each vying for a reasonable share of the market, is expected to bring in larger addition of new subscribers.

- As per Census of India, the projected population in 2014 will be approximately 1239 million persons[5] and it is estimated that the share of the urban population will increase to about 40% of the total population by the year 2021[6]. Increasing urbanisation of our population is likely to result in around 37% of the total population living in the cities/major towns. Assuming urban and rural mobile teledensity at 125 and 60 respectively, the number of mobile subscribers in the urban and rural areas, by the year 2014/15, will be 572 million and 468 million

[5] http://www.censusindia.gov.in/ [Projected population]

[6] *Source: Ministry of Urban Development – JNNURM document Mission Overview*

respectively, totalling around 1040 million or say 1000 million. **Annexure V** gives the detailed calculation.

1.5 Regarding the number of data subscribers by 2015 and more importantly, the amount of spectrum which will be required to cater to their requirement, it is seen that presently, the number of subscribers, who have subscribed to data services is about 150 million as of Dec'09. This number was about 100 million in Dec'08 indicating a growth of approximately 50% in just one year. It is expected that the introduction of 3G and BWA technologies in the country will give an impetus to the growth of various applications and development of customised value added services and the number of the subscribers using data services will increase at a much faster pace.

B- Demand for Spectrum

1.6 The assessment of the requirement of spectrum needs to keep in view the foregoing. In the consultation paper, the spectrum requirement by 2014 for various services has been indicated as below and the views of the stakeholders were sought.

Future spectrum requirement for India

Service	**Total requirement (MHz)**	**Remark**
2G	274	GSM :-2x100 MHz CDMA:-2x37 MHz
3G	100	Assuming 5 operators with each 2x10 MHz
BWA	100	20 MHz each for 5 operators
LTE & Broadcasting	108	Including Mobile TV

Table 1.2

1.7 In their response, the stakeholders held divergent views. While some stakeholders agreed with the above projections, others observed that the spectrum requirement will be less than the projected figures since, in their view, 6.2/5MHz (GSM/CDMA) of spectrum is sufficient for any service area in the 2G bands.

1.8 Some stakeholders stated that fragmenting the available spectrum into small blocks introduces substantial inefficiency through multiplication of guard bands and is likely to impose significant costs on the industry and end-users. Their contention was that usage is now shifting to more data intensive applications, and that spectrum requirements for broadband data networks and applications are significantly higher than for voice. Long term decision-making which aims to encourage the deployment of broadband wireless networks should therefore ensure that operators are allowed to build sufficient scale to allow them to efficiently deploy such networks and services.

1.9 Stakeholders also voiced that the existing non-commercial users of spectrum should be encouraged to migrate to alternate technologies / bands or alternate network like fibre network. The Government should clearly establish a path for providing the spectrum for commercial use in different technologies / bands within a defined timeframe. Internationally, the average spectrum per operator is in the range of 20MHz – 25MHz while in India, it is very low.

1.10 In respect of spectrum requirements for 3G/BWA services (predominantly data services projected in 2.1, 2.3 & 2.5GHz bands), some stakeholders observed that the requirement will be more than 30MHz for each operator and therefore, the actual

spectrum requirement would be higher than the figures projected in the consultation paper.

1.11 Most of the stakeholders restricted their comments in terms of 800, 900 &1800MHz band i.e. for 2G/voice services and the likely requirement of spectrum for data services was not projected. However, in the open house discussion, when the Authority sought the opinion of the house for future spectrum requirement for voice and data, most of the services providers indicated an average of 70:30 ratio for voice and data applications.

1.12 In Chapter-II of these recommendations, while examining the issue of contracted spectrum to a licensee, the Authority arrived at the conclusion that the contracted amount of spectrum is 2x6.2 MHz for GSM technology and 2x5 MHz for CDMA. In chapter III, the Authority has concluded that spectrum requirement per operator will be to the tune of 6.2 MHz in most areas, 8 MHz in large cities having a population of more than one million and 2X10 MHz in Delhi and Mumbai service area. However, keeping in view the principle of level playing field, the Authority arrived at a uniform figure of 8 MHz as the 'Prescribed limit' for all Service areas other than Delhi and Mumbai service area where it would be 2X10 MHz.

1.13 As can be seen from **Annexure VI,** in various service areas the total GSM spectrum allocated to various service providers is in the range of 2X49.4 to 2X72.4 MHz and 2X10 to 2X15MHz in CDMA. These figures include the spectrum available with the old operators and the new operators, most of whom presently have spectrum below the contractual limits. In order to assess the future demand of spectrum, spectrum availability to all the operators up to the prescribed limit has been reckoned. With this

assumption, it is estimated that the total demand for spectrum for the operators using GSM technology will vary between 2x80 to 2x122.4 MHz. Similarly for CDMA, the demand for spectrum will be between 2X20 to 2x25 MHz. Taking into account the present availability of spectrum in various service areas, it is estimated that the future demand for additional spectrum will vary between 2x0.8 MHz in Kerala to 2x65.2 MHz in Delhi service area. Similarly in CDMA the demand for additional spectrum will be between 2x2.5 MHz to 2x8.75 MHz. The only service area where the supply exceeds demand by 2x3.6 MHz is Madhya Pradesh, where total demand is 2x90 MHz and the supply is 2x93.6 MHz.

1.14 Unlike voice service, where the demand for spectrum for future can be reasonably estimated by projecting the growth in the subscriber base in different service areas, estimation of spectrum requirements for data applications requires estimation of several parameters viz. types of application, available data speeds, number and pattern of use of subscribers to applications, and the technologies being deployed. Some of the present and future trends required to be taken into account for determining the spectrum requirement for data services have been elaborated earlier.

1.15 As per the data of December'09, in India, the number of subscribers registered for data services are about 28% of the total. However, it is not known as to how many of these registered subscribers are active users of data services. It is also not known as to how much data is being uploaded/downloaded by these users. With the types of applications and the development described in the foregoing paras, it is expected that introduction of 3G and BWA services by the operators in 2011, will give an

impetus to the growth of smart phones and other data enabled devices in the country and the number of data users and data volume will increase exponentially. Moreover, with the development of embedded technologies, machine-to machine and man-to-machine communication will also increase. It is projected that due to proliferation of embedded technologies, there will be about 50 billion wireless connections globally by 2014. India accounts for about 20% of the world population and if it is assumed that 20% of our population will live as in developed world in next 5 years, then in line with the world projection, the requirement of wireless data will increase in India too, and so will the demand for spectrum.

1.16 Based on the current trends, the International Telecommunications Union (ITU) report, "Estimated Spectrum bandwidth Requirements for the future Development of IMT-2000 and IMT-Advanced" has predicted that in the next 12 years the mobile industry will require three times more spectrum than in the last 20 years. A key challenge will be recovering additional spectrum which is scarce. ITU predictions are given in the table below:-

Future Spectrum Requirements

Demand Scenario	**Total spectrum Requirement (MHz)**		
	2010	**2015**	**2020**
High Demand Setting	840	1300	1720
Low Demand Setting	760	1300	1280*

Table 1.3

Source: ITU-R Report M.2078 (2006)

*Decrease is due to deployment of more efficient systems beyond current and near-term IMT-2000 systems

1.17 In the Consultation paper, it was projected that for mobile, broadband wireless services and broadcasting services including mobile TV, a total of 582 MHz (approx.) of spectrum will be required till 2014. However, in view of the responses received from the stakeholders, study of international trends and internal deliberations, the Authority has revised its estimation of future spectrum requirement especially for data applications.

1.18 While the mobile phones were (and are) predominantly used for voice services, services dependent on large data movement is increasing rapidly. A recent study through traffic measurements by Ericsson[7] has shown that the volume of traffic due to data exceeded the voice traffic in December 2009 and that the trend will continue. Therefore, while estimating bandwidth requirements of future wireless telecom networks, it is important to take this trend into account.

1.19 While suggesting an increase in the data traffic, the above study also noted that such traffic emanates mainly from about 10% of the mobile service users, and that too mostly from the smart phones used by them. (Ericsson has stated that approximately 400 million data users created more traffic than 4,600 million voice users during the study period). Therefore, we assume that for each data user there will be 11 voice users by the year 2014 as a starting point for our calculations.

1.20 A report by Cisco[8] gives country-wise trends in the growth of mobile subscribers that use data. This study also assumes that this data emanates mainly from the smart phones. Moreover, it

[7] Mobile data traffic surpasses: Ericsson press report 23 March 2010

[8] Cisco Visual Networking Index: Global Mobile Data Traffic Forecast Update, 2009-2014, February 2010

estimates that the smart-phone base is currently 4% among cell phone users in India and that this would increase to 12% by 2014. While simpler phones also may generate data, we assume that the bulk of data (both in volume and rate at which it is generated) will be predominantly by smart phones.

1.21 As indicated above, the number of cell phone users by 2014/15 will be 1000 Million. As per the data of December' 09, there are around 150 Million users who have subscribed to data services. With the introduction of 3G and BWA, it is expected that this number will increase at a higher rate in the next one year. Therefore, it is likely that apart from the estimated 150 million users, there will be another 100 Million users for the data services. These users are likely to create considerable data traffic. In so far as Smart phones are concerned, it is estimated that their number will be about 120 million by the year 2014. Even at a conservative estimate, there should be 80 million smart phones[9].

1.22 Assuming again that these users generate 11 times the traffic of a voice phone (from Ericsson study cited above), the following table gives an approximate estimate of the traffic by 2014.

[9] Cisco Visual Networking Index: Global Mobile Data Traffic Forecast Update, 2009-2014, February 2010

Traffic calculation by 2014

	Normal Estimate	**Conservative Estimate**
Number of smart phones by 2014	120 million	80 million
Number of other Data users	100 million	50 million
Number of pure voice subs	780 million	870 million
Traffic by smart phones (Assuming 1 billion phones produce 1 unit of traffic	220*11/1000=2.42	130*11/1000 = 1.43
Traffic due to voice	780/1000 = 0.78	870/1000 = 0.87
Assuming 1.5 times efficiency of new technologies	2.4	1.8
Total traffic	**2.4**	**1.8**

Table 1.4

1.23 Assuming bandwidth efficiency for data transmission will be at least 1.5 times that for voice, it is seen that the bandwidth required for data and voice service by 2014 will have to be 2.40 and 1.82 times the bandwidth for voice alone, assuming the two estimates as above.

1.24 Currently, the estimated bandwidth required for mainly voice service is about 274 MHz by 2014. Therefore, for voice and data services we need about 660 MHz and 500 MHz for the two scenarios above. The reports cited above also state that the data traffic increased by about 40% per year during the last few years and this trend is likely to continue, if not increase further. Moreover, the increasing trend may be much sharper in India

where adoption of such technologies is even more rapid. Therefore, the bandwidth needed by 2014 may be even as high as 800 MHz.

1.25 It is also true that a major part of this traffic may emanate from 3G services. However, this does not alter the need for bandwidth in coming years. It has to be noted that data traffic currently measured and monitored in the above studies emanated mainly from video traffic and social networking sites. However, in India the traffic is likely to come for the following main applications:

- Agriculture and extension services (may be the most important traffic, but its contribution to over all traffic may not be very high)
- Healthcare through telemedicine: There are a number of government schemes and other initiatives from medical service providers offering tele-medicine services, to extend affordable healthcare to all. Therefore, this sector is likely to increase the data traffic significantly.
- m-governance: This sector is a major area of growth and will need considerable data movement.
- m-education: This is to help bridge the supply-demand gap of high quality teachers in the country. Data traffic due to m-learning will go up considerably.
- Another major area requiring increased data traffic will be surveillance and safety devices employed by individuals as well as agencies such as police, and corporate entities.
- Other sectors such as mobile banking, m-commerce, tourism, mobile-entertainment, voice-web, gaming etc., will also push

the data traffic. Conventional video and social network traffic will also contribute to the data traffic.

1.26 In Table-1.2, the Authority has projected a requirement of around 308 MHz for the 3G, BWA and LTE & Broadcasting services with the assumption that 2X10 and 20 MHz of spectrum per operator will be sufficient for the 3G and BWA services respectively. Recent international trends suggest that in a few years, much more spectrum per operator than estimated will be required for these technologies to satisfy the users' expectations of higher throughput and quality of service. As per the WiMax forum, a minimum of 30 MHz of spectrum is required to achieve satisfactory throughput. Similarly, for technologies like HSPA+, 2X10 MHz is the minimum requirement and to get internationally comparable data speeds, higher amount of spectrum needs to be allocated.

1.27 The Authority is also recommending allocation of about 100 MHz in the 585-698 MHz band for the Broadcasting services including mobile TV so as to ensure digitisation of TV broadcasting and adequate number of terrestrial TV channels and another 100 MHz in the 698-806 MHz band for the future LTE requirement. Therefore, as per the revised estimate, there will be a requirement of around 800 MHz of spectrum to fulfil the demand for the future technologies and data applications. To fulfil these expectations, it is imperative that the process of identifying the potential bands and laying out a framework for vacation/refarming of spectrum is started without any further delay. An objective review in terms of spectrum audit and spectrum relocation & refarming to make it available for meeting the demand seems to have become critically important issue.

C- Availability of spectrum

1.28 Internationally, the entire usable spectrum has been allocated to 41 different types of radiocommunication services namely fixed service, mobile service, maritime mobile service, mobile satellite service, broadcasting service, radio navigation service, radiolocation service, aeronautical satellite service, etc. In India the major users of the spectrum are Telecom Operators, Doordarshan, All India Radio, Defence, Department of Space, Police, National Airport Authority, Railways, and Public sector undertakings etc.

1.29 Usable spectrum for various radio communication services is in the range of 10 KHz – 30 GHz. Internationally, the following bands have been identified for IMT and IMT- advanced for public telecommunication services: 450 MHz; 585-806 MHz; 800 MHz; 900 MHz; 1800 MHz; 1900 MHz; 2010-2025 MHz; 2.1 GHz; 2.3-2.4 GHz; 2.5-2.69 GHz; 3.3-3.4 GHz and 3.4-3.6 GHz.

1.30 The summary of total spectrum allocation versus its availability and likely availability situation is given in the table below:

Spectrum available for Telecom Service Providers in different frequency bands							
S.No.	**Frequency Band (in MHz)**	**Total available spectrum in the Band (in MHz)**	**Telecom**	**Spectrum currently available (in MHz) with**		**Likely additional available for Telecom by 2014**	**Total available for Telecom by 2014**
				Govt. Agencies	**Commercial**		
1	**450-470**	20	-	8-9	11-12 (State Police, Security Organisations, Captive Users)		
2	**698-806**	108	-	24-48	36 (Others)		
3	**806-824**	18	-	-	18 (CMRTS & PMRTS)		
4	**824-844**	20	20	2.5 (only in Jammu)	-		20
5	**869-889**	20	20	2.5 (only in Jammu)	-		20
6	**890-915**	25	18.6-21.8	1.2-6.4	-		18.6-21.8
7	**935-960**	25	18.6-21.8	1.2-6.4	-		18.6-21.8
8	**1710-1785**	75	35-75	0-40	-	20	55-75
9	**1785-1805**	20	-	20	-	-	
10	**1805-1880**	75	35-75	0-40	-	20	55-75
11	**1880-1900**	20	0-20 (after coordination)	0-20	-	-	0-20 (after coordination)
12	**1900-1910**	10	-	10			-
13	**1920-1980**	60	0-60	0-60	-	25	60-25
14	**2010-2025**	15					
15	**2110-2170**	60	60	-	-	-	60
16	**2300-2400**	100	40	24	36 (other	20	60
17	**2500-2690**	190	40	150	-	-	40
18	**3300-3400**	100	100 (ISPs)	-	-	-	100 (ISPs)
19	**3400-3600**	200	-	200	-	-	-
	Total	**1161**	**287.2-453.6**			**85**	

Table 1.5

D- Need for spectrum review & re-farming

1.31 As emphasised earlier, RF spectrum is a scarce natural resource. It cannot be produced, generated or created. The limitation of the spectrum arises from the fact that not every frequency band is suitable for a particular application, considering the propagation characteristics of different parts of the spectrum. Suitable equipment from multiple sources for a required application is generally available in limited frequency bands only. With the requirement of ever increasing data rates, different broadband wireless access technologies are coming on the horizon at a very fast pace and the spectrum requirement for such applications is also growing rapidly. Hence, there is a need to refarm the required

frequency bands periodically. At present, no part of the spectrum up to 40 GHz (approx.) is totally free/ unused.

1.32 To accommodate these new mobile technologies, a significant amount of additional spectrum will be required to be vacated from the existing applications. Against a projected demand of around 800 MHz of spectrum in various bands, out of 1161 MHz of identified spectrum, a minimum of 287 MHz and a maximum of 454 MHz is presently available. Spectrum being limited in availability, the main aim of the frequency management administrator is to ensure allocative efficiency i.e. the spectrum must be allocated in such a way as to maximize the creation of community wealth, resulting from its use. This general objective provides the foundation for the procedures for assignment of frequencies and for spectrum refarming.

1.33 Spectrum refarming (spectrum redeployment) is one of the tools of national spectrum management which combines administrative, financial and technical measures aimed at vacating users or equipment of existing frequency assignments either completely or partially from a particular frequency band. In view of increasing worldwide demand for radio communication services, spectrum refarming is considered a powerful and innovative approach to manage the spectrum dynamically so as to make it available for newer applications such as 3G, broadband wireless access, digital broadcasting etc. These new applications have a tremendous impact on the development of the countries. The frequency band may then be allocated to the same or different radio service(s). The different elements to be taken into account are:

a. National plans on new radio technology implementations;

b. Obsolete technologies;

c. The best international practice;

d. Results of Public consultation.

1.34 The Authority has studied the international practices in this regard. In Australia, the Australian Communications and Media Authority (ACMA) commissioned an Independent Review of Government Spectrum Holdings (IRGSH) in 2006 on the issues of stocktaking of government spectrum holdings, opportunity cost of government spectrum, identification of sharing or reallocation opportunities and spectrum regulation. One of the major recommendations of IRGSH was that all Defence footnotes and band allocations should be reviewed at regular intervals, not more than three years. In 2009, ACMA prepared a 'live document' called 'Five-year spectrum outlook- 2009-2013' with its demand analysis and indicative work program for the next five years with the objective of allocating spectrum to highest value use(s), encourage spectrum to move to its highest value use or user, promote both certainty and flexibility and balance the cost of interference and benefits of greater spectrum utilisation.

1.35 In Italy, the Ministry of Communications and the Ministry of Defence agreed to make 2x75 MHz spectrum available for WiMax, in the 3.4-3.6 GHz band.

1.36 On spectrum refarming, the U.K. Government has published a statement on Spectrum framework Review for the Public Sector[10] in January 08. As per the Statement, the Ministry of Defence (MOD) which has management rights to 35% of the spectrum bands listed in the UK Frequency Allocation Table (UKFAT),

[10] UK Spectrum strategy committee in consultation with Ofcom: Forward look: A strategy for Management of major Public Sector Spectrum Holdings

initiated a programme to identify which spectrum can be released and when.

1.37 In USA, On 23rd December, 2004, a fund called Spectrum Relocation Fund (SRF) was created by the Commercial Spectrum Enhancement Act (CSEA) to provide a centralized and streamlined funding mechanism through which Federal agencies can recover the costs associated with relocating their radio communications systems from certain spectrum bands, which were authorized to be auctioned for commercial purposes. The CSEA appropriated such sums as are required for relocation costs, which are financed by auction proceeds.

1.38 In September 2006, the Federal Communications Commission (FCC) concluded an auction of licenses for Advanced Wireless Services (AWS), on radio spectrum in the 1710 MegaHertz (MHz) to 1755 MHz band, paired with the 2110 MHz to 2155 MHz band. The 1710-1755 MHz band of spectrum used by Federal agencies was reallocated to AWS under the provisions of the CSEA, including the use of the Spectrum Relocation Fund (SRF) to facilitate relocation of Federal communications systems, while the 2110-2155 MHz band was reallocated to AWS by the FCC. Later on in March 2007, the Office of Management and Budget (OMB), in consultation with the National Telecommunications and Information Administration (NTIA), transferred funds from the SRF to 12 Federal agencies, in order to relocate their wireless systems from the 1710-1755 MHz band.

1.39 In view of the foregoing, it can be said that the reviews conducted by the Governments in other countries has resulted in creation of significant economic value by re-farming and harmonising international bands for mobile usage.

1.40 Presently, in India, there is no long term plan for meeting the immediate / future requirements of existing and new emerging wireless services in the spectrum management procedures. The Authority is aware that the DoT has drawn up a plan for release of a limited amount of spectrum in the 1800 MHz band. This however does not meet the full requirements of the telecom sector. The old assignments made to Defence and other Government and public sector entities need to be immediately reviewed and replaced with the existing spectrum efficient technologies. The Authority is of the view that a medium 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 account for the changing spectrum management environment. Though the requirement of spectrum for strategic functions of Defence and Space should get the due priority, it needs to be ensured that the spectrum available with these agencies is used most efficiently in view of the competing demands for this resource. The Authority would like to emphasise the need for the use of state of the art technologies by these agencies, as users of the spectrum allocated to them by the Government which is the sovereign owner of spectrum. Simultaneously, the feasibility of usage of alternate media, duly taking into consideration the opportunity cost of the spectrum, also needs to be explored.

1.41 As discussed earlier, the availability of spectrum for commercial wireless services in our country falls short of requirements and compares unfavourably with other countries. Although India has the second largest network in terms of number of mobile phones, it is lagging behind most countries in terms of introduction of 3G,

BWA and other data based services. This is primarily because of the uncertainty and delayed or non- availability of spectrum for these services. It is noteworthy that LTE is being introduced in other countries this year and is likely to be deployed widely in the next 2 years. If we wish to introduce high speed wireless services, essential for the economic and social development of our country, then it is necessary to take quick and firm decisions to vacate the spectrum useful for the commercial services and relocate some of the existing non-commercial services in other bands. The objective of this exercise would be to identify the possibilities of vacating higher amount of spectrum for commercial services including drawing up a definitive timeframe while simultaneously taking due cognizance of the requirements of Government agencies including Defence and Department of Space. A time bound action plan is needed to be prepared on priority basis covering objective review of the usage of the available spectrum, actual need of the spectrum, possibility of relocating in other less important band and refarming of the vacant spectrum.

1.42 As per section 11(1)(a) (viii) of the TRAI Act, 1997(as amended), the Authority has been entrusted the function of making suitable recommendations, *inter alia*, for efficient management of available spectrum. Accordingly, **the Authority recommends that it should be entrusted with the task of carrying out a review of the present usage of spectrum available with government agencies. The objective of this exercise will be:**

- **to identify the spectrum actually in use by them;**
- **to assess the efficiency of spectrum use;**
- **to identify possible alternative solutions;**
- **to examine the creation of a separate defence band;**

- **to draw up a suitable schedule for release of spectrum for Telecommunications.**

E- Spectrum re-farming: Band-wise analysis

1.43 As can be seen from the Table-1.5, out of the total 1161 MHz of available spectrum in the identified bands, around 40% to 55% is with Government agencies including Defence and DoS and only 85 MHz of spectrum is likely to be available by 2014. At a time of rapid technological evolution and globalization, the frequency bands allocated / assigned to them due to historic reasons has to be reframed/ vacated for the new upcoming usages / applications/ services which has come up now. There is a possibility that the Government agencies may be utilizing some of the spectrum assigned to them for the strategic purposes. However, the spectrum which is being utilized for the non-strategic purposes should be refarmed for use of commercial services. For this purpose, some existing usages may have to be relocated or confined to smaller sub-bands, as compared to their existing assignment.

450 MHz band (450-470 MHz)

1.44 As per the Radio Regulations (RR) foot note 5.286 AA, this is one of the identified bands for IMT. IND 34 in National Frequency Allocation Plan 2008 (NFAP) states that 450.5-457.5 MHz paired with 460.5-467.5 MHz may be considered for coordination on a case by case basis subject to its availability. Out of the total 20 MHz spectrum, 8 to 9 MHz is held by the Government agencies and the remaining 11 to 12MHz is with captive users.

1.45 In its recommendations on 'Allocation and pricing of spectrum for 3G and BWA services' dated 27th September, 2006 the Authority examined and considered that there exists a possibility to allocate 2 x 5 MHz in the 450 MHz band for EV-DO services. This band is allocated in countries like Argentina, Finland, Indonesia, Oman, Pakistan, Portugal, Romania, and Russia with 23 EV-DO networks planned or operational.

1.46 The Authority is of the opinion that in view of excellent propagation characteristics, and suitability for coverage in rural areas and to provide additional spectrum to the CDMA operators for EVDO, 2x7 MHz of spectrum in this band needs to be refarmed from the existing users.

700 MHz (Digital Dividend)

1.47 The 700 MHz band is the set of frequencies between 698 and 806 MHz, in the Ultra High Frequency (UHF) band. In many countries this band is presently being used for analogue TV transmission. In India, Defence and BSNL are operating some point to point microwave links in 610-806 MHz and Public Protection & Disaster Relief (PPDR) has some spots earmarked in 750 – 806 MHz. Of the 108 MHz of spectrum in the 700MHz band, 24-48 MHz of spectrum is available with the Government agencies while 36 MHz is presently being utilized for the commercial usages.

1.48 Internationally, this band or portion of the band 698-806 MHz has been identified to implement IMT services. As per the NFAP foot note IND 37, the 585-806MHz band is predominantly for broadcasting services including mobile TV and the requirements of IMT and BWA services may be considered and co-ordinated in the 698-806 MHz band. Of the 108 MHz spectrum in this

frequency band, 24 MHz is held by Defence, 48 MHz by broadcasting services and the remaining 36 MHz is with captive users.

1.49 Being a sub 1GHz frequency, the 700MHz band has the following advantages:-

- Better propagation characteristics .
- Signals travel farther and pass through walls and other obstacles much better than existing cell phone networks do, leading to a less number of cells to provide the same coverage.
- Less capital expenditure is required for roll-out of services.
- Less power is required to run a mobile phone/Internet cell on the 700 MHz band than other bands, which are at higher frequencies.
- Due to less CAPEX, larger wavelength and better propagation characteristics, this band is useful to provide wireless broadband services particularly in rural & far flung areas. Also, it is suitable for the higher bandwidth hungry application eg. 4G services. Thus higher bandwidth at lower cost can be provided.
- The spectrum in the 700 MHz band allow for the creation of a national broadband public network with enhanced communication capability.

1.50 Developing a harmonized arrangement for this band is extremely important so that it is possible for the mobile industry (operators and manufacturers) to provide low cost mobile access and achieve economies of scale avoiding radio interference. The possibility to use the 700MHz (698 – 806 MHz) band (digital dividend), for mobile communication must be explored in the national interest to provide low cost efficient wireless solutions for voice and high

data-rates. This will have positive impact in the overall economic development and inclusive growth in the country.

1.51 As mentioned earlier, presently the main usage of this band is point to point microwave access by BSNL and usage mainly by Defence. The Defence has informed the Authority that the band 698-806MHz is an important communication band being used by Defence services and Defence will not be able to vacate or refarm the usage of the said band.

1.52 In the consultation paper, the Authority had raised the issue as to how and when the spectrum in 700 MHz band be allocated between competitive services and sought the comments on the impact of digital dividend on 3G and BWA.

1.53 In their response, most of the stakeholders were of the view that the 700 MHz band should be made available for telecommunications. Some stakeholders desired the Government to get this band vacated and spectrum allotted to operators when LTE technology is available for commercial use. One stakeholder opined that 3G and BWA service providers will be highly interested in acquiring digital dividend spectrum licenses due to its propagation characteristics and impact on network costs. Flexibility including duplex method, choice of technologies, and amount of spectrum should be provided in use of the assigned spectrum. ISPs were of the opinion that this band should be kept for BWA for pure ISPs and the Operators who get the 3G spectrum (in 2.1 GHz band) should not be assigned 700 MHz spectrum. Another stakeholder opined that some portion of this band may be kept for Digital TV and the balance can be considered for alternate use.

1.54 Earlier, in its recommendation on 'Growth of Telecom Services in Rural India' (Oct.2005), the Authority recommended that 700 MHz band be allocated for use by advanced wireless technologies in rural areas. This recommendation was reiterated by the Authority in its recommendations on 'Allocation and pricing of spectrum for 3G and broadband wireless access services' dated 27th Sept.2006.

1.55 Later on in its recommendations on 'Mobile TV' (Jan 2008), the Authority recommended:

- *Earmarking of carriers in the UHF Band V (from 585 MHz – 806 MHz) for terrestrial mode of mobile television transmission.*
- *Apart from Doordarshan, private operators may be assigned at least 1 slot of 8 MHz each for mobile TV operation using terrestrial systems.*
- *Grant of mobile television license should entitle a licensee for allocation of 8 MHz spectrum only for terrestrial transmission, irrespective of technology and standards used.*

1.56 As mentioned earlier, regarding the allocation in this band, the National Frequency Allocation Plan-2008 mentions that :

> "*In the context of frequency band 585-806MHz, bearing in mind that the band is predominantly for broadcasting services which include mobile TV, requirements of IMT and Broadband Wireless Access (BWA) subject to availability of spectrum in the frequency band 698-806 MHz may be considered for coordination on case by case basis, as appropriate.*"

1.57 Based on the forgoing discussion and looking at the low probability of vacation of spectrum in the other bands in near future, the Authority is of the opinion that in order to keep pace with the advancement in the areas of telecommunications particularly wireless broadband, it is necessary to revisit its earlier recommendation on Mobile TV.

1.58 As per the National Frequency Allocation Plan, the band 470-806 has been allocated to Fixed, Mobile and Broadcasting services on primary basis. Spectrum for terrestrial broadcasting services has been allocated as:

Spectrum allocations in UHF band IV and V

Band	Spectrum (MHz)	No. of TV channels in analog mode	TV Channel No.
UHF Band IV	470 - 582	14	21 – 34
UHF Band V	582 – 806	28	25 – 62

Table 1.6

1.59 **UHF Band IV**: There are 14 TV channels available in the UHF Band-IV (470 -582 MHz) with 8 MHz channel bandwidth. Doordarshan has been assigned spectrum in this band to operate about 330 transmitters in this band. Its three digital TV transmitters at Kolkata, Chennai and Mumbai are also operating on an experimental basis in this band. Recently it has started its mobile TV service in Delhi using DVB-H technology in this band at channel 26. Additionally, it has received a few more frequency assignments for the digital transmission.

1.60 **UHF Band-V**: In this frequency band, there are 28 channels available with 8MHz bandwidth in the sub-band 582-806 MHz. Doordarshan has not been assigned any channel in this sub-band for analogue TV transmission. However, frequency earmarking has been made in favour of Doordarshan to operate a digital transmitter, one each for four metros. It is also planning for

upgradation of its 14 analog TV Channels transmission to digital TV transmission.

1.61 The requirement for spectrum for digital terrestrial transmission can be met within the broadcasting bands. Existing analog TV channel requires 8 MHz carrier for transmission whereas 3-8 TV channels can be accommodated in one 8 MHz carriers in digital TV transmission. Using conservative estimate, it means that Doordarshan would require at the most 4 more 8 MHz carriers to accommodate existing 14 TV Channels for simultaneous transmission of digital TV and analogue TV during the transition period. This requirement can be met by assigning spectrum in 582 – 698 MHz band. Requirement of spectrum for terrestrial Mobile TV broadcasting services and private digital transmission could also be met in the frequency band 582 – 698 MHz band and the band 698 – 806 MHz can be completely utilized for the IMT. In view of the foregoing discussion, **the Authority recommends the following:-**

- **585-698 MHz may be earmarked for digital broadcasting services including Mobile TV.**
- **698-806 MHz be earmarked only for IMT applications.**

Refarming of 800 & 900 MHz bands

1.62 As per ITU, both 800 and 900 MHz have been identified as IMT bands. As discussed in the consultation paper, there is a growing interest in deploying UMTS in the 800 and 900 MHz frequency bands in order to reduce the cost of coverage for mobile communications services, especially in rural areas. The 900 MHz band is very valuable for providing 3G and LTE services. Being a sub 1GHz band, the 900MHz band has the same advantages over

other bands as have been mentioned earlier for the 700 MHz band.

1.63 The 900 MHz spectrum is far more efficient than the 1800 MHz and the 2100 MHz spectrum as can be seen from the Table below[11]:

Impact of Frequency on base station densities

Base stations per km^2	UMTS 900	UMTS 1800	UMTS 2100
Suburban	0.017	0.027	0.037
Remote/rural	0.008	0.013	0.018

Table 1.7

1.64 As per Global mobile Suppliers Association (GSA), the comparison of WCDMA coverage in Figure below yields site ratios of approximately 2.9 for voice and 3.1 for 1 Mbps data.[12]

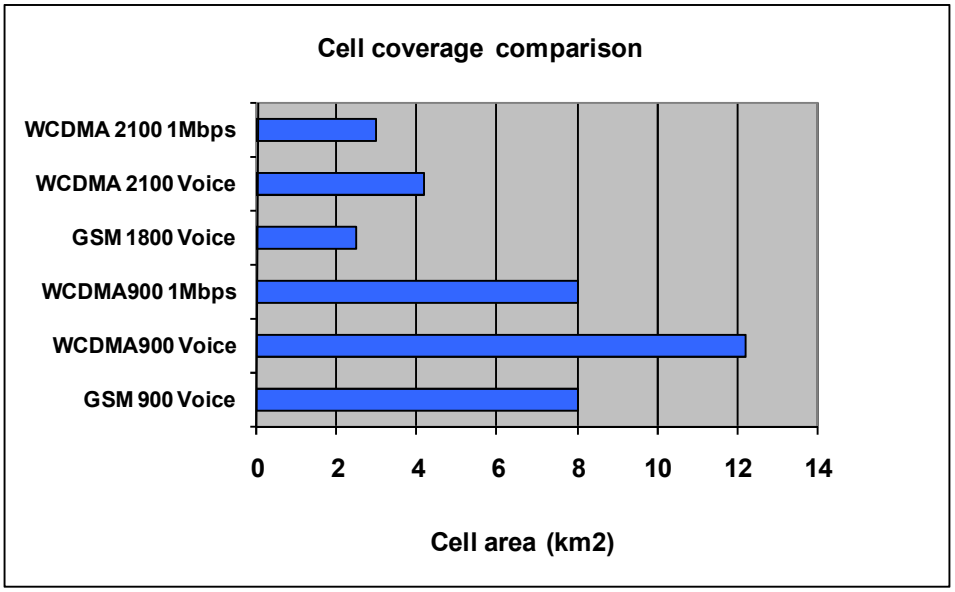

Figure 1.1

[11] http://www.analysysmason.com/PageFiles/14182/GSM_refarming.pdf

[12] Source: Ofcom

1.65 The 900MHz band is one of the most used bands in the world. GSM operators all over Europe, Africa and Asia use this band extensively, which makes it one of the most "harmonised" bands in the world. All operators using the 900MHz have started with GSM services and most of them have already acquired 3G licenses in the 2.1 GHz band. This business evolution makes UMTS900 a most attractive option for operators and a likely follow-up technology for the future. This is primarily due to the propagation characteristics of the lower frequency band leading to lower Capex and increased mobility benefits, providing a new option, with greater service capability for operators who may wish to replace their GSM networks. The indicative coverage area increase is shown in the following Table:-

Percentage increase in coverage area[13]

Frequency	**Percentage increase in coverage area per Node-B (km^2)**			
	Dense Urban	**Urban**	**Suburban**	**Rural**
900MHz vs. 2100MHz	87%	44%	60%	119%

Table 1.8

1.66 One of the studies has demonstrated that UMTS900 can effectively generate cost reductions of up to 40% in Capex and 30% in overall costs when compared to a baseline case scenario of deployment using UMTS at 2100MHz. These lower costs are primarily due to the radio propagation characteristics in the lower

[13] http://www.gsmworld.com/documents/umts900_exec_sum.pdf

band which provide greater reach of UMTS900 and improved in-building coverage[14].

1.67 Some Regulators, especially in developed countries, have already initiated discussions about new 2G spectrum management policies, the re-farming of GSM bands and the processes to be followed for the migration of GSM services to UMTS services. The issue whether to refarm (i.e. reallocate) spectrum in the 900MHz band, which is currently assigned to GSM services, to allow mobile network operators to operate UMTS services in the spectrum is being considered by several regulators. Following Table gives details of some of the countries where the operators have launched the UMTS900 networks.

[14] Ovum report, commissioned by the GSMA and QUALCOMM (Feb. 2007)

Launching of UMTS900 commercial networks			
S. No.	**Name of Country**	**Name of Operator**	**Month of Launch**
1	Finland	Elisa	Nov-07
		DNA	Oct-08
		TeliaSonera	Jun-09
2	Estonia	Elisa	Jan-08
3	Thailand	AIS	May-08
4	Australia	Optus	May-08
		Vodafone	Aug- 09
5	Belgium	Mobistar	May-08
		Proximus	Jul-08
6	New Zealand	Vodafone	Jul-08
7	Iceland	Siminn	Oct-08
8	Venezuela	Digitel	Mar-09
9	Latvia	LMT	Nov-09
10	Poland	Aero2	Nov-09

Table 1.9

1.68 As the spectrum in 900 MHz band is far more efficient both technically and economically, there are the following two options available - either to refarm the spectrum and distribute it among all operators at the rate of 2.4 MHz, or to refarm the spectrum and assign it for 3G services.

1.69 Redistribution of 900 MHz spectrum among all the GSM operators would mean fragmenting the spectrum below 5 MHz block. As indicated above, the 900MHz band is valuable from 3G point of view and utilising it for 2G purposes would mean

uneconomic use of a valuable commodity. Moreover, by the time the refarming of spectrum is completed, most of the operators would have rolled out their 2G networks and assignment of 900 MHz at that stage may not result in any major advantage to them. Therefore, to exploit the full potential of this band and in line with the international practice, this band should be used to provide IMT services. It is all the more required as the available spectrum in the 2.1 GHz band is also limited and currently only 4 blocks, and that too only of 5MHz each, are being allocated .

1.70 Regarding the 800 MHz band, spectrum is not even available for allocation to the operators as per their contractual requirement. Apart from the fulfilment of contractual obligations, additional spectrum is required for the CDMA operators for the EVDO services. The Authority is also recommending refarming of spectrum in the 450 and 1900 MHz band. In case sufficient spectrum is refarmed in those bands, then the Authority would also like to assign 800MHz band for future technologies.

1.71 The next question is the timing of refarming. The Authority is of the opinion that as the operators were given the spectrum as per the terms and conditions of the license and subsequent administrative orders of the Government, to take it back at this stage may not be legally tenable. The first two licenses are due for renewal in 2014/2015, which would be the time the 900 MHz/ 800 MHz bands can be refarmed.

1.72 There is, at the same time, a need to carefully assess the likely impact of the refarming of 900 MHz spectrum in terms of the management of the traffic, as well as the frequency coordination and reconsideration of the spectrum. Spectrum refarming poses significant challenges for operators such as the need for guard

band and transitional zones, management of voice and data traffic loads. Issues of site optimisation would also require to be studied. The Authority is of the opinion that even as there should be a definite decision to refarm the spectrum, the details are to be worked out in greater detail, for which a separate consultation process may be necessary.

1.73 **The Authority recommends that spectrum in 800 and 900 MHz bands should be refarmed at the time of renewal of the licenses. For holders of spectrum in 900 MHz band, substitute spectrum should only be assigned in 1800 MHz band and for licence holders of 800 MHz band, spectrum should be assigned in 450 /1900 MHz bands.**

1.74 **The Authority will carry out a separate consultation process on the issues involved in the refarming of 800/900 MHz spectrum and shall endeavour to give its recommendations before the licences come up for renewal.**

1.75 In the consultation paper, a question was raised regarding restrictions on the usage of spectrum in the bands of 800/900 and 1800MHz for providing a specific service. Views were also sought on the assignment of spectrum in 800/900 MHz bands after the expiry of present licenses. As regards the first part of the question, most of the stakeholders agreed that the UAS Licenses are technology / service neutral and no restriction should be placed on any telecom operator to provide any specific service in 800, 900 and 1800MHz bands so long as it does not interfere with any service / technology / band / operator. However, some stakeholders also added that as the specific spectrum bands allocated to the Licensees are not technology neutral as separate bands and bandwidths are allotted for GSM and CDMA operators,

UAS Licensees do not have an automatic right to use the allotted spectrum for offering services utilizing UMTS / HSPA / and other 3G technologies in the 800/900/1800 MHz bands.

1.76 The response to the second part of the question, regarding the mechanism to be used for assigning spectrum in the 800/900 MHz bands after the expiry of the licenses, was based on the band in which the operators are presently holding the spectrum. Operators having 900 MHz of spectrum were of the view that at the end of the license period when the assigned spectrum reverts to the licensor, the licensee holding the spectrum should be given the first right of refusal for the same spectrum for the next 20 years. Some stakeholders however were strongly of the opinion that even today, level playing field has been disturbed on account of some operators having spectrum in the 900 MHz band, which is a far more valuable spectrum ,while others have been given spectrum only in the 1800 MHz band. Their view was that the entire 800 / 900 MHz spectrum, after expiry of the license, should be refarmed and put up for auction, where after, the winner may be allowed to use it for 3G technologies. This is particularly so because current holdings traditionally are quite fragmented and cannot directly be used for other technologies, while respecting the spectrum mask. To facilitate this exercise and protect their customer's interest, the operators should be given advance notice of 3 years of this intent. One operator stated that the 900 MHz band should not be renewed automatically; rather all efforts should be made to give spectrum in 1800 MHz as a part of spectrum harmonization and refarming. Only in case this is not possible, should the spectrum in 900 MHz be renewed subject to a sufficiently higher fee to reflect the true market value of this band. Some stakeholders suggested that in view of the

better propagation characteristics of spectrum in the 900 MHz band, all service providers should have equitable access to 900 MHz spectrum band and no operator should have more than 2x2.4MHz spectrum in this band.

1.77 In India, spectrum in the 900 MHz band has been assigned to mostly first three cellular licensees in most of the service areas. The subsequent licensees were given spectrum in 1800 MHz only. Of the 25 MHz paired spectrum, 18.6 to 21.8 MHz is already assigned to various commercial telecommunications service providers across the country, 1.2 to 4.8 MHz is with Defence and the remaining 1.6 MHz is with Railways.

1.78 On the issue of restrictions on the usage of spectrum in the bands of 800, 900/1800 MHz for providing a specific service, it is true that the UAS license is service and technology neutral and the licensee can use any recognized technology. However, the spectrum given in the bands of 800, 900/1800 MHz are for using specific technology i.e. CDMA and TDMA (GSM) respectively. The Wireless Telegraphy License given for using spectrum in these bands also restricts the licensee to use particular technology i.e. either CDMA or GSM. As such, the Authority is of the opinion that the licensee is permitted to use the assigned spectrum only for deploying the specific technology as specified in the Wireless Telegraphy License.

1800 MHz band

1.79 As discussed earlier, out of 75 MHz of paired spectrum in this band, only 35 MHz is available for commercial services in a number of service areas. As per WPC, it is expected that the

Defence will vacate 2x20MHz of spectrum in 1800MHz band which will be refarmed for 2G services. As per the available information, the schedule of vacation of this 2x20MHz spectrum by Defence is subject to procurement and installation of alternate media. The Authority would like this schedule to be hastened. In case this spectrum is refarmed, then with the deployment of spectrum efficient techniques, the requirement for the future voice traffic will be more or less met in all service areas except Delhi, subject to the condition that these bands are used primarily for voice. However, the Authority is also recommending refarming of spectrum in the 900 MHz band from the incumbents and re-assigning it for the use of 3G services. Therefore, additional spectrum in the 1800 MHz band will be required to compensate for the refarmed 900 MHz spectrum.

1900MHz band (1850 –1910 paired with 1930-1990 MHz)

1.80 This band is popularly known as PCS1900 band. The Indian Defence services are extensive users of this band. Low power TDD CorDECT systems also use 1880-1900 MHz, with an additional band earmarked in the 1900-1910 MHz range for future microcellular TDD technologies. In view of non availability of future growth path for the CDMA operators in the 800 MHz band, this band can be used as an alternate band for the CDMA. However, as the 2.1 GHz uplink band (1920-1980 MHz) overlaps with the PCS1900 downlink band (1930-1990 MHz) except for 10 MHz between 1980-1990 MHz, it is contended that there would be interference at the WCDMA base station receiver and the CDMA2000 handset receiver if both bands operate simultaneously. Therefore only 2 x 10 MHz (1900-1910 MHz paired with 1980-1990 MHz) can be made available in this band,

that too only if the future requirements of microcellular TDD technologies are covered in some other band.

1.81 The Authority in its recommendations on 'Allocation and Pricing of 3G and BWA services' dated 27th Sept.2006 had recommended that the Government should conduct the trial to verify practical feasibility of coexistence of mixed band allocations. Further, in the above mentioned recommendations, the Authority recommended 2 carriers of 2x1.25MHz each to be dedicated for EVDO services as the equipment for EVDO services is readily available in the 800 MHz band. It is learnt that the trial has been conducted and the results of the trial are being analysed. As the Authority is considering refarming of 800 MHz in future, spectrum in PCS1900 MHz and in 450MHz will be needed so that the service providers in 800MHz band can be relocated in 450 and 1900 MHz bands.

2300-2400 MHz

1.82 As per the Radio Regulation provisions, this band is among the IMT identified bands. In the country also, this band has been allocated for IMT applications including BWA on a case by case basis. Out of the total 100 MHz spectrum, 40 MHz has been allocated for commercial telecom services, 24 MHz is with Govt. agencies and the remaining 36 MHz is with captive users. A number of captive users like State electricity boards, power utilities, oil companies, railways and security organizations have deployed point to point microwave links in this band. The 40 MHz of spectrum allocated for the commercial telecom service is scheduled to be allocated through auction for the BWA services. However, only two operators will be able to get the available spectrum. In view of the fact that there should be at least 5 to 6

operators providing BWA services in each service area to provide effective competition, and the present allocation of 20 MHz per operator may not be sufficient to take care of the future technological requirements, it is imperative that the remaining 60MHz of spectrum in this band needs to be refarmed in a short span.

2500-2690 MHz

1.83 As per the NFAP provisions, INSAT system uses the frequency band 2535-2655 MHz for Radio Networking, cyclone warning dissemination system, meteorological data dissemination, satellite time frequency dissemination and digital multimedia applications (BSS). Requirements of IMT applications including Broadband Wireless Access (BWA) may be considered for coordination on a case by case basis in this band. Many countries, including the United States, Brazil, Mexico, Singapore, Japan, Hong Kong, and Canada, have identified and allocated the 2.5 GHz band for all types of wireless systems. The ITU's Radio Regulations identify this band as an extension band for IMT-2000 and beyond.

1.84 Out of 190 MHz in this band, 150 MHz is with the Department of Space (DoS), of which 80MHz is earmarked for Broadcast Satellite Service (BSS), and remaining 70MHz is earmarked for Mobile Satellite Service (MSS). The balance 40 MHz is for the Local Multichannel Distribution system (LMDS) and Microwave Multichannel Distribution System (MMDS) applications.

1.85 The Authority in its recommendations on "Allocation and pricing of spectrum for 3G and broadband wireless access services" dated 27th September 2006 had recommended that the 40 MHz in use for LMDS and MMDS (2.535-2.550 GHz and 2.630-2.655 GHz) be

vacated or refarmed by end 2007, and that an additional 40 to 80 MHz be coordinated with DoS in the same timeframe. The DoT has assigned 20MHz of spectrum to BSNL/MTNL for BWA services in most of the service areas in the 2635-2655 MHz band, under sharing/ co-ordination with DoS.

1.86 As this is an important band identified for the 3G services, the Authority would like to review the usage by the incumbents and refarm for the commercial services.

3.4-3.6 GHz

1.87 This band has been identified for IMT applications by WRC 2007. National allocation has been made in NFAP that the requirement of IMT including BWA may be considered on a case by case basis subject to appropriate protection from out of band emission to the networks in the Fixed Satellite services operating in the band 3600- 4200MHz. Presently, the entire 200MHz has been assigned to DoS in the country. Earlier, DoS had informed the Authority that the lower extended C band from 3.4 to 3.7 GHz is being used for INSAT satellite for television reception. As per the DoS, "use of these bands for terrestrial application... has to be technically coordinated after detailed space-terrestrial system interference analysis." Further, they informed that they have undertaken a study of these aspects and findings are expected shortly.

1.88 Accordingly the Authority in its recommendations dated 27th September, 2006 had recommended that "the DoT should get 100 MHz for broadband wireless applications in the 3.4 – 3.6 GHz band, coordinated with DoS urgently and make appropriate allocations"

1.89 In its recommendation on 'Allocation and Pricing of 2.3-2.4 GHz, 2.5-2.69GHz, 3.3-3.6 GHz' dated 11th July, 2008, the Authority observed that *"the Authority does not have any information regarding the efforts made by the DoT/WPC to coordinate with Department of Space (DoS) for spectrum in this band and also results of the study done to find solution to the interference problem in this band between the satellite and terrestrial wireless services."* Further, the Authority noted that *"in response to the consultation paper, a number of stake holders particularly DoS, broadcast and satellites service operators (CASBAA, Asianet etc) have also strongly opposed the allocation of this band(3.4-3.6GHz) for BWA services citing interference problem (both in-band and out-of-band) between terrestrial wireless services with the satellite services. They have submitted that since a number of satellite based services are located in the 3.4-3.6 GHz band which is a lower extended C-band and is already being used, it would be very difficult to vacate spectrum in this band and re-locate satellite services in some other bands".* Considering the fact that there was no clarity on the use of this band in the country, the Authority then decided not to make any recommendation for 3.4-3.6GHz unless DoT assess the compatibility of satellite based services with the terrestrial BWA services and a detailed analysis is done in a transparent and time bound manner to ascertain the feasibility of mitigation of the interference problems reported by some of the stakeholders including DoS. The results of such an exercise, if carried out, are not known. Keeping in view the significance of this band for IMT and BWA, it is necessary that the effort be pursued.

1.90 **The Authority would undertake the refarming exercise, at the end of which it would work out and recommend the process and timeframe for refarming.**

1.91 The Second Committee has recommended that the government should set up a committee to develop a roadmap for exploiting the digital dividend. The proposed refarming exercise would cover this activity.

1.92 As discussed in the foregoing paras, by carrying out an effective refarming exercise, it should be possible to vacate about 350-400 MHz of spectrum from the present users. Most of this refarming will have to be done from the Government agencies including Defence and Department of Space. As the spectrum assigned to these agencies is being used for some specific purposes, either an alternate media like optical fibre or some other non-commercial alternate spectrum band will have to be provided and the incumbents will have to replace/ upgrade their equipment so as to work with the alternate media. This will require considerable expenditure on the part of the existing users. As this exercise is being done to vacate the spectrum and employ it for commercial uses, it is necessary to meet the required expenditure.

1.93 **The Authority recommends that a specific fund for spectrum refarming be created and that 50% of the realisation from all proceeds from spectrum including from the auction proceeds as well as from the Spectrum Usage charges should be transferred to this fund.**

F- Spectrum Audit

1.94 While a review of spectrum usage by the current users and refarming, with the objective of freeing unused/inefficiently used spectrum, is eminently desirable, it is equally necessary to ensure that the spectrum allocated to the service providers is being utilised optimally and that the service providers are deploying advanced/latest spectrum efficient techniques. Accordingly, in the consultation paper, the Authority had raised the issue regarding necessity to carryout spectrum audit.

1.95 Many stakeholders have suggested/favoured spectrum audit to be conducted to assess the actual spectrum need and to know whether the spectrum being held is as per need and is being utilised efficiently. In their opinion, audit is a must and there should be a provision of penalty for hoarding of excess spectrum. They are of the opinion that excess spectrum, if found, should be taken back. The other view was that if spectrum is allocated on market based mechanism, it need not be audited as the market mechanism will ensure its efficient and optimal utilization.

1.96 A number of technological developments are taking place in the sector for efficient utilization of available spectrum. The Authority in its earlier consultations/ recommendations, in the year 2005, 2006 and 2007, related to spectrum, discussed various spectrum efficient techniques like Synthesises Frequency Hopping (SFH), Tighter Frequency Reuse plan (Cell splitting/electrical down tilt antennae), Discontinuous Transmission(DX), Power control, In-building solution & Micro cells, AMR codec etc, to utilize the available spectrum more efficiently. It is expected that the service providers use these latest techniques so that they are able to

support more traffic per MHz of spectrum, serve more number of customers and remain competitive in the market.

1.97 The Authority is of the view that even as efforts are on to make available greater amount of spectrum to meet the increasing telecommunications needs, it is also important on the part of the service providers to utilise the spectrum made available to them in the most efficient manner. Achieving optimal levels of spectral efficiency is the hallmark of any credible spectrum policy. Therefore, it is essential that the utilisation of spectrum by the service provides is monitored on a regular basis. In view of the foregoing discussion, it is clear that there is a case for spectrum audit. What needs to be studied in detail are the parameters that can be measured, their measurement, the frequency of measurement etc.

1.98 **The Authority would undertake regular spectrum audit through appropriate means. The details of the audit procedure and frequency of the exercise would be finalised through a separate consultation process.**

1.99 The Second Committee in its report has also recommended "*The government should set up a committee to develop a roadmap for exploiting the digital dividend. This should be done in the context of a strategic review of spectrum allocation across various bands (both licensed and unlicensed bands), harmonization with ITU allocated bands, policies and plans for government use of spectrum, instruments and institutions for managing towards a more commercial use of spectrum and unleashing the potential of wireless for Indian citizens.*"

1.100 The Authority agrees with the Second Committee as far as its recommendation on exploiting the digital dividend is concerned. However, as recommended earlier, the Authority would undertake the refarming exercise, at the end of which it would work out and recommend the process and timeframe for refarming.

Chapter II: Licensing related issues

A- Background

2.1 Prior to liberalization of Indian telecommunication service sector, the telecom services in the country were provided by DoT and MTNL. In 1992, the Telecom Services Sector was opened up for private participation with the issue of licences for radio paging and other value added services. Duopoly in the GSM based cellular mobile telephony segment was introduced in 1994/1995[15], with two private service providers being licensed in each service area (the Government retaining the right to enter as the third operator). The 1st and 2nd Cellular Mobile Telephone Service (CMTS) licences were granted for a period of 10 years. The licence was extendable by five years or more at the discretion of the Licensor, unless terminated earlier. In Metros, these licences were awarded through Beauty contest and in Circles through a single stage bidding process. In all, 42 licences were issued.

CMTS Licence Fee (For Metros)

(Rs. in Crore)

Service area	1st year	2nd year	3rd year	4th to 6th year (each year)	7th year onwards (each year)	Total of 10 years
Bombay	3	6	12	18	24	171
Delhi	2	4	8	12	16	114
Calcutta	1.5	3	6	9	12	85.5
Madras	1	2	4	6	8	57

Table 2.1

4th year onwards @ Rs. 5 Lakh per 100 subscribers or part thereof; subject to the minimum shown in table above.

[15] In terms of National Telecom Policy (NTP)-1994, the first phase of liberalization in mobile telephone service started with issue of 8 licences for CMTS in the 4 metro cities of Delhi, Mumbai, Calcutta and Chennai to 8 private companies in November 1994. Subsequently, 34 licences for 18 Territorial Telecom Circles were also issued to 14 private companies during 1995 to 1998.

CMTS Licence Fee (For Circles)

(Rs. in Crore)

Service Area	Licence Fee to be paid during 10 years	Service Area	Licence Fee to be paid during 10 years
AP	1001.00	MH	1657.70
Assam	1.32	NE	1.90
Bihar	136.53	Orissa	89.22
Gujarat	1794.10	Punjab	1266.00
Haryana	240.00	Rajasthan	382.00
HP	14.96	TN	836.00
Karnataka	1393.00	UP (East)	210.89
Kerala	517.00	UP (West)	406.21
MP	51.00	West Bengal	42.00

Table 2.2

2.2 In the year 1997-98, fixed services licences were awarded to the private service providers, initially, permitting the Basic Service Operators (BSO) to use WLL technology to provide fixed wireless access only[16]. The details of these licensee along with their licence fee commitment for 15 years, are provided in Table 2.3 below:

[16] NTP 1994 had recognized the fact that the resources of the Government would be inadequate to achieve the targets set in the Policy document and for that purpose it envisaged opening up the basic telephone services segment for participation by the private sector. The Government invited bids for private investment in 1995 through a competitive process so as to introduce an additional basic service operator in each service area. The Government then decided that only one new entrant would be granted licence in each service area for providing basic telephone service in competition with the DoT. Three rounds of tenders invited since January 1995 led to signing of the licences for six circles only in 1997/98.

BSO Licence Fee

(Rs. in Crore)

Circle	Licensee	Date of signing of licence	Licence fee commitment
Madhya Pradesh	Bharti Telenet	28.2.1997	655
Andhra Pradesh	Tata Teleservices	4.11.1997	4200
Maharashtra	Hughes Ispat	30.9.1997	13909
Rajasthan	Shyam Telelink	4.3.1998	1110
Gujarat	Reliance Telecom	18.3.1997	3396
Punjab	Essar Commvision	7.11.1997	4593

Table 2.3

2.3 The New Telecom Policy (NTP), announced in 1999, provided the required impetus for further growth in the Sector. The NTP'99, permitted the CMSPs to provide, in its service area of operation, all types of mobile services including voice and non-voice messages, data services and PCOs utilizing any type of network equipment, including circuit and/or packet switches, that meet the relevant International Telecommunication Union (ITU)/Telecommunication Engineering Centre (TEC) standards. By an order dated 1.10.1999 the Cellular licence was made technology-neutral; earlier to this, it was mandatory for the licensees to use GSM technology. NTP'99 also allowed the licensees to migrate from a Fixed Licensee Fee Regime to a Revenue Share arrangement with effect from 1st August, 1999. NTP' 99 mentioned that licences would be awarded for an initial period of 20 years and would be extendable by additional periods of ten years thereafter. The Government exercised its right to enter as the Third Mobile operator and granted MTNL a licence in 1997 for Delhi and Mumbai service areas. BSNL was licensed as the third cellular mobile operator in the year 2000 for all service areas except Delhi and Mumbai. A fourth Cellular Mobile Service

provider was introduced in 2001 through a multi stage bidding process.

2.4 On migration of the licences from a fixed licence fee regime to a revenue sharing regime, the Revenue share was provisionally fixed as 15% of AGR subject to review by TRAI, and was reduced to 12, 10, & 8% respectively for Metro & A, B and C Circles, when the BSOs were permitted to provide limited mobility w.e.f 25th January, 2001. The Licence Fee was further reduced to 10%, 8% & 6% of Adjusted Gross Revenue (AGR) for Metro and Category `A', Category `B' and Category `C' Service Areas respectively w.e.f. 1st April, 2004 and the old cellular licensees (1st and 2nd CMTS licensees) in telecom circles were given additional concession of 2% in the licence fee for a period of 4 years.

2.5 The New Telecom Policy'99 envisaged the opening up of the National long distance service beyond the service area to the private operators. The Government decided to open the National Long Distance Service without any restriction on the number of operators w.e.f. 13th August 2000. As per the original provisions of NLD licence, the combined net worth requirement of the company for NLD licence was Rs 2500 crore and Paid up Capital of Rs 250 crore was required. The entry fee was fixed as Rs 100 crore and the annual licence fee was fixed as 15% of AGR. NLD licences stipulated a mandatory provision of setting up of a point of presence in each Long Distance Charging Area. NLD service providers were not allowed to access the subscriber directly for provision of leased circuits/closed user groups. From 1st January 2006, these provisions were relaxed and as per the present provisions of the licence, the licensee is required to pay one-time non refundable Entry Fee of Rs 2.5 crore only before the signing

of the Licence and an annual licence fee of 6% of AGR. The net worth requirement and paid up capital requirement of the company was also reduced to Rs 2.5 crore. The Licensee can access the subscribers directly only for provision of Leased Circuits/Close User Groups (CUGs) and also for provision of national long distance voice service only through Calling Cards.

2.6 In accordance with the NTP-1999, the Government opened the International Long Distance Service from 1st April 2002 for private operators. As per the original provisions of ILD licence, the combined Net worth requirement of the company for ILD licence was Rs 25 crore. The entry fee was fixed as Rs 25 crore and the annual licence fee was fixed as 15% of AGR. From 1st January, 2006 these provisions were relaxed and as per the present provisions, the licensee is required to pay one time Entry Fee of Rs 2.50 crore and an annual licence fee of 6% of AGR. There is no mandatory roll out obligation for ILD service licensees except for having at least one switch in India. Net worth and Paid up Capital of the company for ILD service licence is Rs. 2.5 crore. ILD service providers are permitted to offer international bandwidth on lease to other operators. ILD service providers are allowed to access the subscribers directly only for providing International Long Distance voice service through Calling Cards. They are also permitted to provide international bandwidth on lease to Resellers who are issued licence for 'Resale of IPLC'.

2.7 Internet Services in India were launched on 15th August 1995 by Government of India through Videsh Sanchar Nigam Limited (VSNL). The Government recognized the need for encouraging spread of Internet in the country and in November 1998, the sector was opened to Private Operators for providing Internet

Services. The Licence conditions framed for providing Internet services were liberal with no Licence Fee and unlimited number of players for delivering this service. ISPs could decide their own tariff plans and can even setup their own International Gateways.

2.8 Based on the recommendations of TRAI, the Government modified the terms and conditions of the ISP licence in August, 2007, providing for a One time entry fee of Rs. 20 lakh for Category-A Internet Service Licence & Rs. 10 lakh for Category-B Internet Service License; and an annual licence fee at 6% of Adjusted Gross Revenue (AGR) subject to a minimum of Rs.50,000/- (Rupees Fifty Thousand Only) and Rs.10,000/- (Rupees Ten Thousand Only) for category A & B service areas respectively. The revenue accrued from pure Internet services was excluded from the definition of AGR for the purpose of computing licence fee. In January 2010, the onetime entry fee was amended to Rs 30 lakh for Category-A Internet Service Licence & Rs. 15 lakh for Category-B Internet Service License.

2.9 To start with, more than 95% subscribers were using dialup access and the speed was approximately only 56 Kbps. Initially, the subscriber base grew more than 200 percent per year, from 0.28 millions in March 1998 to 3.04 million by March 2001 due to supportive government policy and entry of large number of private players resulting in lower Internet tariffs. However, from April 2001 onwards, the growth rate started declining and reduced to just 7% at the end of March 2003.

2.10 Meanwhile, ISPs were allowed to offer IP telephony Services with effect from 1st April, 2002. Subsequently, based on TRAI's recommendation, Government declared the Broadband Policy in October 2004. Today, 376 ISPs licenses are there out of which

162 ISPs[17] are reporting the data to TRAI. Top 20 ISPs cater to 98.63 % of total Internet subscribers.

2.11 In October 2003, the Authority recommended that Unified Licensing regime should be initiated for all services covering all geographical areas using any technology. The ultimate objective of the Unified Licensing/Authorisation regime was to be achieved in a two-stage process with the unification of access services at circle level, in the form of Unified Access Service license, to be taken up immediately, and to be followed up with steps to define the guidelines and rules for fully unified licence/Authorisation regime. The Unified Licensing regime was to be implemented through automatic Licensing/ Authorisation subject to notification to Regulatory Authority and compliance with published guidelines (by the operator), thereby removing barriers to facilitate growth in the sector. The Guidelines would be notified by the licensor based on TRAI recommendations to include nominal entry fee, USO, etc. The charges for spectrum shall be determined separately. The operator shall be required to approach the licensor mainly for spectrum allocation, which being a scarce resource, needs to be regulated separately such that it is allocated optimally promoting efficiency.

2.12 In November 2003, Government introduced the Unified Access Service (UAS) licensing regime. It permitted an access service provider to offer both fixed and/or mobile services under the same licence, using any technology. It was decided by the Government that with the introduction of Unified Access Service Licence (UASL), all applications in future shall be in the category

[17] Internet service provider having multiple licenses is counted as one.

of Unified Access Service Licence. The existing operators were given the option to continue under the present licensing regime or migrate to new UASL in the existing service areas, with the existing allocated/contracted spectrum. The majority of licensees have migrated to the UASL regime. Table 2.4 below indicates number of CMTS/UAS licences as on 31st December 2009.

Number of CMTS/UAS licences

SL NO	Service Provider	Area for which licensed with No.	UASL	CMTS
1	Bharti	All India (22)	All India except NE	North East
2	Aircel Group	All India (23)	All India except Chennai & TN	Chennai & Tamil Nadu
3	Reliance Communications	All India (except Assam & NE) (20)	All	
4	Reliance Telecom	Kolkata, MP, WB, HP, Bihar, OR, Assam & NE (8)	All	
5	Vodafone	All India (23)	All	
6	Tata Teleservices	All India (22)	All	
7	IDEA	All India (22)	Mumbai, TN incl Chennai, Kol, KTK, Pb, WB, Bihar, OR, Assam, NE & J&K	Delhi, Mah, Guj. ,AP, Kerala, Haryana, UP-W, UP-E, Raj., MP, HP
8	Sistema Shyam	All India (22)	All	
9	BSNL	All India (except Delhi & Mumbai) 21		All
10	MTNL	Delhi Mumbai (2)		All
11	Loop Telecom Private Ltd	All India (22)	All except Mumbai	Mumbai
12	Unitech Group	All India (22)	All	
13	Videocon Telecommunications Ltd.	All India except Pb (21)	All	
14	Etisalat DB Telecom Pvt. Ltd & Allianz	Delhi, Mumbai, Mah, Guj, AP, Ktk, TN incl Chennai, KR, Punjab, HR, UP (W), UP (E), Raj, MP & Bihar (15)	All	
15	Spice Communications	Delhi, Mah, AP, KTK, Punjab, Har (6)	All	
16	S Tel Ltd	HP, Bihar, Orissa, Assam, NE, J&K (6)	All	
17	HFCL	Punjab (1)	Punjab	

Table 2.4

2.13 Since introduction of UAS licensing regime, many new UAS licences have been issued by the Government of India. Presently the total number of CMTS/UAS licensees in a service area ranges from 12 to 14. The total number of GSM and CDMA operators in various service areas along with the details of the spectrum assignment to these operators is provided in **Annexure VII**.

B- Limiting the number of service providers in a service area

2.14 Vide its letter no. 20-228/2009-AS-I dated 22nd July 2009 **(Annexure III)**, Department of Telecommunications (DoT) referred to TRAI the issue of 343 pending applications (received from 26.9.2007 to 1.10.2007) and sought TRAI's recommendations on the policy of no capping on the number of access service providers. The reference also drew attention to the objectives of NTP-99, the fact that a scarce resource like spectrum shall be made available in adequate quantities to the licensees and the judgement of the Hon'ble TDSAT dated 31.3.2009. In August 2009, this Authority indicated that it will be looking into the entire matter and suggested that DoT may keep in abeyance the grant of any new access service licence till finalisation of these recommendations and decisions thereupon by the Government.

2.15 Before proceeding to deal with the issue, it is necessary to go into the background. The licensing policy as it existed till 2007 did not have any limit on the number of licences. After 2001, licences were given in November 2003, January 2004, December 2006, and March 2007, as and when people applied for the same. All these licences were linked with spectrum and entry fees was the same as charged for the fourth cellular licence. By April 2007 there were 5-6 GSM licences in each service area besides

operators having CDMA spectrum, as can be seen from Table 2.5 below:

List of Service area-wise Licences as on April, 2007

SL.No.	Name of Circle	No of Operators		
		GSM	CDMA	Total
1	Delhi	5	3	8
2	Mumbai	6	3	9
3	Chennai	3	2	5
4	Kolkata	5	3	8
5	Maharashtra	5	3	8
6	Gujarat	5	3	8
7	Andhra Pradesh	5	3	8
8	Karnataka	5	3	8
9	Tamil Nadu	3	2	5
	Tamil Nadu including Chennai	1	1	2
10	Kerala	5	3	8
11	Punjab	5	4	9
12	Haryana	5	3	8
13	Uttar Pradesh - West	5	3	8
14	Uttar Pradesh - East	5	3	8
15	Rajasthan	5	4	9
16	Madhya Pradesh	6	3	9
17	West Bengal	6	3	9
18	Himchal Pradesh	6	3	9
19	Bihar	6	3	9
20	Orissa	5	3	8
21	Assam	5	1	6
22	North East	5	1	6
23	Jammu & Kashmir	4	2	6

* BSNL/MTNL is providing services using both GSM & CDMA technologies. Hence they are included in both the categories.

Table 2.5

2.16 In April 2007 (**Annexure VIII**), the DoT had requested the Authority to furnish its recommendations on the issue of limiting the number of Access providers in each service area. It is necessary to bring out the concern of Department of Telecommunications even at that stage. DOT pointed out that the then existing policy, under which any Indian company fulfilling

the eligibility criteria can apply for a licence, was increasing the demand on spectrum in a substantial manner and that the Government was contemplating to review the policy, including the option of limiting the service providers in view of the fact that spectrum is a scarce resource.

2.17 On the issue of entry of additional mobile operators, NTP-1999 states as under:

> *"It is proposed to review the spectrum utilisation from time to time keeping in view the emerging scenario of spectrum availability, optimal use of spectrum, requirements of market, competition and other interest of public. The entry of more operators in a service area shall be based on the recommendation of the TRAI who will review this as required and no later than every two years."*

2.18 In December 2002, DoT had sought the Authority's recommendation on the issue of inducting additional operators for Cellular Mobile Telephone Service. In its recommendations on the issue of fresh licences to Cellular Mobile Service Providers (CMSPs) dated 20th February 2003, the Authority had recommended that it was in favour of open competition in the different segments of Indian telecommunication market but in respect of the cellular mobile services there had to be a clear view on the quantum of additional spectrum which could be allocated to GSM Cellular services. TRAI was of the opinion that induction of additional mobile service providers in various service areas can be considered if there was adequate availability of spectrum for the existing service providers as well as for the new players, if permitted. (Para 2 of the February 2003 recommendations).

2.19 Again, in its recommendations on Unified licensing regime dated 27th October 2003, the Authority had recommended that the

induction of additional mobile service providers in various service areas can be considered if there was adequate availability of spectrum. (Para 7.39 of the October 2003 recommendations).

2.20 In its recommendations on Spectrum related issues dated 13th May, 2005, the Authority had pointed out that with 4 to 7 mobile operators in different service areas, there was adequate competition and that before allocating spectrum to new service providers, it was necessary to ensure that the existing service providers have adequate spectrum. It was indicated that its specific recommendation was that new operators should be allowed if spectrum requirements of existing operators have been met and additional spectrum is available. (Paras 3.3.6 & 3.3.7 of the May 2005 recommendations).

2.21 In response to the letter of April 2007 from the DoT, the Authority after due consultation process recommended, in August 2007, that no cap be placed on the number of access service providers in any service area. In doing so, the Authority kept in view the limited availability of spectrum. Having considered all the aspects including the current and upcoming technological developments, principles of competition etc. it recommended that no cap be placed on the number of access service providers in any service area.

2.22 Thereafter, government received several applications for grant of UAS license. On 24.9.2007, the Department of Telecommunications issued a press release indicating that 1.10.2007 would be the last date for receipt of applications. In all, 575 applications were received from 46 applicant companies in 22 service areas in the country. Government considered the

applications received till 25.9.2007 and issued 122 new licences out of 232 applications received by that date.

2.23 As indicated above, TRAI's recommendations in 2007 were in favour of a no capping policy. However, developments subsequent to August 2007 reveal that this policy of no capping requires reconsideration. The issue of capping the number of access service providers is directly linked to the availability of spectrum, as in the present licensing regime the spectrum is bundled with the licence and the licensor is under the contractual obligation to assign a certain amount of spectrum to the licensee, subject to its availability. NTP-99 mentions that *"availability of adequate frequency spectrum is essential not only for providing optimal bandwidth to every operator but also for entry of additional operators".* Before deciding on whether or not to cap the number of service providers and service area, one has to examine the question of availability of spectrum to the existing licensees. And in this context, the amount of committed spectrum as per the licences is crucial besides the question of the spectrum required by the licensees to provide effective communications. This then has to be seen with reference to the available spectrum.

Quantum of Committed Spectrum

2.24 Internationally, in most countries, the allocation of spectrum is separate from the grant of licence to provide the access service. However, in India, the present cellular licence, whether CMTS given prior to 2003, or the subsequent UASL, is bundled with certain amount of committed spectrum. Thus a licensee is entitled to receive the committed spectrum subject to its availability and efficient usage. The issue required to be discussed is the amount of committed spectrum, both for TDMA (GSM) and

CDMA technologies. The relevant clauses in the various cellular licences awarded to the service providers since 1994/95 are mentioned in the subsequent paragraphs.

2.25 In India, Cellular Mobile Services started with a duopoly in 1994-95. These licences were awarded through a bidding process for the various Service Areas. The technology at that point of time was specified as GSM and the licences had provision for assignment of 4.4 + 4.4 MHz. The relevant extract from 1995 CMTS licence, which is also reflected in the 1998 licence, is given below:-

Extract from 1994 CMTS Licence

a. *A separate licence shall be required from the WPC wing of Ministry of Communications, which will permit utilization of appropriate radio frequency spectrum for the establishment and operation of the CMTS under usual terms and conditions of that licence. Grant of licence will be governed by normal rules, procedures & guidelines and will be subject to completion of necessary formalities.*(**Clause 20.1**)

b. *A cumulative maximum of upto 4.4 MHz in the bands 890-902.5 & 935-947.5 MHz shall be permitted based on appropriate justification. Exact 200KHz RF channel frequencies will be assigned contiguously as far as practicable on case by case basis after due coordination, wherever considered necessary.* (**Clause 20.3) (Emphasis supplied)**

2.26 Thus, the licence for the first two operators provided for only 4.4 MHz of spectrum in the 900 MHz band, based on appropriate justification. The Licences granted in 1997 to the third Cellular Mobile licence also had the same clause as above on the issue of committed spectrum.

2.27 On 22nd September 2001, WPC wing of the DoT issued an Order that w.e.f. 1.8.99, if additional bandwidth (upto 6.2+6.2MHz

instead of 4.4+4.4MHz) is allotted, subject to availability and justification, it shall attract additional royalty and licence fee as revenue share (typically 1% additional revenue share). The Order states that the licence fee is for cellular mobile handsets and cellular mobile stations and also for possession of wireless telegraphy equipment.

2.28 Government awarded the fourth Cellular Licence in 1800 MHz band through a bidding process in the year 2001. The relevant extract from the 2001 CMTS licence is given below:-

Extract from 2001 CMTS Licence for the 4th Operator

A. *The frequencies shall be assigned by WPC from the designated bands prescribed in National Frequency Allocation Plan – 2000. (NFAP-2000). Appropriate frequency spots in frequency-band of 1710-1785 MHz paired with 1805-1880 MHz will be assigned. A cumulative maximum of upto 4.4 MHz + 4.4 MHz will be permitted. Based on usage, justification and availability, additional spectrum upto 1.8 MHz + 1.8 MHz making a total of 6.2 MHz +6.2 MHz, may be considered for assignment, on case by case basis, on payment of additional Licence fee. The bandwidth upto maximum as indicated i.e. 4.4 MHz & 6.2 MHz as the case may be, will be allocated based on the Technology requirements. (e.g. CDMA @ 1.25 MHz, GSM @ 200 KHz etc.). The frequencies assigned may not be contiguous and may not be same in all cases, while efforts would be made to make available larger chunks to the extent feasible.* (**Clause 24.7)** **(Emphasis supplied)**

2.29 In this context, it is significant to note that the licence provision is different from that of the earlier licences in that (a) spectrum is assigned in 1800 MHz band and not in the 900 MHz band; (b) the total of spectrum is upto 6.2 MHz and not 4.4 MHz; (c) the provision of 1.8 MHz from 4.4 to 6.2 MHz is on payment of additional licence fee; and (d) the justification required to be provided was for the additional 1.8 MHz.

2.30 In November 2001, the Department of telecommunications decided that new cellular licensees who were granted in 1800 MHz band may be given an option to seek allotment of additional 1.8+1.8 MHz in the beginning itself subject to payment of additional 1% of revenue has licence fee. In other words, the need for justification and availability of additional spectrum requirement of 1.8 MHz was done away with. This is significant in that it underscores the understanding of the Department of Telecommunications about the requirement of 6.2 MHz in the 1800 MHz band.

2.31 On 1.2.2002, the WPC wing of the Department of Telecommunications issued an order providing for a further additional spectrum of 1.8 MHz +1.8 MHz beyond the already allocated spectrum of 6.2 MHz +6.2 MHz, to be assigned in the 1800 MHz band and on payment of an additional charge of 1% of AGR. A subscriber base of 5 lakh was the criterion adopted, besides spectrum being available and being co-ordinated on a case to case basis. This order also provided for allocation of further spectrum upto maximum limit of 10 MHz per operator in a service area, subject to suitable subscriber base, as may be prescribed, being reached. The licences issued prior to 2001 were not amended.

2.32 In 2003, TRAI recommended migration from the service specific regime to a Unified Licence regime. This was to be implemented in two phases. The first phase provided the licensees (Basic and CMTS) the option to migrate to a Unified Access Service Licence. For a BSO, the migration fee was the differential between the Entry Fee paid and the amount paid for the fourth cellular licence, while a CMTS was allowed to migrate without payment of

any Entry Fee. Accordingly, their licences were also amended from Basic /CMTS to UASL. The relevant extract from licence for migration from BSO/ CMTS licence to UAS licence is given below:-

Extract from Licence Agreement for Provision of Unified Access Services (UAS) after migration from BSO [2003]

43.5.(i) *For wireless operations in SUBSCRIBER access network, the frequencies shall be assigned by WPC wing of the Department of Telecom from the frequency bands earmarked in the applicable National Frequency Allocation Plan and in coordination with various users. Initially a cumulative maximum of upto 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. While efforts would be made to make available larger chunks to the extent feasible, the frequencies assigned may not be contiguous and may not be the same in all cases or within the whole Service Area. For making available appropriate frequency spectrum for roll out of services under the licence, the type(s) of Systems to be deployed are to be indicated.* **(Emphasis supplied)**

43.5(ii) *The Licensee operating wireless services will continue to provide such services in already allocated/contracted spectrum. At present contracted spectrum allocation is 5+5 MHz.* **(Emphasis supplied)**

43.5(iv) *The Licensor has right to modify and / or amend the procedure of allocation of spectrum including quantum of spectrum at any point of time without assigning any reason.*

2.33 Thus, in the year 2003 itself, the UAS licence stated that the contract spectrum allocation is 5+5 MHz. (This is apparently in the case of CDMA, since it is a case of migration from BSO to UAS licence). On the other hand, there is no such mention in respect of the CMTS licences which have migrated to the UAS licence

regime, as can be seen from the extract of the licence agreement below. However, clause 43.5 (ii) does state that the service provider will continue to provide such services in already allocated/contracted spectrum. In other words, although the licences were not amended, by virtue of this provision, they were allowed to carry already allocated/contracted spectrum. As mentioned above, by this time, administrative orders already issued providing for spectrum allocation beyond 4.4 MHz and even 6.2 MHz

Extract from Licence Agreement for Provision of Unified Access Services (UAS) after migration from CMTS [2003]

43.5.(i) *For wireless operations in SUBSCRIBER access network, the frequencies shall be assigned by WPC wing of the Department of Telecom from the frequency bands earmarked in the applicable National Frequency Allocation Plan and in coordination with various users. Initially a cumulative maximum of upto 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. While efforts would be made to make available larger chunks to the extent feasible, the frequencies assigned may not be contiguous and may not be the same in all cases or within the whole Service Area. For making available appropriate frequency spectrum for roll out of services under the licence, the type(s) of Systems to be deployed are to be indicated.*

43.5(ii) *The Licensee operating wireless services will continue to provide such services in already allocated/contracted spectrum.* **(Emphasis supplied)**

43.5(iv) The *Licensor has right to modify and / or amend the procedure of allocation of spectrum including quantum of spectrum at any point of time without assigning any reason.*

2.34 From 2003, only UAS licences are being issued to any new entity. It is significant that the UAS licence provides for an initial allocation of spectrum of 4.4 MHz/2.5 MHz (GSM/CDMA). Additional spectrum beyond the initial allocation may be considered for allocation after ensuring optimal and efficient utilisation of already allocated spectrum and subject to guidelines/criteria prescribed from time to time. It is noteworthy that there is no stipulation regarding payment of additional fee. The relevant extract from UAS licence for the allocation of spectrum is given below:-

Extract from amended Licence Agreement for Provision of Unified Access Services (UAS) licensees

43.5 *Subject to availability and as per Guidelines issued from time to time, the spectrum allocation and frequency bands will be as follows*

43.5.(i) *For wireless operations in SUBSCRIBER access network, the frequencies shall be assigned by WPC wing of the Department of Telecom from the frequency bands earmarked in the applicable National Frequency Allocation Plan and in coordination with various users. Initially a cumulative maximum of upto 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. While efforts would be made to make available larger chunks to the extent feasible, the frequencies assigned may not be contiguous and may not be the same in all cases or within the whole Service Area. For making available appropriate frequency spectrum for roll out of services under the licence, the type(s) of Systems to be deployed are to be indicated.* **(Emphasis supplied)**

43.5(ii) *Additional spectrum beyond the above stipulation may also be considered for allocation after ensuring optimal and efficient utilization of the already allocated spectrum taking into account all types of traffic and guidelines / criteria prescribed from time to time. However, spectrum not more than 5 + 5 MHz in respect of CDMA system or 6.2 +*

6.2 MHz in respect of TDMA based system shall be allocated to any new Unified Access Services Licensee. The spectrum shall be allocated in 824-844 MHz paired with 869 – 889 MHz, 890 – 915 MHz paired with 935 – 960 MHz, 1710 – 1785 MHz paired with 1805 – 1880 MHz. **(Emphasis supplied)**

43.5(iii) *In the event, a dedicated carrier for micro-cellular architecture based system is assigned in 1880 - 1900 MHz band, the spectrum not more than 3.75 + 3.75 MHz in respect of CDMA system or 4.4 + 4.4 MHz in respect of TDMA system shall be assigned to any new Unified Access Services Licensee.*

43.5(iv) *The Licensor has right to modify and / or amend the procedure of allocation of spectrum including quantum of spectrum at any point of time without assigning any reason.*

2.35 In 2007, the Government decided to permit dual technology for an existing licensee by payment of additional specified charges. The licences of those service providers who exercised this option were amended. The relevant extract from the amended portion in relation to spectrum is given below:-

Extract from amended Licence Agreement for Provision of Unified Access Services (UAS) for licensees using dual technologies. [2008]

43.5 (i): '*For wireless operations in SUBSCRIBER access network, the frequencies shall be assigned by WPC wing of the Department of Telecom from the frequency bands earmarked in the applicable National Frequency Allocation Plan and in coordination with various users. Initially a cumulative maximum of upto 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) and 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. While efforts would be made to make available larger chunks to the extent feasible, the frequencies assigned may not be contiguous and may not be the same in all cases or within the whole Service Area. For making available appropriate frequency spectrum for*

roll out of services under the licence, the type(s) of Systems to be deployed are to be indicated.'

43.5 (ii): '*Additional spectrum beyond the above stipulation may also be considered for allocation after ensuring optimal and efficient utilization of already allocated spectrum taking into account all types of traffic and guidelines/criteria prescribed from time to time. However, spectrum not more than 5+5MHz in respect of CDMA system and 6.2+6.2MHz in respect of TDMA based system shall be allocated to the licensee. The spectrum shall be allocated in 824-844MHz paired with 869-889 MHz, 890-915 MHz paired with 935-960 MHz, 1710-1785 MHz paired with 1805-1880 MHz.*

43.5(iv) *The Licensor has right to modify and / or amend the procedure of allocation of spectrum including quantum of spectrum at any point of time without assigning any reason.*

2.36 A reading of the licence conditions clearly reveals that the committed spectrum, as per the licences issued prior to 2001, was 4.4MHz of GSM spectrum. It is only by virtue of the UAS licence issued on migration, wherever such migration has taken place that the licensees were allowed to continue with their allocated/contracted spectrum. Otherwise, the additional allocations beyond 4.4 MHz were by virtue of administrative orders issued in September 2001, February 2002 and thereafter. In respect of all the UAS licensees issued from 2003 onwards however, Government is contractually obliged to give spectrum upto 6.2 +6.2 MHz for GSM technology and 5 +5 MHz for CDMA technology. It is true that spectrum beyond the initial start up spectrum is subject to its availability and efficient utilization. But there cannot be any doubt that the contracted spectrum is 6.2 MHz in respect of GSM and 5 MHz in respect of CDMA. This view is supported by the following:

a. By Auction:

2.37 The tender document for bidding for the fourth cellular licence in 2001 has the following provisions:

Section V

"1.7 The frequencies shall be assigned by WPC from the designated bands prescribed in National Frequency Allocation Plan-2000. (NFAP-2000). Appropriate frequency spots in frequency-band of 890-915 MHz paired with 935-960 MHz will be assigned to operators selected for vacant slots and 1710-1785 MHz paired with 1805-1880 MHz will be assigned to the fourth cellular operator. A cumulative maximum of upto 4.4 MHz +4.4 MHz will be permitted. Based on usage, justification and availability, additional spectrum upto 1.8 MHz +1.8 MHz making a total of 6.2 MHz +6.2 MHz, may be considered for assignment, on case by case basis, on payment of additional Licence fee. The frequencies assigned may not be contiguous and may not be same in all cases, while efforts would be made to make available larger chunks to the extent feasible."

Section VI

"*1.1 Entry Fee*

The successful bidder will be required to pay one time Entry Fee based on the final bid before signing the Licence Agreement."

"1.2 Licence fees:

In addition to the entry fee described above, the licensee shall also pay a licence fee annually @12% of adjusted gross revenue (AGR) for Metro service areas and category a telecom circles, 10% of AGR for category B telecom circles and 8% of AGR for category C telecom circles, excluding spectrum charges. The Licence Fee as Revenue share includes contribution towards (i) USO, (ii) R&D, Administration and Regulation.

1.3 RADIO SPECTRUM CHARGES:

In addition, the cellular licensees shall pay spectrum charges on revenue share basis of 2% of AGR towards WPC charges covering royalty payment for the use of cellular spectrum upto 4.4 MHz + 4.4 MHz and Licence fee for Cellular Mobile handsets and Cellular Mobile Base Stations and also for possession of wireless telegraphy equipment as per the details prescribed by Wireless Planning & Coordination wing (WPC). Any additional bandwidth, is allotted subject to availability and justification shall attract additional Licence fee as revenue share (typically 1% additional

revenue share it Bandwidth allocated is upto 6.2MHz + 6.2 MHz megahertz in place of 4.4 MHz +4.4 MHz).

Further, royalty for the use of spectrum for point-to-point links and access links (other than Cellular Service Spectrum) shall be separately payable….

The above spectrum charge is subject to review by WPC wing from time to time."

2.38 It is significant to note that the tender document, which is the basis for the receipt of bids, which culminated in the entry fee of Rs. 1659 crore, clearly makes a distinction between Entry Fee and Licence Fee. Spectrum beyond the initial start-up spectrum and upto 6.2 MHz/5 MHz may be made available to the licensee, on payment of additional licence fee. Significantly, there is no mention of additional entry fee. The entry fee remained constant in respect of each service area, totalling to Rs.1659 crore for the entire country. And this value was adopted for all licenses that were granted subsequent to 2001.

b. By Action:

2.39 While awarding the 3rd and 4th cellular licences, the Government has assigned 6.2 + 6.2 MHz of spectrum at the initial stage itself to a number of service providers. The list of service providers who received 6.2MHz of spectrum directly is given at **Annexure IX.** The question as to why the initial start-up spectrum of 4.4 MHz was not given and why these licensees were given 6.2 MHz of spectrum directly would be relevant but not in this particular context when we are examining the question of committed spectrum. The assignment of 6.2 MHz of spectrum clearly demonstrates once again that the Licensor also considered this to be the contracted spectrum for a given entry fee.

c. By Contract:

2.40 A reading of the relevant clauses in various licences (as given above) clearly establishes the fact that all UAS licences issued from 2003 onwards have a provision for giving a committed spectrum of 6.2 + 6.2 MHz for GSM technology and 5 + 5 MHz for CDMA technology, additional spectrum beyond the start-up spectrum being given after ensuring optimal and efficient utilization of already allocated spectrum and subject to availability. In case of the fourth cellular operators licence too, provision for 6.2 MHz of spectrum was made, albeit on payment of additional licence fee.

d. By Admission:

2.41 The Government, in its affidavit dated 18.08.2008 in the Petition no. 286 of 2007 before the Hon'ble TDSAT, has affirmed as follows:

> *"(F) In the meanwhile an interim decision was taken by the Government on the report of the Committee for allocation of additional spectrum to the existing GSM operators and placed before this Hon'ble tribunal by an affidavit dated 9.1.2008. This decision was as below:*
>
> *i. Spectrum to be allocated based on TRAI's recommendation dated 28th August 2007.*
>
> *ii. For UAS licensees, the GSM spectrum allocation from initial allocation of 4.4 MHz to the contracted spectrum of 6.2 MHz shall be in a single step i.e. 1.8 MHz allocation as per eligibility.* ***(Emphasis supplied)***
>
> *iii. Additional GSM spectrum beyond the contractual allocation (i.e. 6.2 MHz) is to be allocated in multiple of 1 MHz as per eligibility.* ***(Emphasis supplied)***
>
> *iv. Accordingly, in line with the TRAI recommendations, as an interim measure, on 17.01.2008 with immediate effect, WPC wing of DoT, has issued the separate orders specifying the criteria for allotment of GSM spectrum and CDMA spectrum."* ***(Emphasis supplied)***

2.42 Similarly, the Government in its affidavit filed in the Writ Petition No. (Civil) No. 9654 of 2007 in COAI & Ors vs. Union of India & Ors. Dated 14th January 2008 in the Hon'ble Delhi High Court affirmed as below: (Para 9)

> *"..... The committee (first committee) finalized its report on 18.12.2007. The interim decision of the Government on this report of the committee for allocation of additional spectrum to existing GSM operators is as below:*
>
> *(i) Spectrum is to be allocated based on TRAI's recommendation dated 28th August 2007.*
>
> *(ii) For UAS licensees, the GSM spectrum allocation from initial allocation of 4.4 MHz to the contracted spectrum of 6.2 MHz shall be in a single step i.e. 1.8 MHz allocation as per eligibility.* ***(Emphasis supplied)***
>
> *(iii) Additional GSM Spectrum beyond the contractual allocation (i.e. 6.2 MHz) is to be allocated in multiple of 1 MHz as per eligibility.* ***(Emphasis supplied)***
>
> *It is submitted that as per the decision above, as on the verifiable available data on date, there is no applicant who is eligible for allotment of Spectrum above 10 MHz."*

e. By Technological requirement:

2.43 Technically, it can be argued that 2X4.4 MHz of spectrum is adequate to provide initial coverage in a service area. But, after the licensee sets up enough BTS for providing coverage in the required geographical area, additional spectrum is essential to meet the enhanced capacity required for acquiring new subscribers. In 2X4.4 MHz of spectrum, the number of carriers of 200 KHz each are 22. With these carriers and employing 5/15 reuse factor, a service provider can normally have a configuration of 2+2+2. With this configuration and traffic requirement of 40 mE per subscriber, a BTS would technically be able to cater to around 400 subscribers, if voice traffic is taken into

consideration. In several areas, the traffic requirement per cell site is more than what can be provided through this quantum of spectrum. It is for this reason that a service provider requires 6.2 MHz of spectrum. With 2X6.2 MHz of spectrum, the service provider can cater to about 1000 subscribers per BTS and with reasonable inter-site distance it can serve around 3000-4000 subscribers per sq. km which is sufficient to meet the demand in most of the areas of the country (refer Para 3.26). Therefore, in order to ensure that the service providers has sufficient spectrum to acquire subscribers and meet QoS parameters, spectrum upto at least 2X6.2MHz is required.

2.44 In Chapter IV of its report submitted in May 2009, the Second Committee has examined the licence conditions and held that the contention of some of the service providers that they have a right to receive the contracted spectrum of 6.2 MHz free of cost, as per clause 43.5 is not correct. Having examined the clauses, the Second Committee concluded as follows:

> *"Condition 43.5 (i) clearly states that initially a cumulative maximum spectrum of 4.4 MHz +4.4 MHz in case of GSM or 2.5 MHz +2.5 MHz in case of CDMA will be allocated. Condition 43.5 (ii) clarifies that additional spectrum beyond 4.4 MHz and upto 6.2 MHz may be considered for allocation after ensuring optimal and efficient utilisation of the already allocated spectrum taking into account all types of traffic and guidelines/criteria prescribed from time to time. Currently the criteria for additional allocation is rolling out the network and achieving specified subscriber numbers as stipulated in subscriber linked criteria dated 17.1.2008. This makes it clearly beyond doubt that initial start-up spectrum which is received with licence free of cost is only 4.4 MHz +4.4 MHz for GSM and 2.5 MHz +2.5 MHz for CDMA. The additional 1.8 MHz +1.8 MHz for GSM and 2.5 MHz +2.5 MHz for CDMA may be considered for allocation after efficient utilisation of initial spectrum and*

after fulfilling the guidelines/criteria prescribed from time to time. Condition 43.5 (iv) further stipulates that Government has a right to modify and/or amend the procedure for allocation of spectrum including quantum of spectrum at any point of time without assigning any reason. From reading of all the three conditions together, it is clear beyond doubt that licensee has a right to receive initial spectrum (4.4 MHz +4.4 MHz or 2.5 MHz +2.5 MHz, as the case may be) and government is within its right to change the procedure for further spectrum assignment. Government is under no obligation to assign spectrum beyond this free of cost, or, without auction."

2.45 The Authority is unable to agree with the conclusions of the Second Committee. For reasons clearly explained, the contracted spectrum is 6.2/5 MHz (GSM/CDMA). It is incorrect to state that the existence of subscriber linked criteria for assignment of 6.2 MHz is an indication of the fact that the entitlement is only 4.4 MHz. It is equally incorrect, in the opinion of this Authority, to draw an artificial distinction between the words 'shall' and 'may'. The committee relies on the 'right' of the government to change the licence conditions including the amount of contracted spectrum. But nowhere is there any indication that the Government has chosen to modify the contracted spectrum. Even recently, Government on affidavit stated that the contracted spectrum is 6.2 MHz. The provisions of clause 43.5 of the licence for Unified Access Service make it very clear that subject to availability and as per guidelines issued from time to time, a licensee is entitled to an initial allocation of 4.4 + 4.4 MHz in case of TDMA-based systems (and 2.5 + 2.5 MHz in the case of CDMA-based systems) and additional spectrum, after ensuring optimal and efficient utilisation of the already allocated spectrum, upto a maximum of 6.2 + 6.2 MHz or 5 + 5 MHz (GSM/CDMA). It is true that clause 43.5 (iv) stipulates that the licensor has the right to modify and/or amend the procedure of allocation of spectrum

including quantum of spectrum at any point of time without assigning any reason. But this was never invoked to limit the spectrum available under the licence to 4.4 MHz of TDMA and 2.5 MHz of CDMA. Apart from a mere statement regarding what they consider is the eligibility as per the licence, the Second Committee has not given any justification for its statement. The committee seems to suggest that Government should effect a change in the contracted spectrum using the power given in clause 43.5 (iv) of the licence. It appears to the Authority that the effort of the Second Committee was more to place all spectrum under auction. In any case, clause 43.5 (iv) refers to the power to modify and/or amend the procedure for allocation of spectrum including the quantity of spectrum. This cannot be taken to authorise the Government to reduce the quantity of committed spectrum. As such, this Authority is unable to agree with the comment of the Second Committee that the eligibility under the licence is only 4.4 MHz of GSM technology or 2.5 MHz in CDMA technology.

2.46 The Second Committee in its report has recommended that-

> "*Start-up spectrum of 4.4+4.4 MHz for GSM and 2.5+2.5 MHz for CDMA is to be assigned to an existing UAS licensee as per current policy as and when spectrum becomes available.*"

As mentioned above in Paras 2.44& 2.45 above, the Authority does not agree with the views of the committee that a licensee is entitled only to the start up spectrum of 4.4/2.5 MHz. However, this Authority is in agreement to the extent that a UAS licensee is entitled to start up spectrum of 4.4 MHz/2.5 MHz (GSM/CDMA). But, it is also entitled to, subject to optimal and efficient utilisation of the already allocated spectrum, to assignment upto 6.2/5MHz (GSM/CDMA).

2.47 **The Authority is clearly of the view that the contracted spectrum for all the access licences issued in or after 2001, is 6.2MHz / 5 MHz in respect of GSM/CDMA respectively.**

2.48 Having settled the issue of contracted spectrum, the Authority examined the requirement of spectrum for the existing licensees to meet the contractual obligations. In chapter III, the Authority has examined the issue of adequate spectrum and has concluded that it is 8/5 MHz (GSM/CDMA) in all the service areas except in respect of Delhi and Mumbai where it is 10 MHz/6.25 MHz (GSM/CDMA respectively). It has already been pointed out above that even the NTP-99 recognises the need for provision of adequate spectrum to each service provider. The Authority is therefore of the view that the effort should be to meet the requirements of spectrum of existing service providers before considering any new applications.

2.49 Even though the spectrum in 900 MHz band is 25 MHz and that in 1800 MHz band is 75 MHz, the total available spectrum is less than 100 MHz in all the circles. Likewise, the quantum of available CDMA spectrum is 20 MHz in all circles. Table 2.6 and 2.7 gives the amount of spectrum required for licensees using GSM and CDMA technologies and the available spectrum.

Calculation of GSM Spectrum Requirement in Various services areas upto Specified Limits

S.No.	Circle	Available GSM Spectrum	No. of Operators	Operators with MHz						Additionally Required Spectrum for quantum upto (MHz)				Spectrum already allocated	Balance available spectrum
		A		12.4	10	8	6.2	4.4	Nil	4.4	6.2	8	10	B	C=A-B
1	Delhi	57.2	12	1	2	1		3	5	22	36.4	50.8	68.8	53.6	3.6
2	Mumbai	74.8	11	1	3			7			12.6	25.2	39.2	72.4	2.4
3	Kolkata	78.4	10		2	1	1	6			10.8	23.4		60.4	18
4	Maharashtra	69.4	12		2	1	1	8			14.4	30.6		69.4	0
5	Gujarat	60.4	11		1	1	2	7			12.6	28.8		60.4	0
6	AP	83.6	12		2	1	1	8			14.4	30.6		69.4	14.2
7	Karnataka	79.2	12		2	1	1	8			14.4	30.6		69.4	9.8
8	Tamil Nadu	87	11		3	1		7			12.6	25.2		67	20
9	Kerala	89.2	11		1	1	2	7			12.6	28.8		61.2	28
10	Punjab	63.2	12			2	2	8			14.4	32.4		63.2	0
11	Haryana	63.8	12		1		3	8			14.4	34.2		63.8	0
12	UP - West	61.2	11		1	1	2	7			12.6	28.8		61.2	0
13	UP - East	62.4	11		1	2	1	7			12.6	27		62.4	0
14	Rajasthan	63.8	12			2	2	8			14.4	32.4		63.8	0
15	M.P.	93.6	11		1	2	1	7			12.6	27		63	30.6
16	West Bengal	57.4	10			1	3	6			10.8	27		53	4.4
17	H.P.	57.6	11		1		2	8			14.4	32.4		57.6	0
18	Bihar	71.2	12		2	1		9			16.2	32.4		66.8	4.4
19	Orissa	77.4	11		1	1	1	8			14.4	30.6		59.4	18
20	Assam	59.4	10		1		3	6			10.8	27		55	4.4
21	North East	57.6	10		1		2	7			12.6	28.8		53.2	4.4
22	J&K	49.4	10			1	1	8			14.4	30.6		49.4	0

Note: In stray cases, Spectrum allocated varies slightly from the above tranches

Table 2.6

Calculation of CDMA Spectrum Requirement in Various services areas upto Specified Limits

S.No.	Circle	No. of Operators	Operators with MHz			Additionally Required Spectrum for quantum upto (MHz)				Spectrum already allocated	Balance available spectrum#
		A	2.5	3.75	5	2.5	3.75	5	6.25	B	C
1	Delhi	4	2	0	2	-	2.5	5	10	15	2.5
2	Mumbai	4	2	0	2	-	2.5	5	10	15	2.5
3	Kolkata	4	2	1	1	-	2.5	6.25		13.75	2.5
4	Maharashtra	4	2	0	2	-	2.5	5		15	1.25
5	Gujarat	4	2	2	0	-	2.5	7.5		12.5	5
6	AP	4	2	1	1	-	2.5	6.25		13.75	2.5
7	Karnataka	4	2	1	1	-	2.5	6.25		13.75	2.5
8	Tamil Nadu	4	3	0	1	-	3.75	7.5		12.5	5
9	Kerala	4	1	2	1	-	1.25	5		15	2.5
10	Punjab	5	3	2	0	-	3.75	10		15	1.25
11	Haryana	4	2	2	0	-	2.5	7.5		12.5	5
12	UP - West	4	2	1	1	-	2.5	6.25		13.75	3.75
13	UP - East	4	2	1	1	-	2.5	6.25		13.75	3.75
14	Rajasthan	4	1	2	1	-	1.25	5		15	0
15	M.P.	4	3	0	1	-	3.75	7.5		12.5	3.75
16	West Bengal	4	3	1	0	-	3.75	8.75		11.25	5
17	H.P.	4	4	0	0	-	5	10		10	7.5
18	Bihar	4	2	1	1	-	2.5	6.25		13.75	3.75
19	Orissa	4	3	1	0	-	3.75	8.75		11.25	6.25
20	Assam	4	4	0	0	-	5	10		10	7.5
21	North East	4	4	0	0	-	5	10		10	7.5
22	J&K	4	4	0	0	-	5	10		10	5

Note: In stray cases, Spectrum allocated varies slightly from the above tranches
 # As per the carrier plan only 14 carriers are available in 20 MHz band

Table 2.7

2.50 The spectrum demand and supply position, as shown in above two tables, clearly establishes the fact that there is not sufficient spectrum to meet the requirements of the existing service

providers and in many cases not even sufficient (in most Circles for GSM) to fulfil the contractual obligations for the existing mobile service providers. Adequacy of spectrum to a service provider is of paramount importance as has been laid down in NTP-99. As at present, the only licence available for access service is UASL which comes bundled with spectrum.

2.51 As such, **keeping in view the scarcity of spectrum and the need to provide the contracted spectrum to the existing licensees, the Authority recommends that no more UAS licence linked with spectrum should be awarded.**

2.52 In making the above recommendation, the Authority notes that 343 applications for UAS licences, filed between 26.9.2007 and 1.10.2007 are pending, and that one of these applicants, M/s STEL Ltd., approached the Hon'ble High Court of Delhi contesting the DoT's Press Release dated 10.01.2008 to the extent that it deprived STEL from being granted Letters of Intent for UAS Licences for 16 circles applied for after 25.9.2007 but before the government's announcement of the cut-off date. The Hon'ble High Court in its judgment dated 1st July 2009 directed DoT to consider the applications submitted by the STEL on 28.9.2007 for 16 circles. The said judgment was challenged by the Government before a Division bench of the Hon'ble Delhi High Court and later before the Hon'ble Supreme Court. Subsequently, STEL submitted an additional affidavit mentioning that market conditions have changed since it filed its applications for UASL for the said 16 circles, primarily due to the fact that the STEL's competitors who had applied and received licences in January 2008 have already commenced or are in an advanced stage of commencing the service in the service areas and that a period of

two and a half years has also since elapsed. The Hon'ble Supreme Court took note of the averment of the learned Attorney General appearing for the Government of India that "the Union of India reiterates that the application made by the respondent on 28th September, 2007 has not been rejected but has been put in abeyance and that the Government will consider the pending applications including the application made by the respondent on 28th September, 2007 for 16 circles on a first-come-first-serve basis in due course as per the prevailing policy and consultation with the TRAI". In its order dated March 12, 2010, the Hon'ble Supreme court mentioned that taking the additional affidavit and the suggestions made by the learned Attorney General, the appeal is disposed of as requiring no further adjudication. Hon'ble Supreme Court further mentioned that the findings recorded by the High Court with regard to the cut off date is not interfered with and disturbed by the Hon'ble Supreme Court. **The Authority would therefore like the Government to note that the recommendation made by the Authority in para 2.51 above is subject to the court decisions in this regard. The applicants will however be free to apply for or opt for a Unified licence, which is being recommended for future licences separately.**

C- Delinking spectrum from UAS license

2.53 The recommendation of the Authority in Para 2.51 above is not to grant any more access service licence in the current form. However, presently, there is no other form of access licence. There may be some services which can be provided without using spectrum. Therefore, in the consultation paper dated 16th October

2009, the Authority raised the issue of the need for delinking of spectrum from the UAS Licence.

2.54 The response of a significant majority of the respondents to this issue has been that the UAS licence should be delinked from the spectrum in so far as future licensing is concerned. The rationale for this, according to them, is that the available amount of spectrum is insufficient to meet the needs of the existing operators and linking the licence with it will only mean that no future licences can be considered. It is possible that some operators might want to offer services which do not require spectrum, and making a provision for a licence which has no organic linkage with spectrum would be useful. In this context, some respondents referred to the recommendations made by TRAI in January 2005 when it suggested a changeover of policy from UASL to ULR (Unified Licence Regime) and have urged the reiteration of this recommendation.

2.55 The stakeholders have also argued that the Economic Survey of 2008-09 has also advocated for de-linking the spectrum from the licence. Another rationale pointed out by some respondents for delinking of the spectrum from licence was that the Government in a way has already delinked allocation of spectrum for 3G and BWA services from the licence, since operators would have to get this spectrum through the auction process. Some stakeholders gave the rationale that delinking of spectrum from license would bring India in line with the international best practice, enabling it to move to a market based regime. By having a separate spectrum license, technical, reporting and compliance requirements can be standardized across all users of the radio spectrum. One operator favoured delinking of spectrum from the licence on the ground

that it would enable government to institute a licence for basic/fixed services at very nominal or zero licence fee which would encourage small/local players to build wireline networks. This might actually encourage the local cable operators to offer such services. Delinking spectrum from licence will also facilitate ISP operators to obtain UAS licences and provide all IP based voice, non voice services in the country. Another stakeholder favoured delinking of spectrum for all bands as bundling spectrum with license will make it technology biased. Moreover, by delinking spectrum, only serious players, interested in rolling out network, will participate in the entire process.

2.56 It is significant to note that most of the respondents who favoured delinking suggested that this delinking be done only so far as future licensing is concerned. It was pointed out by some that the current licence assures spectrum upto 2 x 6.2 MHz for GSM spectrum and 5 MHz for CDMA system and that any move to deny existing licensees spectrum upto this extent would be untenable under the law of Promissory estoppel, legitimate expectation and the principle of level playing field.

2.57 Some stakeholders were of the view that spectrum should not be de-linked from UAS licence as the demand for UAS Licence is primarily for acquiring the right to provide commercial mobile communication services, which requires spectrum. Without spectrum, UAS licence may not have any meaning. For other services covered under the UAS Licence, there is either negligible demand (e.g. Wire-line services) or there is an alternate licence available (e.g. VAS Licence, ISP Licence etc). Further, as the major part of 2G spectrum in 800/900 and 1800 MHz bands is exhausted (except to the extent to be vacated by Defence) there is

no logic in now de-linking spectrum from the UAS Licence. While stating that spectrum should not be de-linked from UAS licence, some stakeholders also mentioned that to facilitate provision of certain Access Services (e.g. fixed wireline) that do not require spectrum, DoT may prescribe a lower entry fee than the current entry Fee for UAS Licences.

2.58 This is not the first time that the Authority is examining the issue of delinking spectrum from UAS licence. In its recommendations on Unified licensing regime dated 27th October 2003, the Authority had recommended that Unified Licensing" regime should be initiated within six months for all services covering all geographical areas using any technology. The operator shall be required to approach the licensor separately for spectrum allocation.

2.59 In its recommendations on Review of licence terms and conditions and capping of number of access providers dated 28th August, 2007, the Authority recommended that the DoT should specify appropriate license fee for UAS licensees who do not wish to utilise the spectrum. In its reply dated 8th November 2007, conveying non-acceptance of this recommendation, the DoT had informed the Authority that as per the NTP-99, there are only two forms of licence, viz., Unified licence and UAS licence. In other words, the Authority's recommendation in 2007 did not find acceptance on the ground that a UAS licence cannot exist without linked spectrum.

2.60 Internationally, several administrations follow separate pricing and licensing regulation for allocation of telecom licence and spectrum. Detailed International practice is provided in **Annexure X.**

2.61 Apart from the non-availability of spectrum, another reason for delinking the spectrum from the licence is that with the proliferation of technology and services in various bands, there could be many applicants who may like to offer access services using wireline networks or through fibre. In the existing licensing regime, such licensees are also required to obtain a UAS licence by paying the same entry fee prescribed therein, which is not economically feasible.

2.62 The Authority has, in Para 2.51 above, recommended that no more UAS licences should be granted as any form of UAS licence will only put additional pressure on the 900/1800 MHz bands and will only aggravate the already difficult situation as far as spectrum availability is concerned. At the same time, keeping in view the possibility of some service providers wanting to launch access services without spectrum, the Authority is of the opinion that future licences must be unified licences, not linked to spectrum. Therefore, the Authority is of the opinion that the UAS licence in its present form cannot be continued for issue of future licences. **Accordingly, the Authority recommends that all future licences should be unified licences and that spectrum be delinked from the licence.**

2.63 The Second Committee in its report recommended that:

> "*In case any new UAS licences are issued in future, they should not carry with them any eligibility for start-up spectrum. Since there is no start-up spectrum, the licensees will not have any roll-out obligations for wireless access networks.*"

2.64 In view of the non availability of sufficient spectrum to meet the requirements of the existing service providers, the Authority is also recommending that for all future licences, the spectrum be

delinked from the licence. As regards rollout obligations of such future licences, the Authority is separately treating this issue and the recommendations in Paras 2.140 to 2.144 may be referred to.

D- Defining the number of access service providers in a service area.

2.65 The next issue for consideration is the need to place a limit on number of access service providers in a service area and the basis for deciding the number of operators in a service area. In the consultation paper, the Authority had raised the issue of the limit on minimum and maximum number of access service providers in a service area, in case it is decided not to delink spectrum from UAS licence.

2.66 In response to the above question, most stakeholders were of the view that spectrum should be delinked from the UAS licence. Only in the event that this is not done, the stipulation regarding the number of minimum and maximum number of access service providers varied. Insofar as minimum is concerned, there was general agreement that effective competition must be the guiding principle in determining the number of operators. Their main concern was that the minimum number should be such as to maintain a reasonable level of competition and to avoid monopolistic tendencies. The number suggested by the different stakeholders varied from 3 to 6 operators.

2.67 In so far as the maximum number is concerned, the opinion varied considerably. Some service providers opined that in case spectrum is not delinked from licence then the maximum number of operators in a service area should be determined by the availability of spectrum. Some suggested that as the number of

licensees in each service area already exceeds the sustainable limit, incentivising consolidation through an appropriate M&A policy is required.

2.68 It was also pointed out by some stakeholders that an analysis of the HHI index clearly shows that the incremental benefit beyond four or five operators in the market is negligible. However, other stakeholders contested that the analysis of the HHI index, which is based on the experience of other countries, is not reflective of the situation in India. According to them, the HHI model is based on studies in the countries with over 100% teledensity, which is not the case in India. It is only in case of near saturated market (85-100% teledensity), that a new operator can benefit only from weaning customers away from an existing operator; which is not the case in India where the teledensity is still around 45% and where another 500 Million subscribers are to be added over the next 5 years. In India, the market can sustain upto 12 operators in the medium term whereas M&A activities in the long term will bring the market to equilibrium with around 6 operators. Their contention was that introduction of new operators leads to further innovation and brings down tariffs for the customers.

2.69 One stakeholder suggested the introduction of a single RF network based on the maximum available spectrum, managed and controlled by a single independent body called Mobile Network Authority (MNA). It will consolidate all RF access network resource of existing service providers, and provision the RF network such that complete spectrum is available to the service providers on 'as required' basis.

2.70 The Authority agrees with the view of most of the stakeholders that the limit on minimum number of operators in the market

should be decided while addressing the competition concerns. Therefore this issue has been examined separately in the chapter on consolidation of spectrum.

2.71 **The Authority has already recommended that in so far as future licensing is concerned, spectrum should be delinked from UAS licence. Accordingly, there is no need for any cap on the number of access service providers. This recommendation of no cap is only if the future licences are delinked from spectrum. Otherwise, the Authority's specific recommendation is that no more licences should be given.**

2.72 The framework including entry fee, roll out obligations, etc. of the proposed licences (without spectrum) has been discussed subsequently in section G. It is now proposed to discuss some of the provisions in respect of the existing licences.

E- Uniform Licence Fee

2.73 Following media reports that the Department of Telecommunications (DoT) was considering levying uniform licence fee on telecom licensees, TRAI wrote to DoT suggesting that the Authority be consulted before taking any decision. TRAI had also, *suo motu*, included the question of Uniform Licence fee in the Consultation Paper dated 16th October, 2009. Subsequently, a reference dated 2nd December, 2009 **(Annexure IV)** was received from the Department of Telecommunications (DoT) seeking recommendations of TRAI on a single uniform licence fee rate for various telecom service providers in the interest of simplicity, transparency, ending arbitrage in the rate of licence fee, expanding the licence fee base

and ensuring a level playing field between different services, with due consideration of the revenue receipts of the Government and the growth of telecom services in India. The DoT also forwarded a report dated 31st August, 2009 of an internal Committee on the subject. Since the relevant issues were already posed, responses from the stakeholders received and Open House discussions also held, further consultation on this issue subsequent to the receipt of the reference from Government was felt not necessary. *While arriving at the recommendations on the subject, the Authority has based itself on the consultation process on the issues raised in the consultation paper.*

Overview of the Licence fee regime

2.74 As per Section 4 of the Indian Telegraph Act, 1885, the Central Government may grant a licence, on such conditions and in consideration of such payments as it thinks fit, to any person to establish, maintain or work a telegraph within any part of country.

2.75 The Telecom Services in India are provided through various licences issued by the Licensor, the DoT. The initial licences for Basic services and CMTS, granted through the bid process with an annual fixed licence fee, were allowed to migrate to the revenue sharing regime in 1999. Subsequently, the Long distance services were also opened to private sector participation. Since then various telecom services are being provided under multiple licences and registrations. The licences include Unified Access Services (UAS), Cellular Mobile Telephone Service (CMTS), National Long Distance (NLD), International Long Distance (ILD), Internet Service Provider (ISP), Very Small Aperture Terminal (VSAT), Public Mobile Radio Trunk Service (PMRTS) etc.

Infrastructure Provider Category - I (IP- I) requires registration only. Presently, there are about 281 access service providers, 29 NLD operators, 24 ILD operators[18], 219 IP-I, 376 ISPs, 11 commercial CUG VSAT services providers, 55 PMRTS, 20 VMS/AUDIOTEX/UMS service licensees[19].

2.76 Currently, the rates of Licence Fee as percentage of Adjusted Gross Revenue (AGR) vary across different services and service areas (in respect of service area specific licences i.e. access services). The Licence Fee rates have also moved down from the initially high rate of 15% to 10, 8 and 6% at present. The Licence Fee as a percentage share of AGR is comprised of a fixed component towards the Universal Service Obligation (USO) Fund. Presently, the Universal Service Levy (USL) is 5% of the Adjusted Gross Revenue. Therefore, the pure licence fee ranges from 1% of AGR in category 'C' service areas to 5% of AGR in Metro and 'A' circles. The USL is ploughed back into the sector through different projects undertaken by the USO Fund Administrator for the promotion of telecom facilities in the rural areas.

2.77 Under the revenue sharing regime of Licence Fee, the Licence Fee as percentage of AGR for Basic/Cellular/UASL services has been reduced over the years to accelerate growth and expansion of telecom network. The changes in the rates of licence fee for access services are given in the Table 2.8.

[18] Out of this one license is under suspension.

[19] Source: DoT website

Rates of Licence Fee for Access Services

Category	01.08.99 to 24.01.01	25.01.2001 to 30.03.2004	w.e.f. 01.04.2004[20]
A	Provisional @ 15% of AGR (8% for A&N Islands and J&K)	12%	10%
B		10%	8%
C		8%	6%

Table 2.8

2.78 The current licensing fee structure for various telecom licences issued by the DoT is given in Table below.

Current Licence Fee structure for various telecom licences

Licence	Licence Fee
UAS, CMTS, Basic	Metro & Category A Service Area: 10%; Category B Service Area: 8% Category C Service Area: 6%
ISP	6% of AGR; Minimum amount to be paid: Category A Service Area: Rs. 50,000/- per annum Category B Service Area: Rs. 10,000/- per annum
NLD, ILD	6% of AGR
PMRTS	5% of AGR
VSAT	6% (for commercial VSAT) @ Rs. 10,000/- per annum per VSAT (for Captive VSAT)
GMPCS	10% of AGR
IP-I	Nil (registration only)
MNP Service	1% of AGR
Resale of IPLC	Rs. 5 Lakh or 6% of AGR, whichever is higher

Table 2.9

[20] For the first two circle cellular operators (licence awarded before 1999) there was an additional relief of 2% for four years w.e.f. 1.4.2004 subject to a minimum equivalent to the contribution for USO Fund i.e., 5% of AGR.

2.79 As indicated, there had been a progressive reduction in the rates of licence fee for access licences. From a fixed licence fee regime, the licensees were migrated to revenue sharing regime and as against the initial Revenue share at 15% of AGR, the current rates of licence fee range between 6-10% across various licences and service areas. As such, the process of reduction/rationalization of licence fee has been a norm rather than an exception in the Indian Telecom Sector. The rates of licence fee have been reduced considerably from the levels at which it initially started.

2.80 The following issues relating to the issue of uniform licence fee in telecom sector were raised in the consultation paper:

(i) What are the advantages and disadvantages of a uniform licence fee?

(ii) Whether there should be a uniform Licence Fee across all telecom licences and service areas including services covered under registration?

(iii) If introduced, what should be the rate of uniform Licence Fee?

2.81 Most stakeholders favoured a uniform licence fee on the ground that it would reduce the arbitrage and ensure the level playing field among various types of licensees. Further, it will be easy to implement in a transparent manner and will maximise the revenues to the exchequer. They also felt that a Uniform licence fee across various licences will facilitate eventual convergence of all licences to a single one under which all different services can be offered by the licensee. One of the stakeholders submitted that Licence Fee in competitive terms is akin to Sales Tax or Excise Duty. In any truly competitive sector, it is incomprehensible that competitors can have differential Sales Tax rates as this distorts

competition. While favouring uniform licence fee, an opinion was expressed that there should not be any levy of Licence fee for pure Internet and IP-I services. Some stakeholders mentioned that a uniform Licence Fee has also been repeatedly advocated and recommended by the Authority in its recommendations on Unified Licensing dated 13th January, 2005 and Recommendations on components of Adjusted Gross Revenue (AGR) dated 13th September, 2006. One of the stakeholders, while favouring uniform licence fee, also suggested that special treatment is required to be given to the fixed line basic service operators to facilitate broadband penetration which at present is at a very low level and requires rapid growth.

2.82 Those who did not favour the idea of uniform licence fee opined that the licence fee should be charged on revenue based slabs for all the circles, as is being done in case of Income tax. Such fee should be on all telecom licensed services except that on internet service, it should be charged on Gross Revenue instead of the present method of charging on Adjusted Gross Revenue. One stakeholder stated that the existing licence fee based on the type of licensing area (categories A, B and C) is fair and should be continued. Some of the disadvantages mentioned by the stakeholders were that the Operators who are focusing on a particular service/geography, e.g. rural areas with low profitability may end up paying a higher licence fee. In addition, Government may get lower revenue if the rate is set below the maximum rate.

2.83 In dealing with the determination of the issue of a uniform licence fee, the Authority has kept in view the fact that the licence fee rates were last revised in April 2004 i.e. six years ago. As already

indicated, the telecom sector in India has been witnessing a rapid growth, bringing in its wake certain structural changes. The Authority has also kept in view the experience gained over the last six years.

2.84 On the issue of the need to have a uniform License Fee across all telecom licenses and service areas including services covered under registration, most of the stakeholders while advocating a uniform license fee across various licenses and service areas had some reservations regarding extension of this uniformity to Infrastructure providers and ISPs.

2.85 Some stakeholders have argued that services provided under registrations (IP-I) should be kept out of the purview. According to these stakeholders the setting up of passive infrastructure under the IP-I licenses is not a telecom activity requiring a license under Section 4 of the Indian Telegraph Act and any imposition of license fee on these will only increase the cost for providing telecom services and discourage infrastructure sharing.

2.86 Some stakeholders have sought that ISPs without Internet Telephony should also be kept out of the purview of uniform License fee in order to promote Broadband and Internet. Standalone service providers both in the Long distance segment and Access services have also not favoured a uniform License fee considering that any upward revision to bring in uniformity would adversely affect their financials. Other stakeholders have however, favoured a uniform license fee across all telecom licenses including registrations in order to ensure level playing field, eliminate arbitrage and prevent leakage of Government revenues.

2.87 As given in Table-2.9, the licence fee for different licences varies from 10% for UASL in Category 'A' and Metro service area to Rs 10,000/- per annum for an ISP Category 'B' licence. This differential licence fee across various licences has raised concerns about arbitrage, cross subsidization etc. Today, most of the major telecom service providers are integrated players providing various telecom services through multiple licences/registrations held by them, their group companies, subsidiaries or holding companies. Sometimes common resources are used by different licences of an entity, thus generating different revenue streams on which licence fee at varying rates are paid to the Government. For instance, there could be cases where ISP services may be provided using the spectrum allocated under the CMTS/UAS Licence. The arbitrage opportunity available on account of differential licence fee has become a matter of concern. An effective licensing fee regime should be simple, easily verifiable, ensure level playing field, prevent revenue leakage and should have built in safeguards against possible misuse of terms and conditions.

2.88 The Authority through its various recommendations and communication exchanged with DoT, has noted that arbitrage opportunities exist on account of differential licence fee across various licences and service areas and pointed to the need to have a uniform licence fee across various services/licences. In its recommendations on Unified Licensing given on 13th January 2005, the Authority favoured a progressive move towards uniform licence fee. In the recommendations on components of AGR dated 13th September 2006, the Authority discussed the need for a uniform rate of licence fee to address the issue of arbitrage and observed that a uniform rate licence fee regime could obviate the recourse of diverting revenue from one service to another where

incidence of licence fee is lower. With most operators holding multiple licences, there is scope for creative accounting and booking of revenues in a manner to reduce the incidence of licence fee. TRAI raised this concern with the DoT vide its letters dated 21st November 2008 and 20th January, 2009.

2.89 Today, almost all established access service providers/Group companies are present in most service areas. Most of them also have long distance and ISP licences and have presence in the IP-I segment as well. (Table-2.10)

Details of Telecom Licences of major operators

S.No.	Name of Operator	Details of Telecom Licences of major operators				
		UAS/CMTS in No. of service areas	NLD	ILD	ISP	IP-I
1	Aircel	23	Yes	Yes	Yes	Yes
2	Bharti Airtel Ltd	22	Yes	Yes	Yes	Yes
3	BSNL	21	Yes	Yes	Yes	No
4	Etisalat & Allianz	15	Yes	Yes	Yes	No
5	Idea	22	Yes	No	No	Yes
6	Loop	22	No	No	No	Yes
7	MTNL	2	Yes	Yes	Yes	Yes
8	Reliance	22	Yes	Yes	Yes	Yes
9	Sistema Shyam	22	No	No	Yes	Yes
10	Tata	22	Yes	Yes	Yes	Yes
11	Unitech	22	Yes	Yes	No	Yes
12	Videocon	21	Yes	Yes	No	No
13	Vodafone	23	Yes	Yes	Yes	Yes

Table 2.10

2.90 The Authority has noticed that there is scope for creative accounting of the revenues under different licenses to take advantage of the differential license fees. The following types of

arbitrage opportunities are available because of differential/nil license fees across various telecom licenses -Within the access services, among different categories of service areas, between the access providers and long distance services, between the access providers and ISP, and between the access providers and IP-I.

2.91 In case of differential license fee across different categories of service areas in respect of access services, there is no one-to-one correspondence in the accounts of a circle and the corresponding information available in the balance sheet of the company holding a Pan-India license. It therefore becomes difficult to verify that the statement submitted by the UAS licensee for a circle has correct revenue claimed for that circle. Thus, there is a clear arbitrage opportunity available to such UAS licensee under the current framework, by cross booking their revenue from a service area attracting higher license fee to another category of circle which attracts lower license fee, which would be difficult to track. Further, there is no difference in the rates of spectrum charges on the basis of categories of circles, only criteria being quantum of spectrum allocated. There is a strong case for a uniform license fee for all categories of circles for access services.

2.92 The level of entry fee for obtaining license already takes into account the differences among different categories of circles/services. As such, there appears to be little justification for having further differentiation by way of different levels of license fee for different categories of circles and services.

2.93 Many companies are having integrated operations by virtue of having taken access license as well as long distance (NLD/ILD) licenses. The difference in the license fee of these two categories of

licenses is upto 4%, which is a sizeable arbitrage opportunity available to the integrated operators.

2.94 Similarly, scope of service of a UAS licensee includes internet/broadband services. The revenue of the internet services provided by the UAS licensee should be within the UASL domain and attract UASL license fee, particularly when such services could have been provided by using UASL resources. However, invariably such UAS licensee also holds an ISP license and revenue from such internet services is shown under that license. Difference in license fee payments between UAS and ISP licenses is tremendous on account of differential license fee as well as different definitions of AGR.

2.95 **The Authority, therefore, recommends that there should be uniform licence fee across all telecom licenses and service areas.**

The IP-I providers

2.96 The IP-I registration was opened to private sector with effect from 13.08.2000 to encourage growth in infrastructure and bandwidth capacity. All Indian registered companies are eligible to apply. There is no restriction on foreign equity and number of entrants. There is no entry fee and no bank guarantee. The applicant company is required to pay Rs. 5000/- as processing fee along with the application. As per the existing rules for IP-I, the applicant company is only required to be registered. No licence is issued for IP-I. Companies registered as IP-I can provide assets such as Dark Fibre, Right of Way, Duct space and Tower.

2.97 As per the terms and conditions of the CMTS/UASL, the access service providers were initially permitted sharing of "passive" infrastructure viz., building, tower, dark fiber etc. only. However in April, 2008, in order to ensure an optimum utilization of the available resources and to bring down the cost of providing service, the Government issued 'Guidelines on Infrastructure sharing among the Service Providers and Infrastructure Providers'. As per these guidelines, the service providers were permitted to share the active infrastructures limited to antenna, feeder cable, Node B, Radio Access Network (RAN) and transmission system only.

2.98 The DoT, vide its letter dated 9th March 2009 (**Annexure XI**) has clarified that the scope of IP-I category providers, which is presently limited to passive infrastructure, has been enhanced to cover the active infrastructure if this active infrastructure is provided on behalf of the licensees, i.e. they can create active infrastructure limited to antenna, feeder cable, Node B, Radio Access Network (RAN) and transmission system only for/on behalf of UASL/CMSP licensees.

2.99 Recently, with the introduction of a number of new service providers in a service area, reduction in the overall tariffs and restrictions placed by various local bodies on installation of mobile towers, infrastructure sharing amongst service providers has become a norm rather than exception. As mentioned above, the scope of IP-I service provider, which was initially limited to passive infrastructure, has been recently enhanced to cover the active infrastructure also, if this active infrastructure is provided on behalf of the licensees. Therefore, with large number of service providers and recent trend of outsourcing infrastructure

requirements, IP-I service providers have started playing a significant role in the whole ecosystem.

2.100 Presently there are 219 IP-I companies who have registered with Department of Telecommunications for Infrastructure provision. As per the information available with TRAI, the number of towers in the country is approximately 3 lakhs (as on Feb 2010). Majority of these telecom towers are owned by 12 IP-I companies besides BSNL & MTNL who do not have a separate IP-I registration. Out of 3 lakhs towers about 50% are shared by more than one operator. As per the revenue collection for the year 2009-10, the total revenue of the major IP-I companies will be around Rs. 22,000 crore. As per research estimation[21], there will be an average annual growth of 17% in number of towers in next 4-5 years.

2.101 Regarding IP-I, the Authority had earlier also proposed vide its letters to the DoT dated 13th May 2008[22] and 21st October 2008[23] to bring them under the licensing regime. The Authority noted that major telecom companies are forming IP-I companies and hiving off their existing telecom tower assets to such IP-I companies, prime motive being reduction of attendant incidence of licence fee on revenues earned from sharing of their telecom infrastructure. It was further noted that it is possible that the entrepreneurs may adopt novel accounting methods to minimize the incidence of licence fee etc. and it was necessary to ensure certain minimum conditions like transparency, separation of accounts and non-discriminatory treatment provisions introduced through licensing regime.

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[21] Source: Presentation by IDBI bank on Indian Telecom Sector

[22] http://www.trai.gov.in/RelatedDocuments/part1.pdf

[23] http://www.trai.gov.in/RelatedDocuments/part3.pdf

2.102 Therefore, the Authority is of the opinion that in view of increasing role of IP-1 in the sector, there are enough reasons to bring them under the ambit of licensing regime. This will also facilitate the following:

- By licensing them, they can also be permitted to provide both passive and active infrastructure, independent of the service providers. This will facilitate faster roll out and reduction in the capital expenditure on the part of the service providers.
- Currently, tower providers are facing restrictions from different local bodies and are being subjected to local regulations which are not uniform. Bringing them under the licensing regime would facilitate a more orderly development.
- The scope for arbitrage will be significantly reduced.

2.103 **In view of the foregoing, the Authority recommends that IP-I category be also brought under the licensing regime with immediate effect.**

Internet Service providers

2.104 To start with, Internet Service providers licence was opened for private sector from November '98 and carried with it no Entry Fee and a licence fee of Re.1 per annum. Restricted internet telephony service was permitted to the ISPs from 1st April, 2002. The licence fee was waived upto 31.10.2003 and a nominal licence fee of Re. 1 became payable from 1.11.2003 to 31.12.2005. With effect from 01.01.2006, the licence fee became 6% of AGR in addition to Re 1 per annum in respect of ISPs with Internet telephony. As per the new guidelines for grant of licence for operating Internet Services issued by DOT in August 2007, all ISPs were permitted to provide

Internet telephony and separate category of Internet Telephony Service Providers (ITSPs) has been done away with. Licence fee of 6% of AGR was imposed on all ISPs except on the revenue earned from provisioning of pure Internet access services.

2.105 Despite a token licence fee for ISP, the number of internet subscribers has grown from 5.14 million in September 2004 to only 15.24 million by the end of December 2009. Of this, the number of broadband subscribers is 7.83 million. These numbers are way below the target of 40 million and 20 million by the end of 2008 for internet and broadband subscribers respectively. Further, out of the existing 165 active ISPs (as against 375 registered), 95.9% subscribers are covered by the top 10 ISPs, with the two PSUs (BSNL & MTNL) having more than 70% of the market share. The annual Revenues from ISPs is estimated to be about Rs 7000- 8000 Crore. Of this, the revenue from the Internet service providers with Internet telephony amounts to about Rs. 1200 crore This amount would be far higher since the deductions allowed from Gross revenue for arriving at the AGR are over 90% of gross revenue.

2.106 The Authority in its recommendations on "Review of Internet services" sent to DoT on 10th May, 2007 observed that there was a need to stop revenue leakage and prescribe uniform formula for imposing licence fee and recommended a uniform annual licence fee equivalent to 6% of AGR on all ISPs including revenues earned from provision of Internet Access, Value Added Services and Broadband in ISP domain. It also recommended a single Internet service provider licence. In the letter dated 31st March, 2009 to the DoT as a follow-upto the recommendations dated 18th August, 2008 on "Issues relating to Internet Telephony", the Authority

once again underlined the possibilities of arbitrage and pointed out that most of the UAS licensees, who can provide internet and broadband including triple play services under UASL, also take separate ISP licence and provide these services (Internet and broadband services) under ISP licence, thereby avoiding the incidence of licence fee.

2.107 The above position has not changed and the Authority feels that the recommendations given earlier should be given consideration. Some stakeholders have represented that levying licence fee on Internet service providers providing pure Internet access would come in the way of the spread of Internet and broadband in the country and jeopardise the growth of telecom sector. The Authority has duly considered this matter. The growth of Internet so far has been low and falls far short of the targets. There is no demonstrable correlation between the absence of licence fee and growth of Internet spread. On the other hand, the lack of licence fee enables scope for arbitrage as brought out by the Authority in the past.

2.108 At the same time, the Authority is keen that the spread of Internet should be much faster than has been so far. In August 2007, pursuant to the recommendations of this Authority, DoT had done away with the Category 'C' license in ISP with the result that today, there is no licence at the sub-State level. The Authority is of the opinion that multiple operators should be allowed including at the local level with low entry fee. Accordingly, the Authority would like to reintroduce the 'C' Category licence with a District-wide jurisdiction. This would enable small operators including the cable operators to offer Internet service along with other services.

This licence would however not apply to the Metros where, the ISP would be required to acquire a 'B' category licence.

2.109 Since the intention is to enable small operators to acquire ISP licence, the Authority proposes that those operators who have a turnover of less than Rs.1crore, need not be charged any licence fee.

2.110 **The Authority recommends the reintroduction of the 'C' Category licence with a District-wide jurisdiction to enable small operators including the cable operators to offer Internet service along with other services.**

Application providers

2.111 Value added services are enhanced services, in the nature of standard voice calls, voice/non-voice messages, fax transmission and data transmission. In India, SMS, Ringtone and Caller Ring Back Tones (CRBT) constitute bulk of the value added services provided by mobile telecom operators presently. VAS delivery has so far been based on the SMS, IVR, GPRS and WAP portals platforms. However, there are innumerable value added services like gaming, video and audio streaming, stock quotes, news and cricket quotes, tele-voting, chatting, astrology non-core services, which add value to the basic teleservices and bearer services (the core services being standard voice calls, voice/non-voice messages, fax transmission and data transmission). Each service differs in content, cost and demand and is customized for different segment of consumers. With the introduction of 3G services, Next Generation Network (NGN)/ converged network this is going to change in a big way as high bandwidth multimedia

content services, mobile TV and online gaming will push the demand for VAS as well as innovations in VAS products offering.

2.112 Presently, the VAS are provided either by the service providers directly or by third party content aggregators/enablers, generally known as Value Added Service Providers (VASPs). The Indian VAS industry has evolved greatly over the last five years, growing at 50% annually (four-year CAGR)[24]. Its revenue is estimated to be over 10% of the total revenue of mobile telecom service providers. The mobile revenue through value added services is expected to cross 30% of the mobile telecom service provider's revenue in the next 4-6 years as reported in various studies/ position papers.

2.113 A number of players viz. Content/Application owners, aggregators, technology enables/Software developers and operators play different roles in providing the VAS experience to the end consumer. The commercial arrangements exist between telecom operators and Value Added Service Providers (VASPs) for providing these services. In many of these cases, the VASPs provide technology platform which enables a user to access content on to his mobile or terminal device. In some of the cases the VASPs do not own the contents but they have arrangements with the content providers/content developers or copyright owners known as content owners. In India, the operators typically retain the bulk of the revenue (around 70%). The revenue share is also dependent upon a number of factors such as the nature of technology, type of content etc.

2.114 The growth in VAS sector is being fuelled by the improving quality of mobile handsets and their falling prices, increasing usage by

[24] Report on "Indian Mobile Vas Providers" - Noble

young mobile users and innovative content. With the advent of 3G services, it is expected that higher data transfer rates would facilitate more data intensive applications. Considering the market potential for value added service in the coming years the licensing/regulatory framework needs to be harmonized for ushering growth in all the segments of the value added service viz. technology platform, content aggregation etc. There is also a need to facilitate a proper revenue sharing regime between the content aggregators/value added service providers (VASPs) and the telecom service providers.

2.115 In February 2009, TRAI had recommended that Telecom Service Providers should provide uniform access to their infrastructure to the VAS providers through mutual agreement, and stressed the need to publish charges for VAS and maintain transparency in billing. However, it observed that there was no need to formulate terms and conditions for licence/registration for VAS providers.

2.116 In the present scenario, there are a large number of small and medium size content aggregators /content enablers called Value Added Service Providers (VASPs). Mostly, such Value added Service Providers depend on the facilities provided by the telecom operators. Therefore, the matter of revenue share becomes a major issue. Effective cooperation and collaboration amongst various participants is a key factor to form a healthy value chain of value added services. It is therefore necessary to revisit some of the recommendations of February 2009.

2.117 **Accordingly, the Authority would be shortly initiating a consultation process to identify measures for the proper growth of the VAS industry, including bringing them under the licensing regime.**

2.118 **The Authority recommends that all licences/registrations viz. Basic/CMTS/UAS Licences in all the telecom service areas, NLD, ILD, ISP, ISP with IT and GMPCS and IP-I, PMRTS, Commercial VSAT, leftover IP-II licensees till their migration to NLD licence is finalized and IPLC should be brought under the purview of a uniform licence fee regime. Pure value added services i.e., Voicemail/Audiotex/UMS need not however be brought under this regime.**

Rate of the Uniform licence fee

2.119 The next issue to be decided is the rate at which the uniform licence fee should be charged. In response to the question raised in the consultation paper, several stakeholders have suggested that uniform licence fee should not be more than 6% of AGR including the USO levy. They have contended that the licence fee should be only towards the administrative costs at 1% of the AGR and that earlier recommendations of TRAI on a Unified Licensing Regime dated 13.01.2005 and its recommendations on components of AGR dated 13.09.2006 have also recommended recovery of administrative costs through licence fee and not for revenue generation.

2.120 Stakeholders have also argued that a lower licence fee on the service providers would encourage higher growth, further tariff reduction making the services more affordable and increasing service providers' revenue, resulting in increased revenue to the Government. Some stakeholders also suggested bringing down of the USO levy in the light of the accumulations in the USO Fund. A stakeholder has suggested application of a uniform licence fee at 6% of AGR on an asymmetric basis only to the new entrants

and extended to all on a gradual basis to reach 6% over the next 4 years.

2.121 One stakeholder suggested that the license fee should be calculated on the basis of weighted average of license fees being taken currently for various types of services and areas and should be prescribed in such a way that there is no loss to the National Exchequer. A uniform fee of the order of about 6% on revenues from all services, including those who require only registration such as IPs (Infrastructure Providers), will be quite reasonable as the same will protect the present revenues of the Government. Another stakeholder suggested a uniform licence fee at 7% of AGR so that it remains revenue neutral for the Government and also does not impact the operator or the customer in a big way. While another suggested a fee of 7.5%, there was also a view that the licence fee could be a function of revenue growth and inflation. Revenue based slab system for the different service areas as in the case of income tax has also been suggested by a stakeholder. Some stakeholders sought special treatment to the fixed line basic service operators to facilitate broadband penetration.

2.122 Revision of licence fee every year based on revenue growth and inflation, as suggested by one of the stakeholders, is rather arduous considering large number of service providers and multiple licences. The revenue based slab system for licence fee as suggested by a stakeholder as applicable under the Income Tax rules would mean differential rates of licence fee within the same service area. It would also act as a disincentive to service providers, discourage growth and competition. Moreover, it does not address the issue of arbitrage and works against the spirit of level playing field.

2.123 As per the annual figures for AGR and licence fee for the last three years 2006-07, 2007-08 and 2008-09, the average licence fee in respect of access service (across all the service areas in the three categories A, B and C) comes to 8.97%, 8.94% and 9.01% respectively. Access services contribute nearly 80% of the revenue. The Authority in its recommendations on Unified Licensing dated 13th January 2005 has observed that telecom services should not be treated as a source of revenue for the Government. Imposing lower licence fee on the service providers would encourage higher growth, further tariff reduction and increased service provider revenues.

2.124 The Authority is now recommending that both ISP and the IP-I services should also be levied a licence fee. There are more than 3 Lakh towers in the country with more than double tenancy in some of the towers. Of these, BSNL has about 40000 towers. With average tenancy of 1.55 and monthly rent of Rs. 40,000/-, the following estimates are arrived at in respect of revenue from the towers rental of IP-I companies:

Approx. no. of towers in the country	:	2, 60,000
Average Rent per tower	:	Rs. 40,000 per month
Average tenancy per tower	:	1.55
Total Annual Revenue (monthly rent X average tenancy X 12 X no. of towers)	:	Rs. 19344 crore

2.125 As per the data provided by the ISPs, the revenue of all ISPs for 2008-09 was around Rs 5610 Crore. Taking the projected rate of growth at 10%, the projected revenue for the year 2009-10 will be around Rs 6171 Crore. The projected revenue from the tower

rentals for IP-I companies will be around Rs 19344 crore as given above. The Authority accordingly proposes that the IP- I providers and the ISPs be brought into the licensing fee fold. However considering that these services are being brought into licensing for the first time, it is proposed that the licence fee for these services be progressively brought upto 6% over a period of three years, starting with the year 2010-11 at 4%. Simultaneously, the licence fee of 10%, 8% and 6% be progressively brought down to 6% over a four-year period, again starting with the year 2010-11.

2.126 A statement showing the financial implications of this proposal is given in **Annexure XII.** The revenue figures of all the services including ISPs and the IP-I for year 2009-10 have been taken into consideration and the projection has been made for the four-year period beginning with the year 2010-11 and ending with the year 2013-14. To project the revenue of telecom service industry, the Authority has examined the revenue pattern & shares of the various services i.e. Access services and Long distance other services and noted that over the period, the revenue share of access services to total revenue have declined from 90% to 80%. The Authority has also examined quarter-wise growth of revenue of various segments based of Adjusted Gross Revenue(AGR) and has noted that over the period of 11 quarters, the revenue of access services have grown by about 1.51% whereas other segments have registered growth about 15% for the same period. Based on the Adjusted Gross Revenue data of industry over 11quarters, the growth of AGR is projected @1% for next four years for access revenue and for other segments @10% for the same period, except for IP-I where the projected growth rate is 15%. The estimated Revenue for telecom service industry for the next four years is given below:

Projected AGR

Financial Year	Total Adjusted Gross Revenue (Rs in Crore)
2010-11	146347
2011-12	153489
2012-13	161427
2013-14	170071

Table 2.11

2.127 It is seen that compared to the year 2009-10, the proposal is revenue positive and involves additional revenue of Rs. 698.04 crore in the year 2010-11. Over the next four years too, the net overall revenue is positive by Rs.369.92 crore. However, in the year 2013-14, the revenue from the Licence fee shows a decline. At this stage, it is really difficult to predict if this trend will continue in the years thereafter. At this stage, it is also difficult to predict the growth of data services. The Authority would therefore review the position in the year 2012 keeping in view the developments by that date.

2.128 One of the perspectives on the proposal to levy uniform licence fee could be that the smaller players such as the Internet service providers are being charged licence fee and correspondingly the larger telecom operators are being given the advantage of reduced licence fee. The concern could be whether the spread of Internet in India would be adversely affected by this proposal. Firstly, the total revenue arising from the licence fee on the Internet service providers is a very small percentage of the total licence fee being collected. What is being proposed in this measure is the removal of a possible arbitrage that has been detailed above. Besides, there has been no evidence to indicate that the lack of licensing fee so far on the Internet providers has contributed to the growth

of Internet in the country. As brought out above, the spread of Internet in this country is abysmally low and a large number of ISPs are not even active and those who are, have very low turnover. The major share of revenue is from the UAS licence holders. The rational for charging a uniform licence fee has been amply brought out earlier. Yet another concern could be that the four-year timeframe suggested would mean that the possibility of arbitrage would continue. In a way, this is partly true except that the degree of arbitrage reduces every year and to start with, would be lower than at present. After careful examination, the Authority is of the opinion that a uniform licence fee across all services and geographic areas would go a long way in the long-term development of the telecom services in the country. The Authority would however like the Government to examine the issues of double taxation, if any.

2.129 **The Authority accordingly recommends that the licence fee for all the services viz. Basic/CMTS/UAS Licences in all the telecom service areas, NLD, ILD, ISP, ISP with IT and GMPCS and IP-I licences, PMRTS, Commercial VSAT, leftover IP-II licensees till their migration to NLD licence be finalized and IPLC, in all the service areas, will progressively be brought to a uniform 6% of AGR over a four-year period, as shown in the table 2.12 below.**

2.130 **The Authority recommends that Infrastructure providers – IP-I and the ISPs be levied a uniform licence fee which would be scaled upto 6% progressively over a three-year period, as shown in the table below. The Authority would however like the Government to examine the issues of double taxation, if any.**

Uniform license fee

Service providers	2010-11	2011-12	2012-13	2013-14
UASL/CMTS in Metro	**10%**	**9%**	**8%**	**6%**
UASL/CMTS in Category 'A'	**9%**	**8%**	**7%**	**6%**
UASL/CMTS in Category 'B'	**7%**	**6%**	**6%**	**6%**
UASL/CMTS in Category 'C'	**6%**	**6%**	**6%**	**6%**
ISP	**4%**	**5%**	**6%**	**6%**
IP-I	**4%**	**5%**	**6%**	**6%**

Table 2.12

2.131 Presently, the rollout obligations for new licensees are applicable from the date of allocation of start up spectrum. However, it is noticed that some service providers do not commence their operations even after the lapse of sufficient time. Although the licence conditions contained provisions for levying liquidated damages, the amounts involved are low and are not deterrent enough to oblige the service provider to commence operations/conduct its operations such that the spectrum is efficiently utilised. A new licensee having received initial start-up spectrum and not commencing its services results in the Government not receiving its due share of annual licence fee and spectrum charges as a percentage of the AGR. As such, inefficient usage of spectrum leads to loss of government revenues. The Authority is of the firm opinion that such possible loss of revenue needs to be plugged. And in this direction, the Authority proposes to levy the license fee and spectrum usage charges as a percentage of a presumptive adjusted gross revenue or the actual adjusted gross revenue, whichever is higher.

2.132 To this end, the Authority has examined the service area-wise market share of both the GSM operators and the CDMA operators, who hold the UAS licences and who have been allocated the start-up spectrum in the last 24 months. This information is given in **Annexure XIII.** Based on the information provided therein, the Authority proposes that the license fee and spectrum usage charges should be levied on the AGR which is supposed to be generated on the market share of at least 2% in respect of the GSM service providers, the market share being determined on the basis of the number of subscribers. Insofar as CDMA service providers are concerned, the number of service providers and the number of subscribers being low, the percentage of market share that a service provider has to generate for the given spectrum is fixed at 4%. Accordingly, the amount of AGR that would be taken into consideration for the purpose of calculating the licence fee and spectrum usage charges is given in the Table 2.13 below. It is proposed that TRAI would review these percentages every year.

Presumptive Adjusted Gross Revenue

Circle	GSM Presumptive AGR	CDMA Presumptive AGR
Delhi	90	50
Mumbai	80	40
Kolkata	30	20
Maharashtra	110	30
Gujarat	90	20
AP	120	40
Karnataka	110	20
Tamil Nadu	140	30
Kerala	70	20
Punjab	60	10
Haryana	30	10
UP - W	70	20
UP - E	100	20
Rajasthan	70	20
MP	70	20
WB	50	10
HP	10	5
Bihar	70	20
Orissa	30	10
Assam	30	5
NE	20	5
J&K	10	5

Table 2.13

2.133 **The Authority recommends that w.e.f 1.4.2010, the licence fee and spectrum usage charges payable by each such licensee shall be on actual AGR, subject to a minimum AGR as shown in Table 2.13 above. This minimum figure would be reviewed by TRAI every year.**

F- Roll Out Obligations

2.134 As per the UASL, the licensee is expected to cover at least 10% of the District Headquarters (DHQs) in the first year and 50% of the District Headquarters within three years of effective date of Licence. The licensee is permitted to cover any other town in a 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. In the Metro areas, The licensee is required to provide, in 90% of the service area, street as well as in-building coverage within one year of the effective date.

2.135 The Authority is of the opinion that the present roll out obligations are very lenient and are urban centric. The service providers are mandated to provide coverage only in the district headquarters or major towns. The result is that even 15 years after the introduction of mobile service in the country, the rural teledensity is still below 25%. In several countries, the roll out obligations are quite stringent even when the spectrum is given through market mechanism **(Annexure XIV).**

2.136 Spectrum is a scarce resource. Service providers are expected to use it optimally and provide coverage and service in the entire Service area including the rural areas. However, experience reveals the picture to be otherwise. As per the data received from the service providers, though 91% of the total 5,93,731 inhabited[25] villages have been covered by at least one operator, the percentage of villages covered by at least 3 or 4 operators is only 51.3% and 31% respectively (**Annexure XV**). This shows that although, 6-7 operators are licensed since more than 5 years, most of them are yet to cover a large number of villages. The roll out obligations prescribed in the licence do not carry any condition regarding rural coverage. The USO Fund is also not the answer as since June, 2007, when it launched the scheme of providing subsidy for installation of towers and providing mobile service in the rural and remote areas, only 6956 towers have been

[25] As per report of 2001 Census

commissioned till 31.12.09. Most of the fund was spent on wireline and the balance is lying unutilised. As per the Annual Report 2009-10 of the DoT, the achievements of the USO Fund have been as follows:

i. As on 31st December, 2009, about 5.66 lakh (94.79%) villages were covered by VPTs.

ii. 40694 villages out of 40705 villages having more than 2000 population were provided rural community phones.

iii. Under Bharat Nirman Programme, of 62,302 remaining villages, 61,186 covered upto December 2009.

iv. In 1685 cost positive short distance areas (SDCA), about 70.49 lakh RDEL installed

v. Infrastructure sharing scheme to set up 7436 towers spread over 500 district of 27 states of the country implemented; 6956 towers set up as on 31st December, 2009.

2.137 The population-wise distribution of the 593731 inhabited[26] villages is as follows:

[26] As per report of 2001 Census

Population-wise distribution of inhabited villages

Ranges	No. of Villages	Population
Less than 100	45276	2274375
100-199	46276	6912023
200-499	127511	43960187
500-999	145402	105274341
1000-1999	129977	183294133
2000-4999	80413	239184866
5000-9999	14799	98112136
10000 & above	3961	63478578
Total	**593615**	**742490639**
Source:- Primary Census Abstract, India, Census of India 2001		

Table 2.14

2.138 The importance of telecommunications in the development of rural areas needs no reiteration. Providing telecommunications to the rural areas and bridging the urban-rural divide has been the objective of the Government for long. The Authority would ideally like to see all the villages/habitations with a population of 500 and above to be covered within the next three years. Since earlier efforts in this direction have met with limited success, the Authority would like to adopt a two-fold approach to this challenge. One segment of this approach is to impose a full service obligation on the service providers. The Authority is in favour of imposing an obligation of coverage of Habitations having a population of more than 2000 in a phased manner, as follows.

Roll out obligations

Time	Habitation >10000	Habitation 5000-10000	Habitation 2000-5000
2 years from effective date	100%	50%	-
3 years from effective date	100%	100%	50%
4 years from effective date	100%	100%	100%

Table 2.15

In the above roll out obligations, coverage of 90% or above habitations will be taken as compliance of the obligation.

2.139 It shall be incumbent on every service provider to provide connectivity through its own network in all habitations with a population of more than 5000 persons. A licensee would however be allowed to cover the habitations having a population between 2000-5000 through intra service area roaming, subject to the condition that at least one-third of the habitations shall be covered by its own network. The Authority would oversee the interconnection issues arising from the intra service area roaming. The existing Licensees, who have already completed more than 4 years, may be given one more year to complete the roll out in required number of villages.

2.140 In order that the roll out obligations are properly fulfilled, it is essential that the monitoring is strict. The Authority would propose that in the event a service provider, who has already completed five years from the effective date of licence, fails to fulfil the rollout obligations as indicated above, it will be charged spectrum usage charges (as proposed in Chapter-III) at the next slab every successive year. In other words, if a service provider with 6.2MHz spectrum, and liable to pay the Spectrum Usage Charges at 3.1% of AGR, failing in its rollout obligations will be charged 4.8% or 6.9% in the successive years. In so far as

operators who have not yet completed five years, failure to fulfil the rollout obligations would entail an additional spectrum usage charge of 0.5% of AGR every successive year.

2.141 In so far as habitations with a population of 500 to 2000 persons are concerned, the Authority would like to propose incentivising the service providers.

2.142 Regarding roll out obligation in the three metros of Delhi, Mumbai and Kolkata, the existing condition prescribes that the licensee shall be required to provide street coverage in 90% of the service area within one year of the effective date. As these metros are urban conglomerates and have comparatively higher ARPUs, it is natural that the service providers would roll out their networks in these service areas even in the absence of any obligations. Therefore, the Authority does not consider it necessary to amend the existing roll out obligations in the metros.

2.143 **The Authority recommends that the existing roll out obligations in the CMTS/UAS licences be replaced by the following roll out obligations for all the service areas except the Metros. The rollout obligations for metros would continue to be in force.**

Roll out obligations

Time	Habitation >10000	Habitation 5000-10000	Habitation 2000-5000
2 years from effective date	100%	50%	-
3 years from effective date	100%	100%	50%
4 years from effective date	100%	100%	100%

In the above roll out obligations, coverage of 90% or above habitations will be taken as compliance of the obligation.

2.144 **The Authority recommends that a licensee may be allowed to cover the habitations having a population between 2000-5000 through intra service area roaming, subject to the condition that at least one third of the habitations shall be covered by its own network.**

2.145 **For the existing licensees, who have already completed more than 4 years but have not achieved the roll out obligations, the Authority recommends that they should be given one more year to complete the roll out in required number of habitations.**

2.146 **Failure to fulfil the rollout obligations would entail penalty in the form of additional spectrum usage charge at the rates indicated in Para 2.140 above.**

2.147 **In so far as Metros are concerned, the existing licence conditions will continue to apply.**

2.148 While the above measures facilitate the coverage of the larger habitations, it is equally necessary that the service providers focus on the smaller habitations too. Some of these would be getting covered in the normal course even as the larger habitations have been covered. At the same time, there would be certain habitations that are far removed from the larger habitations, particularly in service areas with low population density. As an incentive for roll out of services in smaller habitations, the Authority is of the view that those licensees who have covered 50% of the habitations with a population of 500-2000 be given a reduction of 0.5% in the annual licence fee. And those licensees who have covered 100% (90% & above to be treated as 100%) of the habitations with a population of 500-2000

should be given a 2% discount in the annual licence fee. This discount will be given from the licensee's contribution towards the Universal Service Obligation Fund.

2.149 The Authority is keen that the Universal Service Obligation Fund be utilised by the government for provision of telecommunications facilities in habitations having a population of less than 500, as the economic activity in these habitations may not be sufficient to support extension of such facilities by the individual service providers. The Authority is of the opinion that the universal service obligation fund should be utilised to provide broadband to all the villages having a population of more than 1000 to start with and later extend the same to all habitations having a population of 500 and above.

2.150 **Accordingly, the Authority recommends that those licensees who have covered 50% of the habitations with a population of 500-2000 be given a reduction of 0.5% in the annual licence fee. And those licensees who have covered 100% (90% & above to be treated as 100%) of the habitations with a population of 500-2000 should be given a 2% discount in the annual licence fee.**

2.151 **The Authority also recommends that the Universal Service Obligation Fund be utilised by the government for provision of telecommunications facilities in habitations having a population of less than 500 and to provide broadband to all the villages having a population of more than 1000 to start with and later extend the same to all habitations having a population of 500 and above.**

2.152 **In order to provide a level playing field between the old and new service providers the Authority recommends that the reduction in the licence fee shall be applicable only with effect from 1.4.2012 i.e. four years from the grant of licence to the new service providers.**

G- Perpetuity/Renewal of licences

2.153 In the consultation paper dated 16th October 2009, the Authority had raised the issue of perpetuity of licence for comments of the stakeholders.

2.154 In response, a large number of the stakeholders have suggested that the licence should be perpetual. However, most of these stakeholders also suggested that the licence should be delinked from the spectrum. One stakeholder opined that meeting the licence conditions and payment of the licence fee should be sufficient conditions for renewal of licences for 20 years. Another stakeholder was of the view that the UAS licence should be perpetual along with the spectrum, as the operator has already paid the cost of spectrum while acquiring it and is paying the annual spectrum charges throughout its life. One of the stakeholders was of the opinion that limiting the duration of the license creates significant uncertainty in the operators' business model and inhibits futuristic business planning, especially as the terms of license renewal are not well established. This could result in the operator hesitating in deploying new technologies or undertaking long term capacity enhancement related capital expenditure, as they move closer to license expiry period. This would be detrimental to the interests of the consumers, who may

consequently suffer from declining level of services or be forced to move to a new operator.

2.155 Another suggestion was that the licence may be extended for 20 years at a time instead of the 10 years as at present. One of the stakeholders observed that consistent with international practice, India should move towards a regime of perpetual licences (such as in the UK and USA); in the short term, however, existing licence conditions regarding 10 year renewals must be respected.

2.156 Some of the stakeholders were of the view was that there should be a time limit on licence since spectrum is a sovereign right of the Government which should not be transferred in perpetuity. Some stakeholders also suggested that no radio licence should ever be perpetual as Radio technology and public demand for specific services change over time, and need to be reconsidered periodically. One stakeholder opined that in case DoT decides to continue with spectrum linked licences, renewal should be based on a consideration relating to efficient utilization, re-farming for in-band use etc. A contrary opinion was that termination of the licence would cause trouble to millions of subscribers of that operator. Another suggestion was that the Licence term should be finite, say 20 years and extendable by a term of 10 years.

2.157 The Authority studied the international experience. In some markets, the renewal process is automatic. In Denmark for instance, mobile licences other than for the provision of 3G services have a duration of 10 years and are automatically renewed for another 10 years unless revoked by the regulator (NITA) one year before the expiry of the term. Other legal and regulatory frameworks operate under a “presumption of renewal” or “renewal expectancy” regime. The USA has adopted high

renewal expectancy standard for renewal of domestic public cellular radio telecommunication services. If the licensee meets certain standards in terms of using the spectrum for their intended purposes and complying with the rules and policies, they can file for renewal expectancy. The rationale behind these latter practices is to give regulators discretion to review the terms and conditions of the licence to reflect developments in policies, technologies and markets. Regulators also can review the targets set in the original licence. Another mechanism is to grant existing licensees the first right of refusal on renewing their licences as in case of Hong Kong, for GSM and PCS 2G mobile licences. The International practice on renewal of telecom licences of some countries is provided in **Annexure XVI.**

2.158 As per the current UAS Licence, the validity period of the Licence is 20 years from the effective date of issue of the same. The licensor may extend, if deemed expedient, the period of licence by 10 years at one time, upon request of licensee, if made during 19th year of the licence period on terms mutually agreed. The decision of the licensor shall be final in regard to the grant of extension.

2.159 Presently, the total number of CMTS/UAS licensees in a service area ranges from 12 to 14. These service providers were introduced in the different service areas in phases. It is noteworthy that the licenses issued in 1994/95 shall come up for renewal from 2014 onwards. In order to promote regulatory certainty and predictability, the Authority is of the view that this is the right time to lay down the rules for extending the validity of these licences.

2.160 Licence is an authorization to provide service and it is the sovereign right of the Government to decide continuation of a licence on its expiry or otherwise. Therefore, the Authority is not in favour of giving licence in perpetuity. A number of stakeholders have submitted in their response that perpetuity of the licence is required to provide a certainty in the market in view of the high investment required to set up networks etc. However, even in the telecom sector, 20 years is a long time for an operator to recover the investment. Moreover, the Authority's recommendation is also that spectrum should be delinked from future UAS licences. Therefore, renewal of licences in future should not be a major concern for the operators. Issue of re-assignment of spectrum to such licensees has been discussed in subsequent paras.

2.161 The current licensing conditions required the licensee to apply for renewal in the 19th year of the licence. Since renewal is not a matter of right and is at the sole discretion of the government and is also subject to terms and conditions to be mutually agreed upon, application for renewal in 19th year does not leave enough time for the licensee or its subscribers to readjust in the event of the renewal being rejected. As such the Authority is of the opinion that renewal must be applied for at least 30 months prior to the expiry of licence and that the licensor must take a decision within six months of such application and preferably within three months. This way, at least two years are available to the licensee to readjust to the resultant situation. The existing licences may be renewed, subject to compliance with the licence provisions, for a period of 10 years.

2.162 It must be clearly understood that the licence renewal does not automatically entitle the licence holder to the spectrum. While it

is reasonable on the part of the licensee to expect that spectrum would be reassigned, this cannot be as a matter of right. It is true that the existing UAS licence carries with it a certain entitlement to spectrum. But this entitlement expires with the licence and any renewal is subject to terms to be mutually agreed upon between the licensor and the licensee. The Authority is of the view that what needs to be considered at the time of renewal is the extension of the licence per se. The Authority has already recommended that all future licences shall be without linkage to spectrum and this should apply even to extension of licences. Accordingly, the licensee shall be required to pay a renewal fee which will be equal to the licence fee charged for unified licence under the future dispensation i.e. Rs. 2 crore in Metro and 'A' Circles, Rs. 1 crore in 'B' circles and 0.5 crore in the 'C' circles. This renewal fee does not cover the value of spectrum, which shall be paid for separately.

2.163 **The Authority recommends that a licensee must apply for renewal 30 months before its expiry and that the licensor must convey its decision preferably within 3 months but not later than 6 months from the date of application.**

2.164 **The Authority recommends that existing UAS licences may be renewed for another 10 years at one time, as per the provisions of the existing licensing regime.**

2.165 **On renewal, the UAS licensee will be required to pay a Renewal fee which will be Rs. 2 crore for Metro and 'A' Circles, Rs. 1 crore for 'B' circles and Rs. 0.5 crore for 'C' circles. This Renewal fee does not cover the value of spectrum, which shall be paid for separately.**

2.166 While consideration for the assignment of spectrum is a separate exercise and is not a matter of licensee's right, it is reasonable for the licensee to expect that spectrum will be reassigned. This becomes important particularly from the point of view of their investment that has already been made and the subscribers which it had acquired over the period of time. The Authority would like to make it clear that while due consideration should be given to the investment made by the licensee and a certain amount of spectrum be reassigned to the service provider on renewal, the assignment of spectrum on renewal should not be treated as automatic. It should be noted particularly that in several cases, additional spectrum has been assigned to the licensees without charging any additional payment for spectrum beyond the contracted quantity. The issue for consideration is that at the time of renewal of licence, how much spectrum should be assigned to the licensee and at what price.

2.167 In response to a linked question raised in the consultation paper regarding the period for and the price at which extension of assigned spectrum should be done, one suggestion was that the extension may be given for a period of another 20 years at a price determined administratively. Another suggestion was that spectrum allocated through independent auction process should be valid for 20 years and the allottee should have the option of first right of refusal. However, spectrum extension should be granted at the then prevailing rates. One of the stakeholders said that the average auction price of last 2-3 auctions may be considered instead of taking the price of a recent auction or the benchmark price can be taken from the similar type of the service area where the auction price was not inflated /abnormal. One stakeholder opined that the licence should be renewed for a finite

term, say 10 years against payment of an upfront fee estimated from recent auction of comparable frequency/ adjusted for index. Also, 900MHz should not be automatically re-allocated to those who possess this at present. One of the stakeholders suggested that the extension of spectrum assignment could be done on payment of the prescribed fee for the licence which should be equal to the reserve price for the recent most auctions held in the 3G space. Market driven auctions should not be used for pricing the extension of assigned spectrum.

2.168 After studying the comments of the stakeholders and the relevant conditions in the Licence, the Authority has shortlisted the following options for arriving at a decision:

- As all future licences will be delinked from the spectrum, the licensee applying for renewal will not have any right to the spectrum assigned earlier. The Government can assign the spectrum through a suitable mechanism and all operators including those applying for renewal can lay claim to the assigned spectrum.
- The licensee applying for renewal is assigned spectrum upto the committed amount as per the present licence.
- The licensee applying for renewal is assigned spectrum upto the limit being prescribed for different parts of the country.
- The licensee applying for renewal is assigned back the entire spectrum held before its expiry.

2.169 As far as the first option is concerned, the Authority is of the view that the condition pertaining to renewal of licence in the existing CMTS/UASL provides certain continuity to the Licensee regarding renewal of the licence for a period of 10 years after the expiry of

the current validity. Any operator providing service for 20 years will have invested substantial amount in the network development and will also have a large subscriber base. In case the spectrum is denied and the licensee fails to get the same in subsequent assignment, then it may lose the investment which will adversely affect subscribers.

2.170 In view of the foregoing, the Authority is of the opinion that while there is no legal right for spectrum at the time of renewal, the licensee applying for renewal of the licence can be considered to be assigned spectrum in the interest of continuation of service. On the quantum of spectrum, though it is of the opinion that while the Licensee is entitled for consideration to get the spectrum already held, by it, that but only to the extent of the prescribed limit i.e. 8 MHz in all the service areas and 10 MHz in Delhi/Mumbai. But, in the event the spectrum so held by it is beyond the prescribed limit, the licensee should be required to surrender the excess spectrum. The fact that the licensee is carrying excess spectrum because of allocation by the government in the past should not in any way influence the decision of the licensor to take back such spectrum held by the licensee. The licensee will however be entitled to continue to hold the spectrum obtained from the marketplace through mergers/acquisition. This will not be counted in the quantity of spectrum to be reassigned upto the prescribed limit. Since spectrum sharing is being separately recommended (chapter IV) only for a period of five years and that too only between service providers not having more than 4.4 MHz/2.5 MHz (GSM/CDMA), the Authority is not taking this into consideration.

2.171 Secondly, it must be clearly understood that the entire 800 MHz/900 MHz spectrum held by the licensee is liable to be refarmed at the time of renewal, as brought out in chapter I. As discussed therein, the Authority is recommending refarming of spectrum in 800/900 MHz bands for reassignment for 3G technology. Presently, spectrum in the 900 MHz band has been assigned to the first three licensees except in 3 service areas where the 4th Licensee also has spectrum in this band. Insofar as 800 MHz band is concerned, this is being assigned to the CDMA operators. As the licensees holding the spectrum in the 900 MHz band will be applying for its renewal and keeping in view the high value of 900 MHz spectrum, the Authority is of the view that on renewal of the licence, spectrum held by a licensee in the 900 MHz band should be replaced by assignment of equal amount of spectrum in 1800 MHz, subject however to the prescribed limit. The Authority hopes that sufficient spectrum in 1800 MHz will be refarmed in the next 2-3 years. In case sufficient spectrum in 1800 MHz band is not available with the Government to replace the 900 MHz spectrum, the licensee may be allowed to retain the 900 MHz band spectrum on a purely temporary basis subject to the condition, and an undertaking by the licensee, that on availability of spectrum in the 1800 MHz, the spectrum given in the 900 MHz will be taken back by the Government at 6 months' notice. Renewal of the licence will be subject, inter alia, to this express condition. Similar action would be taken in respect of the 800 MHz band spectrum which would be replaced by spectrum in 1900 MHz/450 MHz band.

2.172 As regards the price to be paid by the licensee at the time of renewal, the Authority holds the view that the current price of the spectrum must be collected. The current price of spectrum will be

the nearest auction price of 2G/3G spectrum, duly adjusted for inflation. The Authority would be reviewing the situation and would recommend to the government the current price from time to time.

2.173 **The Authority recommends that while renewing the licence, the Government should assign spectrum only upto the prescribed limit or the amount of spectrum assigned by it to the licensee before the renewal, whichever is less. Spectrum assigned by the Government to the licensee in excess of the Prescribed Limit shall be withdrawn.**

2.174 **The spectrum will be assigned at the current price, duly adjusted to the year of renewal. The Authority may review the situation and recommend to the Government the Current price from time to time.**

2.175 **Keeping in view the value of 900 MHz spectrum, the Authority recommends that on renewal of the licence, spectrum held by a licensee in the 900 MHz band shall be replaced by assignment of equal amount of spectrum in 1800 MHz. In case sufficient spectrum in 1800 MHz band is not available with the Government to replace the 900 MHz, the licensee will be allowed to retain the 900 MHz band spectrum on a purely temporary basis subject to the condition, and an undertaking by the licensee, that on availability of spectrum in the 1800 MHz, the spectrum given in the 900 MHz will be taken back by the Government at 6 months' notice. Renewal of the licence will be subject to, inter alia, this express condition. Similar action would be taken in respect of the 800 MHz band spectrum which would be replaced by spectrum in 1900 MHz/450 MHz band**.

2.176 The Second Committee in its report has recommended that *"The UAS/CMTS license should be perpetual as long as the licensee pays the annual license fee and meets the license conditions. The expiry date of assigned spectrum currently held will be the date on which the current license of the holder expires. The expiry date of auctioned spectrum is determined based on the date of assignment and period of validity. Spectrum blocks will retain their validity period irrespective of sale/merger/sharing. Access spectrum cannot be held unless the holder has a valid UAS/CMTS license.*

At the end of the license period when the assigned spectrum reverts back to the licensor, the licensee holding the spectrum till date should be given the first right of refusal to the same spectrum for the next 20 years. The licensee must exercise the choice not later than 6 months prior to expiry and pay a fee. This fee is to be administratively determined and publicized by the licensor annually (say, on April 1), based either on (a) a recent auction of spectrum in the LSA, or a comparable one at that time, or (b) extrapolation from past auctions, or (c) escalation based on some formula. In case the licensee refuses the offer, the spectrum should be auctioned for a period of 20 years. Once the spectrum is re-assigned for a fee, the annual usage charge will become the uniform rate of 3% of AGR even if it was not so prior to re-assignment."

2.177 The Authority is disinclined to agree with the Committee's recommendation that existing UASL/CMTS licences be amended and made perpetual as long as the licensee pays the annual licence fee and meets the licence conditions for the reasons discussed above. The Authority is unable to understand as to how the committee recommended amendment of licence conditions, on the one hand to reduce the contracted spectrum and on the other to make licences perpetual. This would seriously disturb the level playing field conditions. The committee's report further mentions that at the end of the licence period when the assigned spectrum reverts back to the licensor, the licensee holding the spectrum till date should be given the first right of refusal for the same spectrum for the next twenty years. The Authority does not agree with this recommendation also as the Licence terms and

conditions clearly prescribe that the licence can be renewed only for 10 years at a time. The licensee does not have any right over the spectrum after the expiry of validity period. Regarding annual spectrum usage charge, the Authority in Chapter III has indicated that the Authority shall review such charges every two years. In case of renewal, the annual spectrum charges shall be as prescribed at the time of renewal.

H- Framework of future licences

2.178 Earlier the Authority has recommended that for all future licences the spectrum be delinked from the licence. Presently in India, there is a service specific licensing regime in the sense that apart from access service licence, there are separate licences for different telecom services viz NLD, ILD, VSAT, IP-1, ISP, GMPCS, PMRTS etc. For offering different types of telecom services the service providers are required to obtain different licences.

2.179 The Authority in its recommendations on Unified licensing regime dated 27th October 2003 had recommended the introduction of a 'Unified Licensing' regime covering all geographical areas using any technology. It recommended that the Unified Licensing regime would be implemented through automatic Licensing / Authorisation subject to notification to Regulatory Authority and compliance with published guidelines (by the operator). The Guidelines were to be notified by the licensor based on TRAI recommendations to include nominal entry fee, USO, etc. The charges for spectrum were to be determined separately. The operator was required to approach the licensor mainly for spectrum allocation, which would be made optimally to the most efficient user. According to these recommendations, there were to be four categories of licences, namely Unified Licence, Class

Licence, Licensing through Authorisation and Standalone Broadcasting and Cable TV licence. These recommendations were however not accepted by the Government.

2.180 With technological developments, the distinction between voice carrying networks, data networks, video/picture carrying networks has blurred. Different networks are being used to offer similar services. The emergence of Voice over Internet Protocol (VoIP) has blurred the line between traditional voice and data communications. The continual technological advancements and market developments of recent years have necessitated a simultaneous evolution of licensing processes to ensure that they remain relevant and beneficial. Unless revised periodically, licensing regimes can lead to under-utilization of network potential. A more flexible authorization regime can also head off disputes that inevitably result when different classes of operators claim inequities in the service-specific or technology-specific licences that apply to them. When the details in such licences are spelt out, they commonly vary from one set of licences to another, creating a virtual breeding ground of litigation. For this reason, a growing number of countries are re-examining their compartmentalized licensing classifications and giving operators the flexibility to provide any or all kinds of services under a single umbrella or converged licence[27]. The licensing framework should be designed so as to cater to future market and technological developments, which are very difficult to anticipate.

2.181 From the International practices (**Annexure X**), it is also observed that the trend is to move towards some form of converged/unified

[27] ITU trends in telecom reform 2004/05

licensing regime as in case of Argentina, Australia, EU countries, Malaysia, Japan etc.

2.182 In Australia, there are carriers and carriage service providers (CSPs). The EU has replaced individual licences with a general authorization to provide all electronic communications services and networks under a new regulatory framework for electronic communications. In Japan, before 1st April 2004, telecommunication carriers were categorized into two types under the Telecommunications Business Law: Type 1 telecommunications carriers, which offered services using their own facilities, and Type 2 telecommunications carriers, which did not have their own facilities and which leased their lines. In the light of heightened competition and the emergence of numerous substitute services and also out of a desire to review the regulations for market entry and service provision. The Telecommunications Business Law was completely reviewed in 2003 and the amended law came into force on 1 April 2004. The amendments abolished the distinction between telecommunication circuit facilities of Type 1 and Type 2 carriers. In Malaysia, , there are four categories[28] of licensable activities: Network Facilities Providers, Network Service Providers, Application Service Providers and Content Application Service Providers. In Singapore, there are Facility Based Operator (FBO) and Service Based Operator (SBO).

2.183 The New Telecom Policy 1999 (NTP'99) also recognized that convergence of markets and technologies is a reality that is forcing realignment of the industry. At one level, telephone and

[28] http://www.skmm.gov.my/what_we_do/licensing/cma/framework.asp

broadcasting industries are entering each other's markets, while at another level, technology is blurring the difference between different conduit systems such as wireline and wireless.

2.184 Keeping in view the emerging trend as well as the needs of telecommunication in the country, the Authority would like to recommend the immediate introduction of a new licensing regime characterised essentially by the unified licence. At the same time, the Authority recognises that there could be services like the V-SAT as well as PMRTS, radio paging services and other services viz. Voice Mail/Audio Tex/Unified Messaging Service. Accordingly, the Authority would like to propose, apart from the unified licence, a Class licence for V-SAT services. The Authority also favours the introduction of licence through authorisation in respect of the PMRTS, radio paging services and other services viz. Voice Mail/Audio Tex/Unified Messaging Service. While the holder of a unified licence can offer any telecom service, the reverse will not be permitted and the licence holders will be required to offer only those services for which they have been licensed.

2.185 In consonance with the current practice of service area -wise licences, the Authority would propose unified licence too at this level. Simultaneously, time has come to consider pan-India licence and accordingly the Authority would recommend a national licence.

2.186 **Accordingly, the Authority recommends that the framework under the new licensing regime should be as follows:**

i. <u>Unified licence</u> covering UASL/CMTS, NLD, ILD, Internet, IP-I and GMPCS;

ii. **Class licence covering VSAT services; and**

iii. **Licensing through Authorisation covering PMRTS, Radio Paging and Voice Mail/Audio Tex/Unified Messaging Service.**

iv. **Broadcasting licences**

2.187 **A Unified licensee shall be permitted to offer any/all services covered under 'Class licence' and 'Licensing through Authorization' but not vice-versa. Such a licensing regime will be service and technology neutral and shall permit a unified license holder to offer any or all telecom services. Spectrum, if required, is to be obtained separately.**

2.188 **There shall be two levels of Unified licence: National level and Service area level. National level unified licence shall permit the licensee to offer any or all of the above-mentioned services in any/all service areas. Service area level unified licence, on the other hand restricts this option to the specified service area/s for which licence is given. Such licensees would not be permitted to offer NLD & ILD services. Both these licences will carry an obligation to pay licence fee at 6% of the AGR.**

Entry fee for Unified licence

2.189 Having recommended that in future spectrum should be delinked from the UAS licence and unified licence should be introduced for CMTS/UAS, NLD, ILD, Internet, GMPCS and IP-1 services and also that there should be no cap on the number of operators in a service area, the issue to be deliberated upon is what should be the modified licence conditions viz. entry fee, roll out obligations etc.

2.190 In the existing licensing regime, the entry fee of various telecom services is provided in table below:

Entry fee of various telecom services in the existing licensing regime

S.No.	Type of Licence	Entry Fee
1.	UASL	Rs.1 – 233 crores (For details see Table 2.17)
2.	ILD	Rs.2.50 crores
3.	NLD	Rs.2.50 crores
4.	VSAT	Rs.30 lakhs
5.	PMRTS	Nil
6.	GMPCS	Rs.1 crore
7.	Voice Mail/Audio Tex/Unified Messaging Service	No entry fee
8.	MNP	Rs.1 crore
9.	Internet with Telephony	Rs.30 lakh for Category A licence and Rs.15 lakhs for Category B Licence

Table 2.16

2.191 The entry fee of UAS licence in various telecom services is provided in table below:

Entry fee of UAS licence in various telecom services

Sl.No	Service area	Category	Entry fee (Rs. In crore)
1	West Bengal	B	1.00
2	Andhra Pradesh	A	103.01
3	Assam	C	5.00
4	Bihar	C	10.00
5	Gujarat	A	109.01
6	Haryana	B	21.46
7	Himachal Pradesh	C	1.10
8	Jammu & Kahmir	C	2.00
9	Karnataka	A	206.83
10	Kerala	B	40.54
11	Madhya Pradesh	B	17.4501
12	Maharashtra	A	189.00
13	North East	C	2.00
14	Orissa	C	5.00
15	Punjab	B	151.75
16	Rajasthan	B	32.25
17	Tamilnadu	A	233.00
18	Uttar Pradesh (West)	B	30.55
19	Uttar Pradesh (East)	B	45.25
10	Delhi	Metro	170.70
21	Kolkatta	Metro	78.01
22	Mumbai	Metro	203.66
			1659

Table 2.17

2.192 In the consultation paper dated 16th October 2009, the Authority had raised the issue of entry fee for fresh licence.

2.193 Some of the responses received from various stakeholders were that the entry fee should recover cost of operations for regulatory functions and deter non-serious operators from gaining licence. International practice is to set fee for operating licences at a level that reflects the administrative costs of granting and administering the licences. Some stakeholders have opined that the entry fee should be the same as that was for basic service operator prior to introduction of UASL. TRAI's recommendation on Unified Licence dated 13th Jan 2005/ spectrum related issues dated 13th May, 2005, duly updated, may also be used. Other stakeholders have advocated an entry fee same as that for NLD/ILD operator, or a fee ranging from Rs.1 to 10 Crore for Metro/Circle A, Rs.50 lakh to Rs.5 Crore for Circle B and Rs.25 lakh to Rs.2 Crore for Circle C. One of the stakeholders has favoured an entry fee of Rs. 25 Crore on a pan India basis. Some other views received by the Authority are that all fee or terms must reflect market principles. Minimum bidding price of Fixed Line MSO operators who have applied for UAS (without licence) may be the entry fee for UAS licence without spectrum.

2.194 After going through the various comments of the stakeholders, the Authority is of the view that as the new Licence will only permit the Licensee to provide the telecom service and will not have any obligation to provide spectrum, the Entry fee should be nominal so as to cover administrative charges and also high enough so as to deter non serious players.

2.195 **The Authority accordingly recommends an Entry Fee of Rs. 20 crore for Nationwide Unified licence. For Service area-wise**

licences, the Entry Fee may be Rs. 2 crore for the Metros and Category 'A' service areas, Rs. 1 crore for Category 'B' and Rs. 0.5 crore for Category 'C' service areas. In addition, Annual Licence fee of 6% on AGR will be levied.

2.196 **The V-SAT licence will continue to have an Entry Fee of Rs. 30 lakh and an annual licence fee of 6% of AGR. The Entry Fee for licences through Authorisation will entail an Entry Fee of Rs. 10,000 and an annual licence fee of 1% of the AGR.**

2.197 **In case an existing licensee obtains a Unified License, the licensee shall surrender the old licence(s). However, in case of CMTS/UASL, the licensee will continue to retain the spectrum assigned for the validity period of the old license.**

Roll Out Obligations

2.198 As per the existing UAS licensing regime, roll out obligations shall apply for wireless network only and not for wireline network. The licensee shall ensure that the metro service area is covered within one year of allocation of start up spectrum. In non-metro service areas, the licensee shall ensure that in first phase of roll-out obligation at least 10% of DHQs where start-up spectrum has been allocated are covered within one year of such spectrum. The date of allocation of frequency shall be considered for computing a final date of roll out obligation. Further, in second phase of roll-out obligation, the licensee shall ensure that at least 50% of DHQs, where start up spectrum has been allocated are covered within three years of date of allocation of such spectrum in non-metro service areas.

2.199 In the consultation paper the Authority had raised the issue of roll out obligation in case the spectrum is delinked from the future licences. In response, though most stakeholders have favoured no roll out obligations being imposed, some stakeholders were in favour of imposing some obligation. One stakeholder opined that licence should stand cancelled if it is found that the licensee is involved in any telecom activity for 3 years from date of obtaining this plain licence. There was also a suggestion that roll out obligation on par with ISP licence[29] may be imposed. Incentives for broadband and rural coverage in the form of a structured Administrative Incentive Pricing mechanism may be given and there should be penalties for failure. One suggestion was that entry fee could be paid back to operators on fulfilling certain roll out obligations. Another suggestion was that rollout conditions should be imposed under spectrum licenses rather than the operating license. One stakeholder advised that Government should review its coverage objectives (i.e., set out clearly what it is trying to achieve in terms of coverage) and seek the least cost way of achieving those objectives rather than to impose ad hoc requirements on each bundle of spectrum that is issued.

2.200 Though roll out obligations contribute to a more equitable spatial growth of networks and wider availability of services through expansion of infrastructure, one of the major objectives of imposing roll out obligations is to ensure efficient utilization of spectrum, a scarce resource, and to prevent its hoarding. Though

[29] As per ISP licence agreement, the licensee shall commission the Applicable Systems within 24 months from the effective date of the licence and offer the service on demand to its customers.

future licences will not carry with them bundled spectrum, the Authority is of the view that some obligations should be imposed in order to deter non-serious players and to ensure speedy roll out of telecom services.

2.201 **The Authority accordingly recommends that in respect of the unified licences, there will be no roll out obligations. But from the second year of the effective date of the license, the licensee will pay the licence fee at the applicable rate, subject to a minimum of 10% of the Entry fee.**

2.202 The Second Committee in its report of May 2009 has mentioned that:

> *"In case any new UAS licences are issued in future, they should not carry with them any eligibility for start-up spectrum. Since there is no start-up spectrum, the licensees will not have any roll-out obligations for wireless access networks…" (Para h of page 14 of the Report)*

2.203 The Authority agrees with abovementioned recommendations of the Second Committee that in respect of the unified licences, there be no roll out obligations. However the Authority has recommended that from the second year of the effective date of the license, the licensee will pay the licence fee at the applicable rate, subject to a minimum of 10% of the Entry fee.

CHAPTER III: SPECTRUM ASSIGNMENT AND PRICING

A- Background

3.1 Having dealt with licensing issues in chapter-II, this chapter focuses on the issues relating to Spectrum assignment and pricing. TRAI had already recommended that spectrum in bands other than 800, 900 and 1800 MHz bands be auctioned. The auction for 3G and BWA spectrum is currently under way. The experience with this auction will pave the way for future policies in respect of issues, if any, in other frequency bands and will have to be addressed appropriately as and when the occasion arises. The focus of this chapter is more on spectrum in 800, 900 and 1800 MHz bands, and more particularly on assignment of spectrum, its pricing and the Spectrum usage charges.

3.2 It may be recalled that the first two cellular licenses issued in 1994-95 were decided on beauty contest principle in the case of Metros and through simple bidding in case of other Service areas. The Government reserved the right to bring in the third operator and MTNL and BSNL were accordingly introduced in years 1997 and 2000 respectively. The fourth cellular operator was chosen through a multi-stage bidding in the year 2001 and licenses were issued in 2001/2002.

3.3 The Unified Access Services License was introduced in 2003. The guidelines for this license state, *inter alia*, the following:

i. The licence fee, service area, roll out obligations and performance bank guarantee under the unified access

services licence will be the same as for the fourth cellular mobile service providers (CMSPs) licence.

ii. The service providers migrating to Unified Access Services Licence will continue to provide wireless services in already allocated/contracted spectrum and no additional spectrum will be allotted under the migration process for Unified Access Services Licence

iii. the LICENSOR reserves the right to modify these guidelines or incorporate new guidelines as considered necessary in the interest of national security, public interest, consumer interest and for the proper conduct of Telegraph/services.

iv. With the issue of these guidelines, all applications for new Access Service License shall be in the category of Unified Access Services License.

v. Licences shall be issued without any restriction on the number of entrants for provision of Unified Access Services License in a service area.

3.4 As brought out in Para 2.15, licenses were issued in November 2003, January 2004, December 2006 and March 2007, and January 2008, in accordance with the Guidelines for the Unified Access Services Licence which remain in force valid till date.

3.5 In April 2007, Government sought the recommendations of TRAI on the policy of no capping. In its recommendations issued on 28th August, 2007, TRAI specifically recommended that no cap be applied on the number of Access Service Providers in any service area. It also recommended that all spectrum other than spectrum in the 800, 900 and 1800 MHz should be auctioned and observed

that *"in the 2G bands (800 MHz/900 MHZ/1800 MHz), 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."*

3.6 In Chapter-II, it has been demonstrated that the present cellular licence, given/amended from 2001 onwards, is bundled with committed spectrum of 6.2 + 6.2 MHz of spectrum in case of GSM technology and 5 + 5 MHz of spectrum for CDMA. Thus, a licensee is entitled to be given the committed spectrum, subject to its availability and efficient usage. The issue to be decided now is the amount of spectrum that a licensee can be assigned beyond the contractual obligation of 6.2 MHz/5 MHz (GSM/CDMA) and the criteria for the assignment of additional spectrum.

3.7 It would be in this context, useful to examine the licence conditions. Clauses 43.5 (ii) and (iv) of the UAS licence are relevant and read as follows:

> ***43.5(ii)*** *Additional spectrum beyond the above stipulation may also be considered for allocation after ensuring optimal and efficient utilization of the already allocated spectrum taking into account all types of traffic and guidelines / criteria prescribed from time to time. However, spectrum not more than 5 + 5 MHz in respect of CDMA system or 6.2 + 6.2 MHz in respect of TDMA based system shall be allocated to any new Unified Access Services Licensee. The spectrum shall be allocated in 824-844 MHz paired with 869 - 889 MHz, 890 - 915 MHz paired with 935 - 960 MHz, 1710 – 1785 MHz paired with 1805 – 1880 MHz. (**Emphasis supplied**)*

Clause 43.5 (ii) of the UAS licence issued in 2008 reads almost the same: "*Additional spectrum beyond the above stipulation may also be considered for allocation after ensuring optimal and efficient utilization of already allocated spectrum taking into account all types of traffic and guidelines/criteria prescribed from time to time. However, spectrum not more than 5+5MHz in respect of CDMA system and 6.2+6.2MHz in respect of TDMA based system shall be allocated to the licensee. The spectrum shall be allocated in 824-844MHz paired with 869-889 MHz, 890-915 MHz paired with 935-960 MHz, 1710-1785 MHz paired with 1805-1880 MHz. (**Emphasis supplied**)*

In both the cases, Clause 43.5 (iv) reads as follows:

***43.5(iv)** The Licensor has right to modify and / or amend the procedure of allocation of spectrum including quantum of spectrum at any point of time without assigning any reason.*

3.8 It is a fact that licences, whether originally CMTS or UAS, were given spectrum beyond 6.2 MHz in GSM technology. The additional spectrum was assigned based on the orders of DoT from time to time. A strict reading of the licence conditions would result in holding that all allotment beyond 6.2 MHz made so far is irregular. And, by inference, that it should be taken back from the service provider. However, this would result in the networks being seriously disturbed causing inconvenience to millions of subscribers. It is a fact that the additional spectrum was given by the Government from time to time. Although orders issued by the WPC wing of the DoT do not invoke clause 43.5(iv), it has to be interpreted that this is based on the provisions of this clause. The question to be decided is whether 6.2MHz is sufficient to meet the needs of all areas including the central business districts. If not, additional spectrum will need to be assigned under the framework of the UASL since it is not permissible for a licensee to hold more than one licence in the same service area. At the same time, the question is also whether such additional allocations can be

without limit. The quantum of spectrum required by a licensee for different areas, having different population densities, needs to be examined to address these issues.

B- Maximum limit on spectrum holding

3.9 In an ideal situation, there need not be, subject to spectrum availability, any limit on the spectrum held by a licence holder, since it is an accepted fact that the higher the spectrum held, the greater the efficiency. The Authority is also conscious that spectrum availability per operator in other countries is far higher than is currently available to the Indian operators. At the same time, it must be recognised that spectrum availability in India is far short of the requirements, as has been brought out in both chapters I and II. Presently, there are 12-14 licensees in each service area and are assigned spectrum which varies from nil to 2x12.4 MHz for GSM technology and 2x2.5 MHz to 2x5 MHz for CDMA technology. The present availability of additional spectrum for future assignment is given in **Tables 2.6 & 2.7.** It is evident from the tables that, with the available quantity, it will not be possible to assign spectrum even up to the committed amount to all the licensees in majority of service areas. The quantum of spectrum required to be assigned to a licensee, therefore, assumes significance, and accordingly the Authority raised the issue in the consultation paper about the need to place a limit on the maximum spectrum a licensee can hold.

3.10 In response, virtually all the respondents have underlined or have agreed on the need to limit the spectrum holding. Some stakeholders opined that the cap should be 25% of that total spectrum in any LSA. Others who have supported the idea of having a limit felt that spectrum being a finite resource and

subject to competing claims, a limit on the spectrum that a licensee can hold would ensure that there is no hoarding and a consequent denial of the scarce resource to the other operators. Their contention was that if there is no limit, operators who can afford to buy spectrum will corner a vast amount of spectrum. A ceiling on spectrum held by the existing licensees would enable availability of spectrum and its allocation to new licensees. Some stakeholders felt that spectrum hoarding can increase the overall price of spectrum thus limiting capital available for new players to provide competitive services and quick rollout. Consequently, this would also have the effect of making spectrum very high-priced resulting in higher tariffs which had to be borne by the consumers. They also pointed out that a limit on spectrum is practiced in UK, USA and New Zealand and has proved to be effective.

3.11 Those who did not favour the imposition of a ceiling felt that good performance of the licensee should entitle it to receive more spectrum. In other words, their contention was that a ceiling on the maximum amount of spectrum would act as a disincentive for good performers. Another consideration for them was that over a period of time, more spectrum may become available and that the market share may keep changing. Some others argued that since the average spectrum that is available with each operator is far lower than the international average, there may not be any scope for imposing a ceiling. One stakeholder commented that there is no requirement of a maximum spectrum limit per individual entity, unless it leads to market monopolization / cartelization.

3.12 The considerations to determine the maximum spectrum per entity varied. Some stakeholders were of the opinion that while

broadly no operator should hold more than 25% of the total spectrum assigned in a service area, this limit should be increased to the maximum amount of spectrum that an operator currently holds. This view however was not shared by others, who felt that the spectrum limit should be so designed as to ensure a minimum number of operators in a service area. Competition, efficient investment in infrastructure, encouraging efficient use and ensuring effective management of radiofrequency resources were cited as relevant considerations. One stakeholder commented that spectrum caps are better avoided if other mechanisms are in place to protect competition, and if permanent caps on the stock of spectrum held by any operator are set, they should be set fairly high- say 50-60% of the entire spectrum available in any Circle. However, a time-specific cap might be imposed to accompany an auction if an operator looked likely to acquire a dominant position through it.

3.13 Some stakeholders also raised the issue of mismatch in the holding of 900 and 1800 MHz spectrum between different operators. According to them, since the incumbent operators have obtained spectrum in the 900 MHz band which is far more efficient than the 1800 MHz spectrum, the limit of spectrum holding should be separately considered for 800, 900 and 1800 MHz bands. In other words, the limit should not be for 2G spectrum as a whole but specifically in respect of each band. They were of the opinion that no service provider should have more than 2 x 2.4 MHz spectrum in the 900 MHz spectrum band and also that the limit on spectrum for 900/1800 MHz spectrum band should be 6.2 MHz and 5 MHz in the 800 MHz band respectively. The view was that cap on spectrum per entity should be determined based on the principle of ensuring fair distribution of

spectrum amongst all operators as per the contractual obligations, preventing hoarding of additional spectrum and preventing market capitalisation/monopolisation. It was also stated that spectrum being a scarce resource, is likely to be a target for accumulation, offering significant competitive advantage and supernormal benefits to the holder through reduced capital investment requirements and that such accumulation can result in other operators incurring additional expenses thereby directly affecting the consumer's interest.

3.14 The Authority has considered this matter carefully. From the comments of the various respondents, it is clear that (a) the vast majority of the stakeholders are in favour of a limit being imposed on spectrum holding of an operator and (b) that the guiding principle of the spectrum limit should be, on the one hand, to prevent the hoarding of spectrum and, on the other, to provide adequate spectrum while promoting efficient use of spectrum.

3.15 Ideally, in a situation of generous availability of spectrum, the Authority would not be in favour of placing an administrative cap on the amount of spectrum a licensee can hold. However, in view of the fact that presently there is a huge mismatch between the demand and the availability of the spectrum in these bands (800, 900 and 1800 MHz) and that every licensee is entitled to a certain amount of minimum spectrum to provide its subscriber an efficient service, the Authority is of the opinion that arriving at the level of 'adequate spectrum' in these bands would be desirable. There is need to examine the issue of ensuring availability of adequate spectrum for an operator to run an efficient network and, at the same time, also to oversee that spectrum is not necessarily locked up with an operator to the detriment of other

operators. Otherwise, there is a risk that spectrum will not be available to the new operators who may require it for the expansion of their network and will assist the operators holding more spectrum to have the advantage of lower Capex, thereby disturbing the level playing field. It is in this context that the Authority has examined the question of the spectrum actually required by an operator to run the network efficiently.

3.16 For arriving at the limit, the Authority studied the measures required for ensuring efficient use of spectrum. The Authority noted that some of the stakeholders had indicated that the maximum of 6.2 MHz of spectrum is sufficient for an operator using GSM technology to cover even the densest area in terms of subscriber density.

3.17 In order to ascertain the amount of spectrum required by a licensee in a service area, the Authority had discussions with service providers. The unanimous view was that it is not the subscribers' number which is relevant but the density of subscribers in a geographical area which is the determining factor. The maximum amount of spectrum required in a service area is governed by the population density of the area. All the service areas have limited number of geographical areas with very high population density. Therefore, to assess the amount of spectrum required by a licensee to serve a particular service area, it is necessary to ascertain the maximum traffic which is required to be served in the densest area of the LSA.

3.18 Based on the submissions of and discussions with various service providers and vendors, the Authority has calculated the maximum traffic that can be served by different amount of spectrum and with different inter-site BTS distances. The

calculation with different quantities of GSM spectrum (4.4/6.2/8/10MHz) and different inter-site distances are at **Annexure XVII.** Presently, in majority of the service areas, the highest market share which an operator has is below 30%. With increase in the number of service providers in each service area, it is likely that this market share may not significantly increase. Therefore, assuming a maximum market share of 35% of the largest operator, the number of subscribers that can be served per sq.km. with a given quantum of spectrum has been calculated. From the table therein, it can be seen that with 6.2, 8 and 10 MHz of spectrum, population density of around 36000, 56000 and 89000 persons per sq. km respectively can be served. This is assuming that every person in the area has a mobile phone. Effectively, therefore, higher population density can be serviced with any given quantum of spectrum.

3.19 Similar calculation is done for the highest subscriber density that can be served by all the CDMA operators in a service area, presuming a maximum market share of 25% of the largest CDMA operator (**Annexure XVIII)**. From the table, it can be seen that with 2.5, 3.75, 5 and 6.25 MHz of CDMA spectrum, subscriber density of around 26000, 38000, 51000 and 64000 persons per sq. km respectively can be served with an inter-site distance of 700m.

3.20 To ensure the sufficiency of spectrum for a given service area, it is necessary to ascertain the densest area of a given service area. The Authority has taken the 100 most populous Districts in the country[30].(**Annexure XIX)** An examination of these 100 districts

[30] Census of India 2001

reveals that barring a few Districts, the population density in majority of these districts today is below 2000 per sq. Km., and will be below 2000 per sq km even by the year 2015.

3.21 It can be seen that with the contracted spectrum i.e. 6.2MHz for GSM and 5 MHz of CDMA, it is possible to serve most of the districts of the country. However, the average density of the district is not always truly representative of the demography of the area specially if the district has large urban areas. There are, today, 42 cities with a population of more than one million. The population density of all these cities is such that 8MHz of GSM spectrum and 5MHz of CDMA spectrum can effectively service the districts having such large cities, including their Central Business Districts, even assuming that the CBDs' density will be 1.5 times the city density.

3.22 The only exception to the above formulation will be the metro cities of Delhi and Mumbai. Both of these service areas are among the largest urban agglomerations of the world and are ranked second and fourth respectively in the world[31]. Both these service areas have around 20 million wireless subscribers each which is far higher than any other city in the country. As seen from **Annexure XIX**, the highest population density in 2009 was around 37000 /sq. km in the North East district of Delhi and the projected population density in 2014 will be around 42500. Assuming that the densest area, the Central Business District (CBD) has 1.5 times the average population density, it translates to around 64000 persons (42500*1.5) per sq. km who will need to be served by all the service providers of that LSA. Mumbai also

[31] United Nations Department of Economic and Social Affairs/Population Division

has similar population density. It also has a high floating population and large CBD areas. It would, therefore, be necessary to assign spectrum higher than 8 MHz of GSM and 5MHz of CDMA spectrum in these areas. As per the information furnished by COAI to TEC, vide letter. No. TVR/COAI/201 dated 11.10.2007, the average inter-site distance in Delhi and Mumbai service areas is 400 metres and 300 metres respectively for dense urban areas and the minimum inter-site distance is 180 metres and 100 metres respectively. The Second Committee in its report has taken 400 metres and 300 metres as the typical inter-site distance in dense urban areas of Delhi and Mumbai respectively in its estimation of spectrum efficiency of a three-sector cell as a function of assigned spectrum for GSM (Annexure A4 of the report). Therefore, the Authority in its calculation has taken 300 metres as the inter-site distance for calculating the mobile subscriber density which can be served by different amount of spectrum in the densest areas. As shown in tables in the **Annexure XVII and XVIII**, the spectrum up to 10MHz for GSM will be required for these two service areas, to take care of the high subscriber density. Similarly, for CDMA, spectrum up to 6.25 MHz will be required in these cities.

3.23 In view of the foregoing, the Authority is of the opinion that for GSM, not more than 2X6.2 MHz of spectrum is required in most of the country and 2X8 MHz of spectrum in the districts having cities with a population of more than one million persons. Only in the Metro service areas of Delhi and Mumbai, the spectrum requirement would be 2X10MHz. Similarly for CDMA, not more than 2X5MHz of spectrum in all of the country except in the Metro service areas of Delhi and Mumbai where 2X6.25 MHz of

spectrum will be required. This would normally be the limit for assignment of spectrum by the Government to the operators.

3.24 It has been claimed by some stakeholders that the Quality of Service (QoS) parameters have been adversely affected due to inadequate spectrum. In order to assess the impact of assigned spectrum on Quality of Service, the Authority carried out a comparison of data pertaining to subscriber base, assigned spectrum and QoS parameters of various services providers in different service areas in 2006 and 2009 **(Annexure XX).** From this comparison, it is observed that QoS performance with respect to the specified benchmarks of relevant parameters have either remained the same or have marginally improved, despite exponential growth of the subscriber base and spectrum remaining the same. As illustrated in Table 3.1, while Metros recorded the maximum subscriber growth of 295%, in Category 'A', 'B' & 'C" service areas, the maximum subscriber growth was 365%, 748% & 997% respectively. The subscriber growth rate and QoS parameters of some service provides are shown in the table below.

3.25 It can be seen that even in Metros like Delhi and Mumbai with very high population density and subscriber growth of more than 200%, there was no demonstrable deterioration in the QoS even though the amount of spectrum assigned remained the same in the last three years. On the contrary, in a number of service areas, the QoS benchmarks for specified parameters are claimed by the service providers to have marginally improved. This comparison is being placed here only to demonstrate the adequacy of spectrum quantities indicated above. This should

however not be read as being synonymous with consumer satisfaction.

		Jun-06					Sep-09					
	Mobile Operator	Sub Base	Spectrum	Call Set-up Success Rate*	Call Drop Rate	Connections with good voice quality	Sub Base	Spectrum	Call Set-up Success Rate*	Call Drop Rate	Connections with good voice quality	% Growth rate of subscribers
				>95%	<3%	>95%			>95%	<3%	>95%	
Delhi	GSM	1955027	10	98.81	1.07	97.79	4466895	10	99.42	0.78	98.16	128
	CDMA	1555790	5	98.02	0.65	96.60	5130788	5	98.68	0.45	98.83	230
Mumbai	GSM	1297278	10	99.41	1.40	99.16	2495087	10	99.99	1.56	96.98	92
	GSM	1387727	9.2	97.00	1.09	96.00	2859089	9.2	97.84	0.99	97.50	106
	CDMA	1824909	5	99.44	0.80	99.36	3825643	5	99.65	0.84	97.92	110
	CDMA	908642	5	98.19	0.34	95.14	3169591	5	98.40	0.83	98.92	249
Kolkata	GSM	679851	8	97.22	1.62	98.09	2688753	8	98.99	0.87	96.97	295
	CDMA	602207	3.75	97.11	0.82	96.17	1591032	3.75	98.85	0.43	98.90	164
Gujarat	GSM	2689158	9.8	98.03	1.25	98.40	9001337	9.8	99.32	0.70	98.23	235
	GSM	1216252	6.2	98.67	1.48	97.82	4445774	6.2	99.43	1.30	96.37	266
	CDMA	1170967	3.75	99.47	0.76	99.16	3358493	3.75	99.48	0.63	99.84	187
	CDMA	640665	3.75	98.59	0.44	98.05	1567031	3.75	98.75	0.46	98.96	145
AP	CDMA	1089877	5	98.14	0.47	96.04	5070148	5	98.90	0.43	98.51	365
KTK	GSM	1238953	8	98.38	1.61	98.49	4295557	8	99.03	0.98	98.28	247
	CDMA	747742	3.75	97.14	1.16	97.59	3216844	3.75	98.97	0.79	98.62	330
TN	CDMA	1103732	5	99.44	0.83	99.93	4993075	5	99.51	0.76	98.04	352
Kerala	GSM	904116	8	99.66	0.77	98.50	4900290	8	99.78	1.14	96.47	442
	GSM	538043	6.2	95.94	1.52	98.47	3729586	6.2	99.10	0.76	97.59	593
	CDMA	1091308	5	99.49	0.82	99.83	2477918	5	99.56	0.78	98.97	127
Punjab	GSM	1567474	7.8	96.44	1.42	97.00	2769615	7.8	98.86	0.79	97.96	77
	CDMA	154138	2.5	97.63	0.68	98.86	379654	2.5	99.05	0.95	96.90	146
UP-W	GSM	1072081	8	98.83	1.24	97.74	4882350	8	99.82	1.25	99.30	355
	GSM	643736	6.2	96.38	1.58	95.88	3005020	6.2	96.87	1.17	95.73	367
	CDMA	421977	3.75	97.93	1.15	96.50	2419298	3.75	99.29	0.74	99.99	473
UP -E	GSM	1744897	8	95.35	2.03	96.23	8176771	8	97.26	1.71	95.51	369
	CDMA	382762	3.75	97.62	0.88	99.20	1672887	3.75	98.54	0.66	99.14	337
Raj	GSM	728430	6.2	96.49	2.69	96.93	6180390	6.2	99.40	1.13	96.67	748
	GSM	1265949	8	96.50	2.90	97.50	3213113	8	98.00	1.97	97.57	154
	CDMA	405809	3.75	97.73	0.87	97.72	1009394	3.75	98.28	0.82	98.57	149
HP	CDMA	42448	2.5	98.38	0.75	97.58	146928	2.5	98.82	0.77	98.28	246
Bihar	CDMA	260660	3.75	96.72	0.76	95.57	2102126	3.75	98.64	0.85	98.20	706
Orissa	CDMA	261627	3.75	99.61	0.73	99.46	807577	3.75	99.62	0.90	99.17	209
	CDMA	119106	2.5	97.67	0.93	97.77	1306137	2.5	98.34	0.42	98.70	997
Assam	GSM	237718	6.2	96.00	1.00	96.10	1480694	6.2	97.04	0.85	96.00	523

Table 3.1

3.26 However, it is seen that the spectrum already held by several operators is more than the above limits. Taking back the spectrum would however raise certain problems. Firstly, spectrum has been given to the service providers in the past on the basis of certain guidelines and it may not be legally possible take back the spectrum. Secondly, it would require a certain realignment of networks for the operators from whom the spectrum is to be taken back. Thirdly, spectrum allocation is service area wise and most service areas have cities with a population of more than one million. It would be difficult to account for the revenues separately for the cities and the rest of

the areas in a given service area. Lastly, it would be an iniquitous situation if the new operators, currently having only 4.4MHz of spectrum, were to be denied spectrum beyond the limits indicated above even as existing operators continue to hold higher spectrum. And it would be equally iniquitous if they are to be given upto 8MHz of spectrum in a service area but the existing operators, on renewal of licence, were to be limited to 6.2MHz in most area. Keeping all these factors in view, the Authority is of the opinion that assignment of 2X8MHz of spectrum would be appropriate for all the service areas other than Delhi and Mumbai, where it would be 2X10 MHz. In case of CDMA, the limit would be 2X5MHz in respect of all the Service areas and 2X6.25MHz in Delhi and Mumbai. This would be the 'Prescribed limit' to be incorporated in the Licence for both GSM and CDMA and no licensee will be entitled for being assigned any spectrum by the Government beyond this limit. This does not however disentitle a service provider from acquiring any additional spectrum through Merger and Acquisitions, dealt with in Chapter IV. As concluded in chapter-II, the contracted Spectrum as per the license is 6.2MHz/5 MHz (GSM/CDMA) only. Therefore, even though the service provider will be assigned spectrum upto the Prescribed limit, Spectrum assigned beyond contracted amount will be paid for at the Current price. This will be equally applicable to the service providers who are already holding the excess spectrum and those who will be assigned beyond the contracted amount in future.

3.27 The next question is whether spectrum beyond 2X8 MHz in all service areas other than Delhi and Mumbai can be withdrawn. Strictly speaking, it can be. In the event spectrum beyond 2X8 MHz is taken back from the service providers, it would need

to be assigned to service providers holding spectrum below the prescribed limit. It may be recalled that the Authority had, in chapter II, recommended imposition of an obligation to cover the habitations with a population between 2000 to 5000 persons including through intra service area roaming subject to the condition that one-third of such habitations will be covered by its own network. It would, in the opinion of the Authority, be more useful for the Government to impose an obligation that all the service providers holding more than 8 MHz of spectrum will invariably permit intra service area roaming on their networks to other operators in the in the event they choose to retain spectrum beyond 2X8 MHz. The Authority observes that BSNL and MTNL hold spectrum of 2X12.4 MHz in most service areas. Going by the subscriber figures of both these service providers, it is apparent that the spectrum is being underutilised and as such the Authority would like the Government to withdraw the spectrum of 2X2.4 MHz from both these agencies. It is necessary for the Government to maintain a level playing field between the public and private sector service providers.

3.28 **Accordingly, the Authority recommends that the limit on spectrum to be assigned to a service provider will be 2X8MHz for all service areas other than in Delhi and Mumbai where it will be 2X10MHz. Similarly for CDMA spectrum the Authority recommends that the limit on spectrum will be 2X5MHz for all service areas and 2X6.25 MHz in the Metro areas of Delhi and Mumbai. As concluded in chapter-II, the contracted Spectrum as per the license is 6.2MHz/5 MHz (GSM/CDMA) only. Therefore, even though the service provider will be assigned spectrum upto the prescribed limit, Spectrum assigned beyond contracted amount will be paid for at the**

current price. This will be equally applicable to the service providers who are already holding the excess spectrum and those who will be assigned beyond the contracted amount in future.

3.29 The Second Committee had recommended that "*A UAS/CMTS licensee cannot have spectrum holding of more than 25% of the total assigned spectrum in the 2G spectrum bands in each Licensed Service Area, irrespective of mix of technologies deployed.*"

3.30 As stated earlier, ideally, in a situation of generous availability of spectrum, the Authority would not be in favour of placing an administrative cap on the amount of spectrum a licensee can hold. However, in view of the acute shortage of spectrum in the bands of 800,900 and 1800MHz, based on technical calculations, the Authority is recommending a cap on the maximum spectrum which can be assigned to a service provider. Therefore, the Authority does not agree with the recommendations of the Second Committee.

C- Tranche for allocation of spectrum

3.31 In the consultation paper the Authority raised the issue of optimum tranche for assignment of spectrum for GSM technology. In their response some stakeholders favoured assignment of spectrum in 2x1MHz tranches. Among them, some of the stakeholders opined that spectrum upto 2x6.2MHz may be assigned in 2x1.8MHz tranche and beyond that it can be assigned in tranches of 2x1MHz. One of the stakeholders was of the view that the tranches in which spectrum is currently assigned upto 8MHz should be continued while another stakeholder suggested that the present contracted spectrum of 6.2+6.2 MHz for GSM

and 5+5 MHz of CDMA spectrum be allotted upfront and any additional spectrum beyond the contracted amount should be acquired through M&A/ spectrum sharing. One stakeholder who did not favour small tranche commented that if spectrum is assigned in a tranche of one MHz at a time then it will be impossible for operators to provide high bandwidth applications.

3.32 The Authority has concluded in Chapter II that the contracted spectrum for operators deploying GSM technology is 2X6.2 MHz and is also recommending that GSM spectrum upto only 2X8 MHz may be assigned to the operators in all the service areas except the metro service areas of Delhi and Mumbai where spectrum upto 2x10MHz may be assigned. The Authority is also of the view that the licensees must be given spectrum i.e. upto the prescribed limit, subject, of course, to meeting the eligibility conditions so that they can plan their network accordingly and compete with other operators.

3.33 In view of the above, the only issue to be decided for majority of the service areas is assignment from 6.2 MHz to 8 MHz. The Authority is of the opinion that as design, planning and installation of network requires heavy investment of capital and time; it will be in the interest of both service providers if the spectrum is assigned in as large a block as possible. However, the intention to provide spectrum from 6.2 MHz to 8 MHz in one block rather than in two blocks of 1 MHz and 0.8 MHz. This would also avoid delays. Likewise, in Delhi and Mumbai too, spectrum may be assigned in one block of 2 MHz from 8 MHz to 10 MHz.

3.34 Accordingly, **the Authority recommends that spectrum beyond contractual quantity i.e. 2x6.2MHz may be assigned in the following tranches:-**

- **For all the service areas, the additional spectrum may be assigned in a single tranche of 2x1.8MHz making a total 2x8MHz;**
- **For the metro service areas of Delhi and Mumbai, the additional spectrum may be assigned in two tranches; the first tranche of 2x1.8MHz, the making a total of 2x8MHz and then the second tranche of 2x2MHz making a total of 2x10MHz.**

3.35 The Second Committee in its report had recommended that GSM spectrum in the tranches of 1+1 MHz may be auctioned. However in view of the reasons given in Para 3.33, the Authority does not agree with the above recommendation of the Committee.

D- Criteria for assignment of spectrum

3.36 Having determined the 'Prescribed limit', which is the quantum of spectrum to be assigned by the Government to any licensee, and also the tranches in which the spectrum is to be assigned, the next question is to determine the criteria for assignment of the spectrum. The first attempt to draw up criteria for assignment of additional spectrum beyond the committed amount arose in the year 2003 following demands from the private operators in 2001-02, for allocation of additional spectrum. The Lalwani committee constituted by the DoT referred to the general international practice of cellular operators being assigned the total spectrum

that would be made available to them right at the time of issuing the cellular licenses, which would afford them the flexibility of designing their networks in the most optimal manner. However, keeping in view the severe constraint on availability of spectrum in our country, the committee recommended allocation of spectrum based on subscriber linked criteria. Additional spectrum beyond 6.2+6.2MHz was to be given once the number of subscribers reached 5 lakh in a service area; beyond 8+8MHz on crossing 10 lakh; and beyond 10+10 MHz on reaching a subscriber base of 15lakh. It also recommended earmarking of additional spectrum beyond 8+8MHz (upto10+10MHz) in 1800MHz band only. The Service providers were allowed to apply for additional spectrum once they reach 80% of the subscriber base possible with the already allocated spectrum.

3.37 Subsequently, in March 2006, WPC revised the subscriber linked criteria (**Table 3.2**). It also prescribed that the active subscribers and peak traffic averaged over a month (for a minimum of 40 m Erlangs per subscriber) in the Visitor Location Register (VLR) would be considered for this purpose.

GSM subscriber base criteria

Service Area	Minimum subscriber base (in Lakh) required for allotment of different amounts of GSM spectrum.					
	4.4 MHz	**6.2 MHz**	**8 MHz**	**10 MHz**	**12.4 MHz**	**15 MHz**
Metro Service Area						
Delhi & MumbaiChennai & Kolkata	No criteria No criteria	3 2	6 4	10 6	16 10	21 13
Telecom Circles as Service Area						
Category 'A' circle	No criteria	4	8	14	20	26
Category 'B' circle	No criteria	3	6	10	16	21
Category 'C' circle	No criteria	2	4	6	9	12

CDMA subscriber base criteria

Service Area	Minimum subscriber base (in Lakh) required for allotment of CDMA carriers of nominal 1.25 MHz bandwidth each	
	5th Carrier	**6th Carrier**
Metro Service Area		
Delhi & Mumbai	16	21
Chennai & Kolkata	10	13
Telecom Circles as Service Area		
Category 'A' circle	20	26
Category 'B' circle	16	21
Category 'C' circle	9	12

Table 3.2

3.38 The Authority in its recommendations on 'Review of License terms and conditions and number of access service providers' dated 28th August 2007 recommended that the then existing criteria needed to be immediately reviewed as they neither take into consideration

the technology innovations for increasing the spectral efficiency nor the subscriber distribution pattern within a service area. The Authority recommended, as an interim measure, enhancement of the subscriber linked criteria (SLC). In its report dated 26th October 2007, TEC, which was asked by the DoT to examine the criteria, recommended SLC that were steeper than those recommended by TRAI. The Government constituted a committee, under the chairmanship of Additional Secretary (T) DoT (referred to in this document as the First Committee) to study the criteria of both the TRAI and TEC and give its recommendations. This committee set out divergent views and left it to the Government to take a decision on the subscriber linked criteria. In January 2008, the DoT took a decision to apply the TRAI criteria as an interim measure. The Second Committee, in its report of May 2009 set out with the opinion that the way forward should be to move away from administratively determined criteria to a market-driven approach. This report of the Second Committee has been referred to the TRAI for its recommendations.

3.39 In the consultation paper of October 2009, the Authority sought comments on the criteria to be adopted for spectrum assignment. The response from stakeholders was mixed. Some stakeholders, mostly those who have spectrum beyond the contracted amount strongly endorsed that in future, all spectrum beyond 4.4 MHz in GSM should be assigned through auction. The other view was that operators should be first allocated contracted amount of spectrum beyond which auction methodology may be applied for assignment of additional spectrum. Another view was that no spectrum beyond the committed amount should be further allocated and operators may acquire additional spectrum through merger & acquisitions.

3.40 On the issue of level playing field, the view of some stakeholders was that this was not an issue since it is the prerogative of the Government to change the license terms and conditions. They referred to the past changes in the subscriber linked criteria. They also refuted the view that the spectrum holding should be uniform among all operators and stated that current spectrum holdings are the result of specific choices made by operators over the past 15 years.

3.41 On the other hand, service providers who currently hold spectrum below the contracted quantum were of the view that adoption of market based mechanism would create issues of level playing field as there are some licensees who hold additional spectrum beyond the contracted amount, which was also assigned to them without any additional fee. This has enabled such operators to significantly reduce their capital cost besides increased capacity for servicing a larger subscriber base. Further, most of these operators have been in the industry for a long time and have capitalized most of their initial roll-out investments and even started obtaining returns on these investments. Such operators are at a financially advantageous position vis-à-vis others who still have less than the contracted spectrum. To address these issues, the suggestion was that the excess spectrum beyond committed limit should be taken back. One stakeholder referred to TRAI's earlier recommendation of August 2007 that allocation through auction may not be possible in the 2G bands and observed that the situation noted by TRAI still exists and as such, no change in the earlier recommendations by TRAI was warranted. Generally, the two-tier mechanism of part auction and part assignment on the basis of SLC was not favoured. A few preferred SLC with some additional parameters like growth rate,

efficiency, opportunity cost etc, while others preferred assignment of spectrum based on payment of upfront charge.

3.42 The choice before the Authority is either to go by the subscriber linked criteria or by auction or work out any other criteria. Insofar as the subscriber linked criteria are concerned, TRAI had, in August 2007, examined the issue and felt that the SLC do not take into account the differential subscriber base density across service areas and that they also do not account for the subscriber distribution within the service area. More importantly, the subscriber linked criteria have led to attempts at over reporting of the subscriber base. The Second Committee also was not in favour of the subscriber linked criteria since the SLC cannot keep pace with the fast changing subscriber profiles, increasing use of data centric applications, randomised network growth and rapid technological developments and data transmission. It felt that advances translating to significant spectrum efficiency gains on the ground make the determination of SLC complex and contentious. It also felt that while service providers need additional spectrum in the dense urban areas, the requirement in the rural areas is much less and the disconnect between the rural and suburban subscriber growth makes the periodic revision of the SLC difficult. The Authority has examined the issue and finds that the grounds adduced by TRAI in August 2007 continue to hold good. Besides, with the advent of several new packages and also be dual SIM phones, people tend to have more than one SIM in order to optimise their expenditure. It is generally perceived that the number of connections exceed the actual number of subscribers which takes away from the relevance of the subscriber linked criteria to spectrum assignment.

3.43 **The Authority recommends that the use of subscriber linked criteria be done away with for assignment of spectrum.**

3.44 The other option is assignment through Auction. As brought out earlier, each operator holding the UAS licence is entitled to the committed spectrum of 6.2/5 MHz. From Tables 2.6 & 2.7, it can be seen that in most service areas, the amount of spectrum that is available after meeting the obligation of the contracted spectrum is very limited. It is only in six service areas that current spectrum availability is beyond the requirement of meeting the contractual obligation. Secondly, in Para 3.27 above, the requirement in each service area has been shown to be 8 MHz, which means that any criteria for allocation will only be in respect of this 1.8 MHz. Since operators will be meeting the eligibility conditions for assignment of the spectrum at different points of time, it is highly doubtful if auction would be an appropriate mechanism. Ideally, auction would be a useful instrument to discover the market price when the number of contenders is large. Thirdly, in the current situation where different licensees have different levels of spectrum, auction can disturb the level playing field. Operators are at various stages of operations, with some having licenses close to expiry, and others having recently been allotted new licenses, and still others who have been allowed to operate on dual Technology and have recently been allocated spectrum. All old operators have received spectrum (based on SLC) without any kind of auction / competitive pricing. The operators are all competing in the same market and for the same addressable population. In order to maintain a level playing field, it would be necessary to avoid the auction route for the newer operators for whom an auction would raise the cost of providing Service vis-à-vis the operators who

already have more than 6.2MHz of spectrum. Given the competitive market conditions this cost can most certainly not be passed on to the consumer. A free auction of 2G spectrum wherein any service provider may compete for additional spectrum carries a serious risk of Spectrum hoarding, since the business model of an established operator would be different from that of a new operator, giving an unfair advantage in the competition.

3.45 The objectives for the award process of spectrum are that the spectrum should be awarded transparently and fairly; that the process should promote efficient use of spectrum in terms of stimulating competition and increasing roll out; that it should ensure effective competition for spectrum and that it should generate revenue for the public purse. The recommendations of TRAI in respect of bands other than 800, 900 and 1800 MHz is already that the spectrum should be awarded through auction process. Only in respect of these three bands, TRAI had recommended even in 2007, and for reasons detailed, that auction would not be appropriate. This has been examined once again as above and the Authority reiterates that auction may not be the appropriate course of action for these bands. In so far as awarding spectrum transparently and fairly, definite criteria have been laid out moving away from the subscriber linked criteria. Roll-out obligations have also been specified separately. With 12 to 14 licensees in each service area, competition is not lacking. As regards generation of revenue for the Government, this is being dealt with separately in the section dealing with the spectrum pricing. On careful reflection, and for reasons detailed above, the Authority is of the opinion that it is not feasible to auction spectrum in the 800, 900 and 1800 MHz bands.

3.46 **The Authority concludes that it is not feasible to auction spectrum in the 800,900 and 1800 MHz bands.**

3.47 While the Authority does not favour the auction process for spectrum in the 800,900 and 1800 MHz bands at this stage, this principle will not apply when the 800 and 900 bands are refarmed for 3G and other future technologies. At that stage, the spectrum must be auctioned.

3.48 **The Authority therefore recommends that spectrum in 800 and 900 MHz bands shall however may be subject to auction as and when it is refarmed.**

3.49 In so far as 3G and BWA spectrum is concerned, the Authority notes that presently, the number of blocks being offered for auction are few. From an effective competition point of view, the Authority would like to see that each Service area has at least 5-6 service providers. The Authority notes that spectrum is available in several service areas but is to be allowed to be auctioned by the Defence. The Authority would like the Government to bring these blocks into 3G services at the earliest. Now that the auction is being conducted and the price being discovered, the Authority would like to see that the spectrum, as and when it is available, is offered at the highest price to the remaining bidders in the order of bids. If, however, more than a year lapses from now for this exercise, a fresh auction needs to be conducted.

3.50 **The Authority recommends that Government should bring additional blocks into 3G services at the earliest and offer the same at the highest price being discovered through the present auction to the remaining bidders in the order of bids.**

If, however, more than a year lapses from now for this exercise, a fresh auction needs to be conducted.

3.51 As discussed in Chapter-II, the Authority is not satisfied with the coverage of the rural areas by various service providers and would like to see a major thrust in this direction in the next few years. Accordingly, it is recommending a modification in the present roll out obligations providing for better rural coverage. Assignment of spectrum provides leverage to the Government to achieve this objective. The Authority would like to link the eligibility conditions for assignment of additional spectrum beyond the initial 4.4/2.5 MHz to the coverage of rural habitations. The Authority is accordingly of the view that instead of the SLC or auction, linking the eligibility conditions with the coverage will be rational and also ensure faster roll out in the rural areas by the service providers.

3.52 Accordingly, **the Authority recommends that the eligibility conditions for assignment of additional spectrum beyond the initial start up spectrum, shall be as follows:**

- **For assignment of spectrum beyond 2.5 MHz and upto 3.75 MHz of CDMA, the service providers should have made the commercial launch and have covered 25% of the district headquarters or any other town in the district in lieu thereof.**
- **For assignment of spectrum beyond 4.4 MHz and up to 6.2 MHz in respect of GSM as well as beyond 3.75 MHz and up to 5MHz in respect of CDMA, the service provider should have covered at least 50% of the District headquarters or any other town in a 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 coverage. The assignment is subject to the condition that the service provider will complete the prescribed roll out obligations for 2 years, within a period of 6 months from the date of assignment of additional spectrum.

- **For assignment of spectrum from 6.2 to 8 MHz in respect of GSM and from 5 MHz to 6.25 MHz in respect of CDMA, the service providers should have completed the two years' roll-out target. The assignment is subject to the condition that the service providers will complete the roll-out target prescribed for three years within a period of one year from the date of assignment of additional spectrum.**
- **In Delhi and Mumbai, the service provider would be entitled for additional GSM spectrum beyond 4.4 MHz upto 6.2 MHz on achievement of 90% street coverage of the Metro service area. Achievement of 5% and 10% of market share in the Metro service area would entitle the service provider for spectrum of 8 MHz and 10 MHz respectively. In respect of CDMA, the commercial launch and 90% street coverage would be the entitlement for spectrum from 2.5 MHz upto 3.75 MHz, and achievement of 5% and 10%of the market share in the Metro service area for 5 MHz and 6.25 MHz respectively.**

3.53 Having suggested the above, the Authority is conscious of the fact that the service providers have not been assigned additional spectrum by the DoT since March 2009. During this interim

period, it is possible that some operators would have qualified to receive additional spectrum based on the present Subscriber linked criteria. Since the Authority is now recommending a different set of criteria than what is currently existing, the Authority recommends that the present subscriber linked criteria be continued to be operational only for a period of six months after which it would automatically lapse and replaced by the criteria now. This would enable all the service providers to adjust to the changed criteria.

3.54 **The Authority accordingly recommends that the subscriber linked criteria, as adopted by the Government in January 2008 be kept operational only for a period of six months to enable all operators who are already qualified for the additional spectrum based on the prevalent SLC or those who would be qualified within the next six months, to be assigned additional spectrum subject to availability and the Prescribed limit recommended earlier (Para 3.27). Assignment of additional spectrum to such service providers will be subject to the condition that they shall complete the 2 years' roll out obligation within a period of six months from the date of assignment of additional spectrum.**

E- Order of priority for assignment of Spectrum

3.55 The next issue to be decided is the order of priority for assigning spectrum to the existing licensees. Consequent upon the cap on the amount of spectrum which a licensee can be assigned in a service area, there will be three categories of licensees for assignment of spectrum: those who have received the start up spectrum and waiting for the grant of contracted spectrum; those who have received the contracted spectrum but waiting to receive

additional spectrum upto the prescribed limit; and those who are awaiting the assignment of initial spectrum.

3.56 It has already been established that the amount of spectrum available is not sufficient to even meet the needs of the service providers who have been given the licence. The Authority considers that assignment of spectrum upto the prescribed limit, which is the spectrum required by service providers should take priority over those who are yet to receive any spectrum and therefore have not even started their business. Those who have received the initial start up spectrum have, in the normal course, already commenced their business in the expectation of receiving the contracted spectrum.

3.57 The Authority is of the view that it would be advisable to fix a reference date for consideration of applications for spectrum and would recommend that 1st day of April and 1st day of October every year be treated as the reference date, starting with 1.4.2010. As on this day, licensees who have received the initial start up spectrum and have met the eligibility conditions for grant of additional spectrum up to 6.2/5 MHz should be given the top priority as they have already invested in rolling out their network and are entitled to be assigned spectrum upto the contracted amount. The inter-se priority for such operators, subject to meeting the eligibility norms, would be the date of application for additional spectrum.

3.58 In keeping with the principle of providing adequate spectrum to the service providers, licensees who have been assigned the committed spectrum but are waiting to get additional spectrum upto the maximum permissible limit would form the next group of claimants for spectrum. Assignment of spectrum to this category

of operators would be possible only when the demand of the first category is met in full on the reference date. In so far as cities of Delhi and Mumbai are concerned, eligible operators would be assigned spectrum upto 10/ 6.25 MHz. The inter-se priority between operators within this group, subject to meeting the eligibility norms, would also be the date of application for additional spectrum.

3.59 The next in priority on the reference date will be those who are waiting for the initial start up spectrum and the inter-se priority between such operators would be the date of UAS licence.

3.60 Since a cap on maximum holding of GSM spectrum of 8/ 10MHz and CDMA spectrum of 5/6.25 MHz has been determined, the question of further allotment of spectrum to the operators currently having spectrum beyond the prescribed limit does not arise.

3.61 **The Authority recommends that the inter-se priority between the different categories of operators shall be as follows:**

a. **Licensees who have received the initial start up spectrum and have met the eligibility conditions for grant of additional spectrum up to 6.2/5 MHz will be given the top priority. The inter-se priority for such operators, subject to meeting the eligibility norms, would be the date of application for additional spectrum.**

b. **Licensees who have been assigned the committed spectrum but are waiting to get additional spectrum- up to the maximum permissible limit will be next in priority. The inter-se priority between operators within this group, subject to meeting the eligibility norms,**

would also be the date of application for additional spectrum.

c. Next in priority will be those who are waiting for the start up spectrum. The inter-se priority between such operators would be the date of UAS licence.

F- Assignment of spectrum in bands other than 800, 900 and 1800 MHz for non-commercial use

3.62 DoT, vide its letter dated 7th July 2009, has sought a clarification on TRAI's recommendation dated 28.8.2007 that in future all spectrum excluding the spectrum in 800, 900 and 1800 MHz bands should be auctioned so as to ensure efficient utilisation of this scarce resource. DoT informed that WPC Wing has been assigning frequencies for different services/users and applications in various bands other than 800, 900 and 1800 MHz bands including Government organizations. In addition to above, spectrum is also allotted for new technologies as and when required on case to case basis, which have not yet become commercial. In view of the above, DoT requested TRAI to furnish a clarification on auctioning of all spectrum other than 800, 900 and 1800 MHz bands.

3.63 The relevant Para 2.79 of the recommendations dated 28th August, 2007, is reproduced below:-

> *"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. ....”

3.64 The Government in its decisions vide its letter no. 20-100/2007-AS-I dated 8th November, 2007, communicated to TRAI that “these recommendations are beyond the scope of present reference, not considered.”

3.65 In response to this issue raised in the consultation paper, stakeholders favoured allocation of spectrum by auction and levying spectrum usage charges for non-commercial usage also, to ensure efficient utilization of spectrum. However, in case of usage by the Government agencies like Defence, security agencies etc., some stakeholders advocated levying of low or nil charges. There was also the suggestion that focused efforts should be made to refarm any excess spectrum towards commercial usage. Till such time refarming is not feasible, a spectrum usage charge should be levied on these non-commercial users to ensure optimal spectrum utilization and insistence of use of the latest technology must be incorporated in the procedures with a mandatory review and vacation clause in the event of new reasonably priced alternative is found.

3.66 The usable spectrum ranges from 30 KHz to 300 GHz and has been allocated to various services like Fixed Wireless, Mobile Telephony, Broadcasting, Radio Navigation, Meteorological Satellite, Aeronautical, Radiolocation, Radio Navigation services, Space Research, Radio Astronomy, Meteorological Aids etc. The recommendation made earlier was limited to only those bands which have been identified internationally for the Telecommunication and Broadcasting services. A careful reading of the above paragraph will reveal that the recommendation

regarding auctioning of all spectrum other than 800,900 &1800MHz was limited to the spectrum for commercial access services for mobile telephony.

3.67 The stakeholders, in their responses, have also commented about pricing and allocation of the spectrum which have been identified for commercial usage. Presently, for non-commercial purposes, spectrum is mainly used by organisations that do not require to have access service license but need the spectrum for their operations viz. Defence, DoS, ONGC, Airport Authority of India etc. These are largely individual organization and spectrum is required for public safety, defence, experimental and other strategic functions.

3.68 The Authority is of the opinion that in view of the demand projected in Para 1.24, allocation of spectrum in these identified bands for non-commercial usage needs to be carefully monitored and the Authority is also recommending a review of the already assigned spectrum in these bands. Moreover, in order to ensure its optimal and efficient utilisation, it is also necessary that for the spectrum already assigned, the users pay a comparative usage charge as is levied for the commercial usage. This will also help in ensuring that the Government agencies demand only that much spectrum as they actually require.

3.69 In view of above, **the Authority recommends that-**

- **Spectrum in bands other than 800, 900 and 1800 MHz could be considered for non-commercial use on a case by case basis, after due reference to and recommendation from TRAI. However, such assignment will be done very sparingly.**

- **Users of all spectrum assigned for the non-commercial usage in the identified commercial bands will be levied an annual spectrum usage charge comparable to the charge being paid for the commercial services.**

G- Spectrum pricing

3.70 For any resource, including radio spectrum, the primary economic objective is to maximize the net benefits to society that can be generated from that resource such that there is an efficient distribution of resources resulting in maximum benefits to society. Prices are used as an important mechanism to ensure the spectrum resources are used efficiently by users.

3.71 The existing licensing framework imposes the following charges on a UASL/CMTS licensee, namely (a)Entry fee for acquiring the license; (b) license fee as a percentage of Adjusted Gross Revenue (AGR) paid on a quarterly basis; (c) Spectrum usage charges as a percentage of AGR paid on a quarterly basis.

3.72 The entry fee for acquiring a UASL license enables the licensee to be eligible for spectrum assignment up to a limit in certain specified bands without any additional fee for acquisition of spectrum. Insofar as cellular licence is concerned (CMTS/UAS), it has been brought out in Chapter-II that the contracted quantum is 6.2/5 MHz (GSM/CDMA). In addition, the licensee pays to the Government licence fee towards the cellular mobile handsets and cellular mobile base stations and also for possession of wireless telegraphy equipment. Spectrum usage charges are paid towards royalty payment for the use of cellular spectrum. Both licence fee

and spectrum usage charges are paid as a percentage of the Adjusted Gross Revenue, and the Government has the right to change these rates from time to time.

3.73 The issue to be deliberated is the price at which the spectrum should be given in future. This price will also form the basis for the calculation of one time levy on the operators with excess spectrum.

3.74 The price of spectrum can be last said to have been discovered through the bidding for the 4th Cellular licenses. Thereafter, the price then discovered has been applied for all subsequent licenses. However, market conditions since then have changed drastically, and this price needs to be modified to reflect the present value. The option of a market discovered price for 2G through an auction has already been ruled out for reasons indicated. The following methods have been applied to estimate the present value of 4th operator's entry fee based on Time value of Money:

- Pre-tax Weighted Average Cost of Capital
- State Bank of India Prime lending rate
- Ratio of growth in Gross Revenue per MHz
- Auction price of 3G spectrum.

3.75 **Weighted Average Cost of Capital (WACC):** The weighted average cost of capital measures the rate of return that a firm/Industry needs to earn in order to reward its investors/stakeholders. The WACC methodology is widely used for calculating the cost of capital for regulated companies and is understood by both the finance community and industry. The cost of capital is also the rate at which firms substitute between

present and future value. This means that it is the appropriate discount rate to be used in Net Present Value ("NPV") calculations when comparing company cash-flows over time. NPV calculations are widely used in a range of regulatory contexts, being relevant to both ex ante charge setting and ex post analysis. The Authority has used 15% as pre-Tax WACC to estimate the present value of entry fee of 4th Cellular License. In the recent past, the Authority has used 15% as opportunity cost/ Return on Capital employed for tariff fixation or various regulatory decisions.

3.76 **Prime Lending Rate (PLR):** Prime Lending Rate or Prime rate is a term applied in many countries to a reference interest rate used by banks. The term originally indicated the rate of interest at which banks lent to customers. It is treated as a benchmark rate for most retail and term loans. Some variable interest rates may be expressed as a percentage above or below prime rate. The prime rate varies little among banks, and adjustments are generally made by banks at the same time. The Authority has collected data of Prime Lending Rates (PLRs) of State Bank of India (SBI) for a period of 8 years (2002-03 to 2009-10) to workout average prime lending for the said period. This has been estimated as 11.09%. The average PLR has been applied to work out the present value of entry fee of 4th Cellular License.

3.77 **Ratio of growth in Adjusted Gross Revenue per MHz:** The Authority examined the revenue generation capacity per MHz of wireless industry over the last years after grant of 4th cellular license and noted that during the financial year 2002-03, revenue generation per MHz was about Rs.19.89 crore per year per MHz whereas at the end of FY 2009-10 it has increased to Rs.99.27 crore per year per MHz i.e. 4.99 times of revenue per MHz over

the period. The Authority has used this multiplier to assess the present value of entry of 4th cellular license.

3.78 Based on the above methods, the following figures have been worked-out:

Statement of present value of Entry Fee of 4th Operator						
Sl.No.	Particulars		Unit	**Methods**		
				Time Value of Money		
				WACC	SBI PLR	Ratio of growth in AGR per MHz
1	Financial Year in which License was Issued		Year	2002-03	2002-03	2002-03
2	Amount Paid as 4th Operator -All India Basis		Rs in Crore	1659	1659	1659
3	Discounting Factor		%	15%	11.09%	
4	Present Value at the end of Financial Year					
	Financial Year	Years elapsed				
	2009-10	8	Rs in Crore	5074	3847	8285

Table 3.3

3.79 Of the three methods, the one related to the AGR of Telecom industry has the maximum relevance to the task at hand of determining the price of spectrum in 800, 900/1800 MHz band. However, this method also gives, like the other two methods, only a derived figure. Currently, auction is under way for 3G and BWA spectrum and this auction has the advantage of actually reflecting the current market price of spectrum in the 2100 MHz band. Taking the current auction price, as on 8th May 2010, a comparison of the original entry fee, the figure based on growth of AGR and the current 3G price works out as follows:

Proportionate Price of 6.2 MHz of Spectrum in various service areas at 3G Auction price

Sl.	Service Area	Category	Entry fee 2001 for 6.2 MHz (Rs Cr)	Indexed Entry Fee for 6.2 MHz (Rs Cr)	3G Auction price for 5MHz (Rs Cr) (A)	Proportionate price for 6.2 MHz at 3G auction price=A*6.2/5 (Rs Cr)
1	Delhi	Metro	170.7	851.793	2208.59	2738.65
2	Mumbai	Metro	203.66	1016.2634	2315.79	2871.58
3	Kolkata	Metro	78.01	389.2699	351.79	436.22
4	Tamilnadu	A	233	1162.67	1171.75	1452.97
5	Maharastra	A	189	943.11	1127.47	1398.06
6	Karnataka	A	206.83	1032.0817	1374.51	1704.39
7	Gujarat	A	109.01	543.9599	1023.86	1269.59
8	Andhra Pradesh	A	103.01	514.0199	1070.84	1327.84
9	West Bengal	B	1	4.99	123.63	153.30
10	UP(West)	B	30.55	152.4445	374	463.76
11	UP (East)	B	45.25	225.7975	276.05	342.30
12	Rajasthan	B	32.25	160.9275	271.16	336.24
13	Punjab	B	151.75	757.2325	176.66	219.06
14	Madhya Pradesh	B	17.4501	87.075999	258.36	320.37
15	Kerala	B	40.54	202.2946	274.62	340.53
16	Haryana	B	21.46	107.0854	222.58	276.00
17	Orissa	C	5	24.95	35.45	43.96
18	North East	C	2	9.98	31.51	39.07
19	Jammu & Kashmir	C	2	9.98	30.30	37.57
20	Himachal Pradesh	C	1.1	5.489	30.00	37.20
21	Bihar	C	10	49.9	70.23	87.09
22	Assam	C	5	24.95	31.51	39.07
			1658.57	**8276.26**	**12850.66**	**15934.82**

Table 3.4

3.80 The issue to be decided is whether this 3G auction price should be reckoned as the 'current price' of 2G spectrum in the 1800MHz band for GSM and 800MHz band for CDMA. There are conflicting views on this subject. While some hold the view that the value of 1800 MHz band is about 1/3rd of the 2100 MHz band, there is a

contrary view that the two are comparable. According to this latter view, while the services in 2G started with only voice, most of the current systems deployed offer both GPRS and EDGE services. While GPRS service is used for low data rates, a significant number of users are subscribing to high bit rate EDGE services. 2G services are today actually offering 2.75G services. Therefore, while comparing spectral efficiency and other factors, it is fair to compare existing 2.75G systems with 3G systems to be deployed. This comparison between 2.75G and 3G services has been carried out in a number of papers. In Furuskar and others[32] it is stated that for spectral efficiency comparison, it is more correct to compare "system spectral efficiency" than "link spectral efficiency" as the former takes the system configuration and deployment strategies into account. As per this paper, 2.75G has a system spectral efficiency of 0.33 as against a spectral efficiency of 0.51 for the 3G systems of comparable complexity and configuration. Given that in India, 3G is expected to operate at 2.1 GHz band and the 2.75G at 1.8 GHz, these figures become 0.45 for 2.75G because of increased reach of the 1.8 GHz spectrum. Therefore, the spectral efficiency, which influences the traffic, quality of service, is nearly the same for the two systems. On the other hand, those who hold the view that the two are not comparable point out that when the comparison is carried out between voice service of 2G and voice service of 3G or between 2G services (which are actually 2.75G) and the 3G services on HSPA or HSPA+, the system spectral efficiency of 2G will be far lower than 3G, and can even be as low as one third. Another argument is that the supply-demand position is different in case of 2G and 3G.

[32] Edge-Enhanced data rates for GSM and TDMA / 136 evolution. Ericsson Review no.1, 1999

3.81 The Authority could not arrive at a definitive conclusion on this subject at this stage. The Authority is of the opinion that, pending further deliberations on this issue, the 3G Price may be adopted as the price for 2G. Keeping in view the significance of this aspect to the Indian Telecom sector, the Authority is separately initiating an exercise to further study this subject and would apprise the Government of its findings.

3.82 **The Authority, therefore, recommends that the 3G prices be adopted as the 'Current price' of spectrum in the 1800 MHz band. At the same time, Authority is separately initiating an exercise to further study this subject and would apprise the Government of its findings.**

3.83 The next issue for consideration is the valuation of the spectrum in 800 and 900 MHz bands. For this, the Authority has studied the spectrum in the 900 MHz band.

3.84 Initially, the cellular service providers were given spectrum in the 900 MHz band. From the fourth cellular licence onwards, spectrum is given only in the 1800 MHz band. Of the 25 MHz of spectrum in the 900 MHz band, around 88% is held by three service providers. During the consultation process, some stakeholders have represented that the entire 900 MHz band spectrum should be withdrawn from these service providers and redistributed such that every service provider has at least 2X 2.4 MHz of 900 MHz band spectrum, which would serve the purpose of carriage. In chapter I, the Authority had indicated that 900 MHz band spectrum is valuable for 3G services and beyond and that the entire 900 MHz spectrum should be refarmed at the time of renewal of the respective licences. At the same time, the Authority recognises that the value of 900 MHz spectrum is

higher than that of 1800 MHz spectrum and should be appropriately fixed.

3.85 It is well known that in free space the lower frequencies cover larger distances due to lower path loss. The coverage quadruples by halving the frequency. Therefore, for free space, coverage in 900 MHz band is 4 times that of 1800 MHz. However, in realistic scenarios like in dense urban areas, the coverage does not quadruple by halving the frequency. Many practical models used in the mobile communication industry typically show that the area of coverage roughly doubles if the frequency is halved. This means coverage at 900 MHz will be roughly double that of 1800 MHz in dense urban setting. In rural and semi-urban environments this will be even higher. Moreover, reach into the buildings is far better with 900 MHz spectrum than with 1800 MHz.

3.86 This increased coverage leads to lower capital equipment as fewer towers are needed for the coverage for the same transmitted power. Lower capital equipment also leads to lower operational expenses. Many practical studies have been carried out to estimate this reduction in capital and operational expenditure. They have typically shown the reduction could be as much as 40% (this means that capital and operational expenditure at 900 MHz is about 60% of that at 1800 MHz).

3.87 Compared with IMT deployment in the 2100MHz band, 900 MHz will reduce the cost of coverage for mobile communications services, especially into rural areas. The Study conducted by the GSMA[33] indicates that IMT implementation in 900MHz provides

[33] http://www.gsmworld.com/documents/umts900_exec_sum.pdf

44% (in urban areas) and 119% (rural areas) increased coverage per Node-B compared with 2100MHz band. The indicative coverage area increase is shown in the following Table 3.5. The reason for the differences in coverage area per Node-B in dense urban and rural areas is due primarily to lower signal attenuation, which improves reach and in-building coverage. The improved coverage of UMTS900 technology reduces the number of cells in a region, which decrease the potential number of gaps between cells, and therefore helps to overcome handover problems as well as to improve the customer experience. The difference in coverage areas for each Node-B affects the number required to serve a given geographic area and consequently the Capex costs. It also provides a new option, with greater service capability, for operators who may wish to extend their 3G coverage or replace their GSM networks in future.

Percentage increase in coverage area

Frequency	**Percentage increase in coverage area per Node-B (km2)**			
	Dense Urban	**Urban**	**Suburban**	**Rural**
900MHz vs. 2100MHz	87%	44%	60%	119%

Table 3.5

3.88 Financial and economic analysis as indicated in Table 3.6 presents an assessment broken down by geographic country area. In the case of UMTS900 only, the dense urban environment case shows the highest cumulative Capex reduction in the range of 37%-46%, this is followed by rural environment (range of 33%-46%), suburban environment (range of 26%-34%) and finally urban environment (range of 20%-36%) for the regions examined.

Cumulative Capex costs per type of environment for 'UMTS900 only' as a percentage of Cumulative Capex costs for 'UMTS2100 only'

	W. Europe	Asia Pacific	Middle East	Sub-Saharan Africa
Dense Urban	60%	63%	62%	54%
Urban	76%	71%	80%	79%
Suburban	74%	72%	74%	66%
Rural	66%	67%	63%	53%

Table 3.6

Total Capex and Opex costs for 'UMTS900 only' as a percentage of Total Capex and Opex costs for 'UMTS2100 only'

Demand	Middle East	Asia Pacific	W. Europe	Sub-Saharan Africa
Low	67%	81%	87%	61%
Medium	68%	83%	90%	62%
High	70%	86%	92%	63%

Table 3.7

3.89 As per the study, the high level modelling indicated that IMT in 900MHz band can effectively generate cost reductions of up to 40% in Capex and 30% in overall costs when compared to deployment at 2100MHz only.

3.90 The detailed study has been done for 900MHz and 2100MHz bands and the benefits in respect of Capex and Opex have been established. Accordingly, the similar benefits in respect of Capex and Opex be applicable for 900MHz and 1800MHz bands also. Therefore, it can be concluded that the value of 900 MHz band is at least 1.5 times that of 1800 MHz band. The price should be similarly fixed for spectrum in the 800 MHz band.

3.91 **The Authority accordingly recommends that the Current price of spectrum in the 900 MHz band be fixed at 1.5 times**

that of the 1800 MHz band. The Authority recommends that this be also fixed as the price of Spectrum in the 800 MHz band.

3.92 The next question to be considered is the action to be taken in respect of service providers having spectrum beyond the contracted spectrum. In chapter II, the Authority has concluded that the CMTS/UAS License has a contractual obligation to give 6.2/5 MHz of spectrum to the licensees using GSM and CDMA technology respectively, subject to its availability and efficient usage. However, over a period of time, some service providers have received spectrum beyond this limit, without any additional one-time charge. In some of the service areas, the service providers have been assigned spectrum even upto 12.4MHz. In the consultation paper, the Authority had raised the issue of levy of one-time charge on the additional spectrum beyond the contracted spectrum and the basis for calculation of such charge.

3.93 In response to the consultation paper, there were two distinctive and divergent views. Those operators who are having spectrum above the limit were of the opinion that as they have been given spectrum as per the guidelines of the Government issued time to time, the question of excess spectrum does not arise. The operators have, accordingly, engineered their network and also committed the investments. The revised limit, if any, should be made applicable prospectively for the new operators licensed after January 2008. They were also in agreement with the recommendations of the Second Committee on the 25% of the total assignable spectrum as limit of spectrum which an operator can hold. These operators also mentioned an affidavit of the DoT submitted before the Hon'ble TDSAT, wherein it was stated that

allotments of spectrum were made in accordance with the norms prevailing at the stage of allotment to achieve the objectives of continued growth of telecom services.

3.94 The other view shared mostly by the new licensees was that additional spectrum has been allocated to the incumbent GSM service providers against the licensing conditions and UASL guidelines without any criteria and without any extra payment. It is not legally tenable and is against the principle of level playing field. Allocation of spectrum in excess of contractual limit has provided undue advantage to incumbent cellular service providers. The hoarding of spectrum by few established service providers have helped them to save capital expenditure on installation of towers and use of other spectrum efficiency enhancement techniques. Some of these respondents wanted the excess spectrum to be taken back while others advocated levying steep charges. According to them, if the additional spectrum is allowed to be retained, it could provide the concerned entity significant and an unfair advantage.

3.95 On the question of the period for which such operators be asked to pay the one-time charge, the responses of the stakeholders were again on similar lines. Most of the incumbent operators were of the view that as they have been allocated the spectrum as per Government guidelines, there is no justification for levying any one-time charge for spectrum beyond the contracted quantum. Some of them also suggested that in case it is decided to levy one-time charge, it should be done as per the recommendations of the Second Committee. The other view was that the onetime charge for holding additional spectrum should be from date of allocation of excess spectrum. One of the stakeholders opined that one-time

spectrum charges beyond threshold should be levied prospectively and should not be applicable to operators already allotted additional spectrum.

3.96 Regarding the basis for fixing such one-time charge, the suggestions by various stakeholders include the price determined in the 3G auctions; per MHz charge from the Entry fee of Rs 1,659 Crore, duly adjusted, using appropriate indexing method; 40% of the 3G Reserve Price per MHz. One of the stakeholders suggested that the upfront charge may be based on the transfer charges proposed in DoT committee report and once the 2G auction takes place, the differential charges may be adjusted.

3.97 The Authority has studied the responses received and also the terms and conditions of various licenses issued since inception. There are two alternatives to deal with the excess spectrum assigned to the service providers over a period of time. They are either to take back the excess spectrum or to charge them for the additional spectrum.

3.98 Some of the existing operators have received spectrum beyond the contracted quantity without any additional charge. It is a fact that they have paid additional licence fee and spectrum usage charges. But as mentioned in Para 3.72, licence fee and spectrum usage charges have specific objectives and are distinct from the entry fee. To the extent the service providers have not paid additional Entry fee, they can be said to have enjoyed the benefit of extra spectrum free of cost all these years and are therefore liable for an additional one-time charge from the date they were allocated additional spectrum. Besides, the order dated 1.2.2002 of the WPC wing in the Department of Telecommunications **(Annexure XXI)** states that for the additional spectrum beyond

6.2 MHz +6.2 MHz, an additional charge of 1% of AGR will be levied. The additional spectrum usage charges are different from the Entry Fee. Ideally, these charges should be levied on all operators holding excess spectrum from the respective date of such assignment. However, it is doubtful if it is legally sustainable and feasible to charge these operators from a retrospective date. Secondly, the service providers have already planned and deployed their networks with the amount of assigned spectrum. Now to take back the spectrum will involve considerable expenditure on their part in reconfiguring the network, will be a long drawn out process and will also impact the quality of service to their subscribers. Thirdly, the charges levied on a service provider will be translated to tariff and it could be argued that the service providers cannot collect the money retrospectively from the subscribers. Keeping in view the overall interests and orderly growth of the industry, the Authority is of the opinion that the charges for excess spectrum be collected prospectively at the 'current price', for the balance life of the licence subject to a minimum balance life of seven (7) years. In the event a service provider holding excess spectrum returns the excess spectrum, it shall be in the 900 MHz band if the service provider is holding the same. The service provider will still be liable to pay the additional one-time charges at the current price for a minimum period of three (3) years.

3.99 Accordingly, **the Authority recommends that all the service providers having spectrum beyond the contracted quantum should pay excess spectrum charges at the Current price, pro-rated for the period of the remaining validity of their licence subject to a minimum of seven years. Service providers returning the excess spectrum shall be liable to**

return the 900 MHz spectrum if any and also pay the additional one-time charges at the Current price for a minimum period of three years.

3.100 The next question is whether the entire excess spectrum should be charged at a uniform rate. It is a matter of common knowledge that spectrum for cellular licensees has been given in stages. And the additional spectrum was given based on the subscriber linked criteria. As a result, based on their subscriber base, the licensees are having different amount of spectrum. It is now being recommended that the licensees having spectrum above the contracted limit will have to pay a onetime charge pro-rated for the period of the remaining validity of their license. One may argue that as the relationship between the incremental amount of spectrum and the capacity of the network to carry additional traffic is non-linear i.e. the traffic increases in a greater proportion than the proportion of increase in spectrum therefore, to mandate each of them to pay one time charge at the same rate/MHz, irrespective of the amount of holding may not be justified. With higher amount of spectrum, the Capex saving per MHz is far higher and therefore, the rate of one time charges should also be linked to the spectrum holding.

3.101 The Authority studied the amount of Capex saved in case of upgradation of network from 6.2 MHz to 8 MHz and 8 MHz to 10 MHz**. (Annexure XXII).** It is seen from the calculations that the additional expenditure which an operator is required to incur in case it is not allocated spectrum beyond 8 MHz is 1.3 times the expenditure required in case it is not given spectrum from 6.2 to 8 MHz.

3.102 **Accordingly, the Authority recommends that the excess spectrum beyond 8 MHz would be charged at 1.3 times the current price.**

3.103 The excess spectrum held by the service providers is not necessarily in one band. Some service providers have excess spectrum in both 900 and 1800 MHz bands. The Authority is of the view that excess spectrum in 900 MHz band should be charged at 1.5 times that of excess spectrum in 1800 MHz band, as per the current price recommended earlier for this band. It will equally apply in cases of 800 MHz band, if any.

For example, if a service provider has 10 MHz, with 8 MHz in 900 MHz band and 2 MHz in 1800 MHz band, it will be required to pay the value for 1.8 MHz of 900 MHz and 2 MHz of 1800 MHz.

3.104 **The Authority recommends that excess spectrum in 900 MHz band should be charged at 1.5 times that of excess spectrum in 1800 MHz band. It will equally apply in cases of 800 MHz band, if any.**

3.105 It may be recalled that in Chapter–II, the Authority has examined in detail the issue of contracted spectrum and has concluded definitively that the UAS licences provide for a contracted spectrum of 6.2MHz /5 MHz (GSM/CDMA). In Para 3.81, it has also been recommended that pending a further study by TRAI that the 3G price may be taken as the current price of 2G spectrum. During the consultation process, a concern was expressed whether allocation of additional 1.8 MHz of spectrum without any additional charges to those not having the contracted spectrum (since the licence comes bundled with 6.2 MHz for Rs.1659 crore) would not result in a loss of revenue to the Government to the tune of Rs.10000 crore. This figure was

apparently calculated on the basis of the base price of 3G spectrum, since the 3G/BWA auction was not initiated at that time. Now that the price as on 8.5.2010 is over Rs. 12000 crore (pan-India), this perceived loss would be of the order of Rs. 35000 crore.

3.106 The Authority has examined this issue carefully. It must be pointed out that the grant of licences at Rs. 1659 crore (pan-India) was a matter of policy. The guidelines for the grant of Unified Access Services Licences issued in the year 2003 clearly stipulate that the licence fee, service area, roll out obligations and performance bank guarantee under the unified access services licence will be the same as for the fourth cellular mobile service providers (CMSPs) licence. These guidelines were never modified subsequently and licences were issued on this basis only in November 2003, January 2004, December 2006 and March 2007. All these licenses were issued on the basis of the service area-wise entry fee corresponding to Rs. 1659 crore (pan-India). Licences were also similarly issued in January 2008. It must be noted that the decision to award licences at Rs. 1659 crore is essentially a policy decision. While revenue generation is no doubt significant, NTP-99 underlines the need for providing Telecom services at affordable rates. That the low telecom tariffs in this country have fuelled the rapid growth of telecom services in the country, and have helped different sections of society to access these services, is widely acknowledged. While the contribution of low entry fee to this phenomenon is a matter of judgement, its role cannot be denied. Otherwise, it can be held that the entire spectrum allocation from the year 2002 was below the market price and that the differential amounts should be recovered from the service providers with retrospective effect. Indeed, it even goes beyond

2002. For, the initial licences provided for an allocation of only 4.4 MHz of GSM spectrum whereas the later licences provided upto 6.2 MHz. On the other hand, licensees had, over the years, received upto 10MHz and some even 12.4 MHz of spectrum without payment of any additional one-time charges. The value of such spectrum given over the years would run into tens of thousands of crores, if it were to be valued at the then market prices, which in the absence of a definite reference price, has to be inferred. Again, this has to be seen in the context of the benefits that the society has reaped from the telecom services. It is noteworthy that this issue was barely raised all these years.

3.107 The value of spectrum currently realised through the 3G auction process, and being recommended as the 'current price' of spectrum, is far higher than the earlier adopted price. The assignment of spectrum beyond the initial spectrum and upto the contracted limit, arising from the licence, would not bring any additional revenue to the Government. The amount of spectrum involved is of the order of 293.4 MHz of GSM spectrum and 160 MHz of CDMA spectrum, in all the service areas put together. This involves licences from the year 2001 onwards. While this amount of spectrum is not even available at this stage, the fact remains that the service providers are liable to be given upto the contracted spectrum as and when it is available, subject to their fulfilling other criteria. Licence being in the nature of contract between the licensor and the licensee, the licensees already has entitlement for the contracted spectrum.

3.108 The licence conditions provide that Government has the right to modify the licence conditions at any time. Clause 5 of the licence conditions rates as follows:

"5. <u>Modifications in the terms and conditions of licence</u>

5.1 the LICENSOR reserves the right to modify at any time the terms and conditions of the licence, if in the opinion of the LICENSOR it is necessary or expedient to do so in public interest or in the interest of security of the state or for the proper conduct of the telegraphs. The decision of the licensor shall be final and binding in this regard."

3.109 This is, therefore, an issue on which the Government has to take a well considered policy decision. If the Government decides to amend the licence conditions, then in the interest of level playing field and equity, the desirability and feasibility of collecting, with retrospective effect, the spectrum charges from all service providers who have received spectrum beyond a specified limit should equally be considered. All this has to be then viewed in the context of the need for orderly growth of the Telecom sector.

Spectrum Usage Charges

3.110 In response to the question raised in the consultation paper regarding the desirability of uniform spectrum charges irrespective of the quantum and technology, the responses of the stakeholders were mainly on two distinct lines.

3.111 Most of the service providers having spectrum more than the contracted spectrum, were of the opinion that it is desirable to have a uniform spectrum usage charges irrespective of the amount of spectrum held by the operator. One operator opined that once a block of spectrum is auctioned at a price that is determined by the market, there should not be any further spectrum charges for use of that spectrum for the specified tenure. However, if any minimal spectrum charge is to be levied at all, it should be a fixed uniform charge irrespective of quantum because the initial price for the block has already been paid for

the spectrum in any case. One of the operators while favouring uniform spectrum usage charges mentioned that deployment of GSM network in the 1800 MHz band involves higher Capex & Opex. Therefore, every operator who has been granted GSM frequencies up to 6.2 + 6.2 MHz in 1800 MHz band should be rewarded an exemption of 1% in Spectrum usage charges. Another operator suggested that if the Government agrees to allow spectrum trading, spectrum sharing and an open M&A regime, then there should be a case for moving to a uniform annual spectrum charge percentage. However, in the event that an open trading / sharing / M&A regime is not introduced, there is no case for changing from present escalating spectrum charge regime. Few stakeholders were of the opinion that if spectrum usage charges are made uniform, then all those currently paying higher charges may be given the choice to migrate to the flat charge regime in return for the payment of a onetime upfront fee. These stakeholders have further mentioned that in the absence of a benchmark market price for 2G spectrum, this one-time upfront fee may be benchmarked to the auction price of 3G spectrum. However, this may be reviewed once an actual market benchmark is available for 2G spectrum.

3.112 Those who did not favour uniform spectrum charges opined that the current policy of escalating spectrum charges for higher allocation of spectrum was adopted to discourage substitution of physical infrastructure by spectrum when spectrum is assigned based on administratively determined subscriber thresholds. Uniform spectrum charges will create inefficient utilization of spectrum by those operators who already have additional spectrum beyond 2x6.2 MHz free of charge. A move to levy uniform flat fee will result in the Government losing substantial

revenue over the next couple of years and huge benefit of regulatory cost savings for the incumbent operators. This will result in the killing of competition and driving new entrants out of the market within a couple of years of issuing new licenses. These operators have suggested that the spectrum usage charges beyond 2x6.2 MHz should be steeply increased so that scarce spectrum is utilized efficiently.

3.113 In the existing 2G licensing framework the annual Spectrum usage charges are payable as a percentage of AGR on a quarterly basis. Before 31st March, 2010 the annual spectrum usage charges as a percentage of AGR were as shown in Col. A of the Table below. The Authority in its recommendations on "Review of license terms and conditions and capping of number of access providers" dated 28th August, 2007 had recommended revision of annual spectrum usages charges (Col. B). In July 2008, DoT proposed certain modifications. (Col. C). In its response dated 16th July, 2008, the Authority concurred with the DoT's proposal with minor modifications. Accordingly, DoT vide their Order dated 25th February 2010, revised the annual spectrum usage charges for GSM & CDMA spectrum applicable wef 1st April, 2010 (Table3.9).

Amount of spectrum	A	B	C
Upto 2 x 4.4 MHz/2 x 2.5 MHz	2	2	3
Upto2 x 6.2 MHz/ *	3	3	4
Upto 2 x 8 MHz	4	4	5
Upto 2 x 10 MHz	4	5	6
Upto 2 x 12.5 MHz	5	6	7
Upto 2 x 15 MHz	6	7	8
Beyond 2 x 15 MHz		8	9

* In the TRAI's recommendations 2 x 6.25 MHz for CDMA was recommended

Table 3.8

Amount of Spectrum (MHz)		Spectrum charges as a Percentage (%) of AGR
GSM	**CDMA**	
Upto 2x4.4	Upto 2 x5MHz	3
Upto 2x6.2	Upto 2 x6.25	4
Upto 2x8.2	Upto 2x 7.5	5
Upto 2x10.2	Upto 2x10	6
Upto 2x12.2	Upto 2x12.5	7
Upto 2x15.2	Upto 2x15	8

Table 3.9

3.114 There has been a demand from the industry that the taxes and levies are high and that they need to be reduced. In so far as taxes are concerned, they are essentially corporate tax, service tax and sales tax, the last of which is levied by the State Governments. The rates of corporate tax and service tax are determined as part of the overall tax policy of the Government and are not telecom industry specific. In view of this, the Authority does not feel it appropriate to go into the correctness or otherwise of this segment of taxes. On the other hand, the charges levied by the Department of Telecommunications are the licence fee and the spectrum usage charges, both of which are levied as percentage of the AGR. As regards the licence fee, this Authority had already indicated that it should be made uniform in order to eliminate the chance of arbitrage.

3.115 The Authority has examined the various suggestions received in respect of the spectrum usage charges. A strong argument was made out that they should be made uniform and that the charges must be only 3% of the AGR. The Authority however does not agree with this proposal for two reasons. Firstly, a number of operators currently have only 4.4 MHz of GSM spectrum, as can be seen from **Annexure VIII**. Till 31.3.2010, the spectrum usage

charges for this category were only 2%. Increasing charges by 1% would mean an additional burden on such service providers particularly when, owing to the number of new operators launching their services, the ARPUs are falling. One could argue that in a situation where the overall AGR of various players in the field is falling, Government would only resort to increase in the rates of spectrum usage charges, so as to maintain/increase the revenue that accrues to the Government. The Authority had already indicated that while revenue to the Government is an important aspect, it need not be and should not be the sole consideration in the determination of the spectrum usage charges. On the other hand, the spectrum usage charge is an instrument that can be used effectively to achieve multiple objectives including Government revenue.

3.116 The Authority is of the opinion that insofar as spectrum up to the contracted level is concerned, it should be made available to the operator at reasonably low cost, which is why the level of Rs. 1659 crore was maintained over the years. It is necessary to maintain the spectrum usage charges at the level that was operating before 31.3.2010. The second reason why the Authority does not favour uniform spectrum charges is because it disturbs the level playing field between new operators and the other operators. While it brings down the spectrum usage charge rates for the bigger operators, it has the effect of simultaneously enhancing the charges for the smaller operators who are already suffering from lack of adequate spectrum and who also have to compete as new entrants in a market that is increasingly becoming difficult to penetrate.

3.117 **Accordingly, the Authority does not favour the levy of uniform spectrum charges. The Authority, on the other hand, favours a continuation of the differential spectrum usage charges, with the operators having larger spectrum paying a higher percentage as compared to those with lesser spectrum.**

3.118 The Second Committee had recommended that *"Uniform spectrum usage charges should be prescribed irrespective of the quantity of spectrum held and the technology, except for UAS/CMTS licensees who opt not to pay an upfront fee for spectrum assigned to them beyond 6.2+6.2 MHz in an LSA prior to 17.1.2008. Such licensees who do not opt to pay the upfront fee will continue to pay at the higher escalating rates currently applicable. This uniform rate should be 3% of AGR per annum."*

3.119 The Authority does not agree with the recommendation of the Second Committee on prescribing uniform spectrum usage charges, in view of the reasons given in Paras 3.116 and 3.116.

3.120 The Authority has examined the quantum of spectrum usage charges to be levied and is of the opinion that the spectrum usage charges should be maintained at a relatively low level for spectrum up to 6.2 MHz. Beyond this however, the operator starts attaining efficiencies because of additional spectrum and, therefore, the charges could be levied at a higher percentage. In the current context, although the jump in the spectrum holding is from 6.2 MHz to 8 MHz-i.e. an increase of 1.8 MHz, the increase in terms of percentage of spectrum usage charges is only 1% i.e. from 4 to 5%. The Authority is of the opinion that spectrum usage charges should reflect a certain equity. Accordingly, the Authority proposes that the charges be in the rate of 0.5% for every MHz up to the contracted spectrum and at the rate of 1% for every MHz in respect of spectrum beyond the contracted quantity. This would

be applicable irrespective of CDMA/GSM spectrum. The Authority would however like the spectrum usage charges to be capped at 10 % in respect of GSM and 7 % in respect of CDMA. Resultantly, the spectrum usage charges would be as follows:

Proposed Spectrum Usage Charges			
GSM		CDMA	
Amount of spectrum (in MHz)	Charge as % of AGR	Amount of spectrum (in MHz)	Charge as % of AGR
4.4	2.2	2.5	1.25
6.2	3.1	3.75	1.9
8	4.9	5	2.5
10	6.9	6.25	3.75
12.4	9.3	8.75	6.25
14.4	10	10	7

Table 3.10

3.121 The Authority has examined the revenue implications of this methodology and finds that there would be a net additional benefit to the Government revenues even though this is not the primary aim of this exercise which is more to establish a level playing field among all the players and also encouraging the service providers to adopt methods to achieve greater spectral efficiency so as to promote the overall effective utilisation of available spectrum.

3.122 **Accordingly, the Authority recommends that spectrum usage charges, both for GSM and CDMA spectrum, should be at the rate of 0.5% for every MHz up to the contracted spectrum and at the rate of 1% for every MHz in respect of spectrum beyond the contracted quantity, subject to a limit of 10% in respect of GSM and 7% in respect of CDMA. The Authority recommends that the changes effected on 25.2.2010 be suitably modified.**

3.123 Regarding the applicability of one time charge beyond the committed threshold, the Second Committee has recommended that " *In the case of additional spectrum assigned beyond 6.2 + 6.2 MHz in an LSA based on SLC after 17.1.2008 notification, the spectrum assigned should attract an upfront charge. This charge should be equal to the 3G auction price prorated per MHz and pro-rated for the period from the date of assignment. This charge should be paid within 2 months of price discovery."*

UAS/CMTS licensees who have obtained additional 2G spectrum beyond 6.2+6.2 MHz in an LSA prior to 17.1.2008 should be given the option of paying an upfront charge for the spectrum beyond 6.2+6.2 MHz, computed as above for the remaining period of spectrum assignment from the date when annual spectrum usage rates become uniform, or a subsequent date from which they exercise the option. If they exercise this option, the annual spectrum usage charges for the spectrum held should become 3% of AGR, instead of the higher rate being levied at present.

3.124 The Authority does not agree with the recommendations of the Second Committee on uniform spectrum usage rates in view of foregoing discussions.

Review of spectrum usage charges

3.125 In response to the question regarding the need to have a periodic review of the spectrum charges and the periodicity; the views of the stakeholders were divergent. Some stakeholders were in favour of periodic review of the spectrum charges with the period varying from one year to six years. Those who were not in favour of periodic review were of the opinion that while the benchmark/reserve price for the auction may be reviewed from time to time, depending upon market conditions, demand for and supply of spectrum, extent of competition, etc., the annual spectrum usage charges should be stable and predictable over the long term. Few mentioned that once the spectrum is auctioned, there should be little need to review the charges regularly as these

charges are only to recover the administrative expenses. One of the stakeholders mentioned that once judicially fixed(as percentage of AGR), it should continue to hold till the validity period of spectrum even if an operator acquires additional slots though market mechanism during the currency of original spectrum authorisation. Another stakeholder opined that in order to enable the operators to take informed business decisions and make huge capital investments in developing telecom infrastructure, there should be certainty of the levies payable by them towards license fee, one time spectrum charges, if any, and the annual spectrum usage charges.

3.126 The Telecom sector is a capital intensive market and a stable and a predictable charging regime is required for the operators to make informed business decisions. However, it is also a fact that we are entering a new development phase, in terms of technology, growth of new applications and the changing pattern of consumer usage. Therefore, it is of the view that a review of the spectrum usage charges will be required after two years.

3.127 **Accordingly, the Authority recommends that the spectrum usage charges will be reviewed after an interval of 2 years.**

Chapter IV: CONSOLIDATION OF SPECTRUM

Introduction:

4.1 The last 2-3 years have seen significant changes in the market since 2003-04. There are at present 12-14 players in the mobile telecom sector compared to the earlier average of 6-7 service providers in a licensed service area. The ARPUs as well as the tariffs have registered a significant decline. While on one hand, there has been a phenomenal growth in the number of subscribers and teledensity has crossed 50%, the telecommunication sector, especially the mobile service segment is also witnessing intense levels of competition, given the large number of service providers in each service area. As indicated before, the availability of spectrum is such that it can only be given to the service providers in limited quantity. The situation calls for measures which are a deviation from the present practices, in order to ensure a healthy growth of the sector. It is generally perceived that consolidation should be facilitated if not encouraged in the telecom sector, given the huge dependence of the sector on spectrum, which is a finite resource.

4.2 Greater competition in the market, global liberalisation, technological advancements, large investments and the greater sophistication in services demanded by customers - all suggest that size will increasingly be an advantage in the delivery of telecommunication services to the people. It is generally accepted that size facilitates cost reductions through economies of scale. It allows for greater resources to be put into technological development and diversification of services and products. In the

telecommunications market, the need for consolidation gets even more accentuated because of the dependence of the sector on radio frequencies, which as said earlier, is a finite resource. This limited resource gets further fragmented because of piecemeal holdings by a large number of licensees in a market. Such fragmentation leads not only to inefficient use of the natural resource but also increases the costs of provisioning of the services by necessitating increased expenditure on creation of infrastructure. Consolidation of spectrum, therefore, acquires significance from the point of view of optimal use of spectrum.

4.3 Consolidation in the Telecom Sector, particularly, in the use of spectrum, can be facilitated by –

a) Putting in place a policy framework which facilitates mergers and acquisitions in the sector resulting in better utilisation of the spectral resources along with other economic benefits while, at the same time, preventing possible abuse through market dominance;
b) Allowing service providers to enter into arrangements for transfer/sharing of spectrum amongst themselves so as to effectively utilise this resource and attain maximum spectral efficiency in the sector.

4.4 Recognising this need, the Authority, in the Consultation Paper dated 16.10.2009, emphasized the need for framing policy and regulations which facilitate consolidation and promote healthy competition in the market. The comments of stakeholders were sought on the impediments, if any, in the present policies and regulations relating to consolidation of spectrum through Mergers and Acquisitions, Spectrum Trading and Spectrum sharing. Suggestions were invited from the stakeholders on ways and

means of facilitating consolidation coupled with effective competition in the market.

4.5 This Chapter, accordingly, deals with issues of framing of an M&A policy framework, Spectrum sharing and Spectrum trading

A- Mergers & Acquisitions

4.6 Mergers and acquisitions are natural in a healthy economy. They play an important role in enhancing economic growth and help in establishing effective competition, attracting investments, enhancing efficiency, improving economies of scale and scope, promoting efficient utilization of resources and increasing affordability of services. While mergers and acquisitions are generally perceived to be beneficial both to the shareholders and to the consumers of a sector, the combining enterprises can, at times, wield substantial market power, can raise prices or reduce outputs, without due regard to consumers. Mergers and acquisitions involving dominant players in a sector could thus lead to monopolistic behaviour on the part of such players. Hence, there is need to have a merger and acquisition policy framework which even as it encourages M&A activities, market consolidation and effective competition prevents situations leading to market dominance and a concomitant abuse of such dominance.

Distinction between Mergers and Acquisitions

4.7 Merger and Amalgamation activities are primarily governed by the provisions of the Companies Act, 1956. Although they are often used interchangeably, as though they were synonymous, the terms “merger” and “acquisition” mean slightly different things. A

"merger" typically refers to a process by which two or more companies join together (usually through the exchange of shares) to become one single entity. An "acquisition", on the other hand, has one company – the buyer –purchasing the assets or shares of another - the seller. In the pure sense of the term, a "merger" happens when two companies, often of about the same size, agree to go forward as a single new company rather than remain separately owned and operated. This kind of action is more precisely referred to as a "merger of equals." Both companies' stocks are surrendered and new company stock is issued in its place. In contrast to this, when one company takes over another and clearly establishes itself as the new owner, the purchase would be called an "acquisition". A purchase deal will also be called a "merger" when both companies agree that joining together is in the best interest of both of their companies. But when a purchase deal is unfriendly, i.e., when the target company does not want to be purchased, it is always regarded as an "acquisition".

4.8 Regardless of their categorisation, all mergers and acquisitions have one common goal: they are all meant to create synergy that makes the value of the combined companies greater than the sum of the two parts. The success of a merger or acquisition depends on whether this synergy is achieved. In many cases, mergers and acquisitions are driven by key trends within a given industry, such as rapidly changing technology, increasing competition, changing consumer preferences, the pressure to control costs, etc.

4.9 Where the increased synergy which results from an M&A activity leads to market consolidation, reduction of costs and effective

competition in the market, both the processes may lead to improved economic efficiency and resultant benefits to the consumers. Thus, it becomes necessary for both the Government and the sectoral regulators to ensure that the M&A regulatory regime in each sector of the economy is conducive to such market consolidation and effective competition.

Review of present M&A scenario in the sector

4.10 The Authority is conscious of the fact that the telecom sector in India has not witnessed significant M&A activity during the past several years. The issue of mergers and acquisitions figured in the recommendations of the Authority dated 27.10.2003 on Unified Licensing Regime. The Authority had, in the said recommendations, expressed the view that a sustainable market structure should be allowed to consolidate so as to achieve higher growth through efficient utilization of resources and hence, intra-circle Merger and Acquisition should be permitted subject to guidelines on Merger & Acquisitions.

4.11 This was followed by detailed recommendations of the TRAI dated 30th January, 2004 on 'Intra-Circle Mergers and Acquisition Guidelines'. The Authority had, in these recommendations, indicated that, internationally, the important issue for consideration at the time of approving M&A is not the dominance of resultant entity in the market but the likely abuse of its market power. Noting that the mobile and fixed markets were not perfect demand substitutes of each other, as the usage profile and requirements of the two sets of consumers/users were not the same, the Authority had recommended that the intra circle access market be classified as 'Fixed' and 'Mobile', wherein Mobile includes all mobility including WLL (M). As regards assessment of

market share, the Authority had then expressed the view that if market share was defined on the basis of revenues, then, despite having lower subscribers, an operator might have higher market share on account of higher ARPU and had, accordingly, recommended that subscriber numbers should be the preferred criterion to compute the market shares. In order to prevent concentration of market power, the Authority recommended that M&A should not be allowed if it leads to less than three operators in the market. Further, taking note of the fact that, internationally, the spectrum of the acquired entity is retained with the merged firm and that the merger of spectrum is one of the important factors for triggering M&A, the Authority recommended that the maximum spectrum that could be held by a Resultant entity should be capped at 15 MHz per operator per service area for Metros & Category 'A' Circles and 12.4 MHz per operator per service area in Category 'B' and Category 'C' Circles. The Authority also recommended that all telecom mergers ought to be notified to TRAI and that the resultant entity should obtain the approval of the Licensor for the proposed merger. It was also indicated that TRAI reserves a right to intervene or enquire into expected or completed mergers.

4.12 On 21st February 2004, the Department of Telecommunications issued Guidelines for intra service area Merger of Cellular Mobile Telephone Service (CMTS)/Unified Access Services (UAS) Licences. In the said Guidelines for ascertaining the monopoly of resultant entity, the market was classified as fixed and mobile separately with subscriber base as the criteria for computing the market share. The monopoly market situation was defined as market share of 67% or above of subscribers within a given service area. For fixed subscribers, Exchange Data Records was

to be taken into account, while for the mobile subscribers, the subscriber figure, as per the Home Location Register (HLR) and Exchange Data Record was to be taken into account in a given Service Area. Intra-service area merger and acquisition was allowed if there were no less than three operators providing access services in a service area. On the limit on spectrum holding, the resultant entity was 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.

4.13 Government had, in April, 2007, again sought recommendations of TRAI on the review of the terms and conditions of licenses of access providers including the guidelines dated 21.02.2004 on merger and acquisitions. In August 2007, TRAI recommended, inter alia, that the service market should be treated separately as wire line and wireless services. It recommended that there should be at least four operators in each service area post-merger and that the market share of resultant entity in the relevant market should not be greater than 40% either in terms of subscriber base or in terms of Adjusted Gross Revenue. For determination of market power, market share of both subscriber base and adjusted gross revenue of licensee in the relevant market shall be considered. On the merger of the two licenses, the licence fee and the Spectrum usage charges were recommended to be charged on the resultant total AGR. The Department of Telecommunications thereafter issued guidelines on 22nd April, 2008 for intra-service area merger of CMTS and UAS licences. **(Annexure-XXIII).**

4.14 In the consultation paper issued on 16th October 2009, stakeholders were requested to comment on the existing licence conditions and guidelines related to M&A in the Telecom sector. There were also requested to respond to queries on various provisions of the existing guidelines on M&A. Most of the stakeholders have commented that the present M&A guidelines are not very conducive for M&A activities in the sector. They also commented that presently, the total number of CMTS/UAS Licenses in a service area range from 12 to 14. Since the number of operators present in the market is large, there is a need to review the M&A guidelines as the operators will have comparatively smaller market shares now, compared to the time when the present M&A guidelines were framed. The stakeholders mentioned that looking at the prevailing market conditions, the consolidation in the telecom sector should be encouraged. A few stakeholders also mentioned that after issuance of the present M&A guidelines, no M&A activity has taken place. One of the stakeholders opined that fewer, healthy competitors are likely to be better for consumers than large number of operators who are unable to build sufficient economies of scale to compete in the long run. Some of these stakeholders also mentioned that the existing M&A conditions are extremely stringent especially with respect to the spectrum retained by the resultant entity and suggested an alternative framework for facilitating/encouraging M&A with relaxed norms in respect of maximum permissible spectrum with the resultant entities, market share of the resultant entity, lock-in period and minimum number of service providers post merger. Suggestions regarding maximum permissible spectrum with the resultant entities, market share of

the resultant entity, minimum number of service providers post merger, lock-in period are discussed subsequently.

4.15 A few stakeholders had a different opinion on the issue. In their view, the existing guidelines on M&A do not restrict the consolidation in telecom sector and there is no need to change the existing license terms in this respect. Their view is that the M&A guidelines have been framed by Government after due consultation and deliberation, keeping in mind the long term growth objectives of telecom sector, development of infrastructure, consumer interests and proper conduct of telegraphs. One of the stakeholders recommended no change in the present licensing conditions and guidelines including lock-in period clause in UASL agreement but suggested that the subscriber base criteria should be done away with. Another stakeholder suggested that TRAI had earlier issued its recommendations on M&A in 2007. Therefore, before reviewing the present M&A guidelines, it should first examine whether its earlier recommendations have been complied with and whether its beneficiaries have discharged their obligations.

4.16 The Authority recognises that in the renewed competitive setup, it is necessary to ensure that the regulatory framework regarding M&A is so designed as to facilitate market consolidation. It has to be borne in mind that effective competition can exist only when there are sufficient numbers of competent and effective players in a market. It is only the number of such players in the market which decides the level of competition or the effectiveness of competition in the market. Thus, it becomes necessary to ensure that the M&A framework in the telecom sector leads towards improved competition benefiting the consumers and also

ensuring, at the same time, that no resultant entity gains dominance in the market. The concepts of "significant market power" and "dominance in the market" would accordingly require to be appreciated properly with a view to framing appropriate new guidelines.

4.17 In this context, the Authority had examined in depth the various clauses in the present guidelines on M&A and based on available evidence, comments of stakeholders, international best practices, and dynamics of telecom sector and in the light of current legal environment in general.

4.18 The first three clauses in the existing guidelines of 22.4.2008 are as below:

> 1. *Prior approval of the Department of Telecommunications shall be necessary for merger of the licence.*
>
> *2. Merger of licences shall be restricted to the same service area.*
>
> *3. Merger of licence(s) shall be permitted in the following category of licences:*
>
> *(i) Cellular Mobile Telephone Service (CMTS) Licence with Cellular Mobile Telephone Service (CMTS) Licence;*
>
> *(ii) Unified Access Services Licence (UASL) with Unified Access Services Licence (UASL);*
>
> *(iii) Cellular Mobile Telephone Service (CMTS) Licence with Unified Access Services Licence (UASL);*
>
> *Merged* licences *in all the categories above shall be in UASL category only*.

4.19 During the consultation process, no comments were received from any stakeholders on these clauses. Regarding the categories of licensees who can merge, the Authority is also recommending a

Unified licensing regime for the future. Therefore, the Authority recommends the following:

- **Prior approval of the Licensor shall be necessary for merger of the licence.**
- **Merger of licences shall be restricted to the same service area.**
- **Merger of licence(s) shall be permitted in the following category of licences:(i) Cellular Mobile Telephone Service (CMTS) Licence with Cellular Mobile Telephone Service (CMTS) Licence; (ii) Unified Access Services Licence (UASL) with Unified Access Services Licence (UASL); (iii) Cellular Mobile Telephone Service (CMTS) Licence with Unified Access Services Licence (UASL); and (iv) Unified licence with Unified licence.**
- **Merged licences in all the categories above shall be in UASL category only. In case of Unified licences, this shall not apply.**

4.20 Clauses 4 to 8:

4. *The relevant service market be defined as wire line and wireless services. Wireless service market shall include fixed wireless as well.*
5. *Exchange Data Records (EDR) shall be used in the calculation of wireline subscribers and specifically Visitor Location Register (VLR) data, in the calculation of wireless subscribers for the purpose of computing market share based on subscriber base.*
6. *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.*
7. *The duly audited Adjusted Gross Revenue shall be the basis of computing revenue based market share for operators in the relevant market.*

8. *The market share of resultant entity in the relevant market shall not be greater than 40% either in terms of subscriber base separately for wireless as well as wireline subscriber base or in terms of Adjusted Gross Revenue.*

4.21 On the issue of whether market share in terms of subscriber base/AGR should continue to regulate M&A activity in addition to the restriction on spectrum holding, a number of stakeholders were of the opinion that the market share in terms of subscriber base/AGR should continue to regulate M&A activity in addition to the restriction on spectrum holding in order to ensure fair competition. A few stakeholders suggested that market share in terms of subscriber base/AGR should not continue to regulate M&A activity. One of the suggestions was that the cap of 40% on the combined market share of the resultant entities in any circle, either in terms of subscriber base or in terms of adjusted gross revenue is an artificial barrier and its removal will help the industry consolidate. Another opinion was that minimum number of operators in a circle should be sufficient to ensure competitive levels in a market. Market share (volume or revenue) can be used as additional criteria when the minimum level is being reached.

4.22 In terms of limit on the share of the resultant entity, the suggestions ranged from 25% to 35% both in terms of AGR and the subscriber base. One stakeholder opined that having capped maximum spectrum holding at 25%, the present requirement that the resultant entity hold no more than 40% market share is unnecessary. Yet another suggestion was that the resultant/acquiring entity should be allowed to retain the entire spectrum subject to the overall spectrum cap of 25% of the total commercial spectrum assigned in a service area irrespective of technology mix and/or band deployed and subscriber base should be an adequate criterion for determining market share.

4.23 One stakeholder was of the view that multiple restrictions on M&A, especially if applied at circle-level, and as "hard" or "brightline" tests (as opposed to triggers for further inquiry) will raise significant barriers to rationalization of the industry and therefore impose costs on consumers. If a test based on market share is to be used at all, there should not be separate/additional tests on the basis of spectrum or number of competitors. A test related to market share is to be preferred as market share is more closely indicative of market power than spectrum which is merely one input into the mobile business. If hard tests are used, caution should be taken and test should be applied nationally rather than by circle, or at least applied at a more conservative level than 25% (for spectrum) or 40% (for market share).

4.24 Before reviewing the market share criteria, it is necessary to discuss the definition to the relevant market. 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.[34]

4.25 The Authority is of the opinion that in view of the exponential rise in the number of wireless subscribers and the fact that the growth in fixed line is negative, keeping fixed and mobile segment as separate relevant market is no longer necessary. Additionally, in view of the technological developments and imminent deployment of 3G and BWA technologies, measuring subscriber

[34] 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.

numbers based on different technologies will become increasingly difficult and cumbersome. **Therefore the Authority recommends that the relevant market for determining the market share will no longer be classified separately as 'Wire line' and 'Wireless'. It will be defined in future as the entire access market.**

4.26 Market share of operators in the relevant market is an important parameter 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 several dimensions of market share of operators that can be examined and analysed. These include market share in terms of Minutes of Usage (volume), market share in terms of revenue earned (Value of sale), market share in terms of subscriber base in the relevant service area. All these indicators of market shares provide the relative strength of market power of operators in the relevant market.

4.27 The present guidelines stipulate that for determination of market power, market share of both subscriber base and Adjusted Gross Revenue (AGR) of licensee in the relevant market shall be considered to decide the level of dominance for regulating the M&A activity. The market share of resultant entity in the relevant market shall not be greater than 40% either in terms of subscriber base separately for wireless as well as wireline subscriber base or in terms of Adjusted Gross Revenue. The duly audited Adjusted Gross Revenue shall be the basis of computing revenue based market share for operators in the relevant market. Exchange Data Records (EDR) shall be used in the calculation of wireline subscribers and specifically Visitor Location Register

(VLR) data, in the calculation of wireless subscribers for the purpose of computing market share based on subscriber base.

4.28 The Authority studied international best practices for assessment of market share and noted that market share may be assessed by Volume or value of sales. The appropriate measure varies between markets, although it is likely that the most appropriate measures will be volume i.e. the subscriber numbers and value i.e. the revenue earned. Where a firm has a higher market share by value than by volume, it may indicate that it can price above rivals due to market power.

4.29 The Authority noted that the method used to calculate market share may have a considerable impact. Generally, the share is calculated on the basis of the value generated by the operations performed by the undertaking in the market. Suppose market share has to be established on the market for Mobile services. The normal method is to see how much value each undertaking has obtained by selling its services. After establishing the total value obtained on the market, a division may be made to obtain the proportion of each undertaking. Another possibility is to look at the quantity of products sold, or the number of customers served, by an undertaking.

4.30 Guidelines of the European Commission on market analysis (2002) state 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.*"[35]

4.31 The Authority noted that there is considerable difference in percentage of market share assessed on subscriber base and AGR. It is necessary that the present criteria for assessment of market share based on subscriber and AGR may be examined and be aligned with the international best practices applied for assessment of market share.

4.32 It is noted that presently, there are on an average 10 operators in each of the circles and the market share of the largest operator is generally not more than 25-30% of the market share in majority of the licensed areas or on All India basis.

[35] European Commission Guidelines, 2002

Statement of Market share for the Quarter ending Dec-2009

Particulars	Gross Access Revenue for the Qtr ending Dec 2009 (Rs in Crore)	Total Subscribers as Dec 2009 (In Mn)	Market Share based on Gross Access Revenue	Market Share based on total subscribers
Aircel	1055.48	31.02	3.39%	5.52%
Bharti	8579.84	121.85	27.59%	21.67%
BSNL	5994.57	90.96	19.28%	16.18%
Etisalat	25.70	0.00	0.08%	0.00%
HFCL	33.19	0.51	0.11%	0.09%
Idea & Spice	3370.75	57.61	10.84%	10.25%
Loop	165.66	2.65	0.53%	0.47%
MTNL	1100.59	8.37	3.54%	1.49%
Reliance	3217.90	94.96	10.35%	16.89%
S -Tel	0.89	0.14	0.00%	0.02%
Sistema -Shyam	65.20	3.09	0.21%	0.55%
Tata	1958.88	58.43	6.30%	10.39%
Unitech	9.26	1.21	0.03%	0.22%
Vodafone	5521.61	91.40	17.75%	16.26%
Total	**31099.52**	**562.20**	**100%**	**100%**
Source: Operators' Data for the Qtr ending 31st Dec-2009				

Table 4.1

4.33 The Authority also carried-out market analysis of operators in all service areas, based on subscribers and Adjusted Gross Revenue, to identify market share of operators based on various parameters. The results are tabulated below:

Statement of Circle-wise Market share- based on total Access Subscribers

Circle	Market Share					Total Operators
	≤ 15%	≤ 20%	≤ 25%	≤ 30%	> 30%	
A P	7	1	-	1	-	9
Assam	4	2	-	2	-	8
Bihar	7	1	1	-	1	10
Delhi	6	3	1	-	-	10
Gujarat	3	4	-	-	1	8
Haryana	5	3	1	-	-	9
H P	6	-	1	1	1	9
J & K	5	-	1	1	1	8
Karanataka	8	1	-	-	1	10
Kerala	7	2	-	1	-	10
Kolkata	5	2	2	-	-	9
M P	3	1	2	1	-	7
Maharashtra	5	4	1	-	-	10
Mumbai	7	3	1	-	-	11
Orissa	6	1	1	1	-	9
Punjab	6	1	2	-	-	9
Tamilnadu	7	1	1	1	-	10
UP (E)	5	1	3	-	-	9
UP (W)	5	3	1	-	-	9
W B	6	1	1	1	-	9
N E	4	1	-	2	-	7
Rajasthan	6	1	1	1	-	9
Source : Operators' data and TRAI analysis						

Table 4.2

Statement of Circle-wise Market share -based on Adjusted Gross Access Revenue

Circle	Market Share					Total Operators
	≤ 15%	≤ 20%	≤ 25%	≤ 30%	> 30%	
A P	6	1	1	-	1	9
Assam	4	2	-	1	1	8
Bihar	7	2	-	-	1	10
Delhi	7	1	1	-	1	10
Gujarat	4	2	1	-	1	8
Haryana	6	2	-	-	1	9
H P	6	1	-	-	2	9
J & K	5	1	-	-	2	8
Karnataka	8	-	1	-	1	10
Kerala	7	1	1	-	1	10
Kolkata	6	-	1	2	-	9
M P	3	1	2	-	1	7
Maharashtra	6	2	1	1	-	10
Mumbai	8	1	1	1	-	11
Orissa	6	1	-	1	1	9
Punjab	6	1	-	1	1	9
Tamilnadu	6	2	-	2	-	10
UP (E)	6	-	1	2	-	9
UP (W)	6	1	1	1	-	9
W B	6	-	1	1	1	9
N E	4	-	-	2	1	7
Rajasthan	6	1	1	-	1	9
Source : Operators data' and TRAI analysis						

Table 4.3

4.34 Based on the comments of the stakeholders and the analysis of the market shares of the service providers and the fact that the Authority is also recommending that the minimum number of service providers should not be less than six in a service area, the Authority is of the view that the existing criteria of 40%

subscriber base and AGR, may lead to a situation where one operator would acquire a dominant position in the market with the possibility of the abuse of dominance. Therefore, the Authority is of the opinion that for the purpose of allowing any M&A activity, the existing criteria be reduced downwards**. Accordingly the Authority recommends that:**

- **For determination of market power, market share of both subscriber base and Adjusted Gross Revenue of licensee in the relevant market shall be considered.**
- **The market share of the Resultant entity in the relevant market shall not be greater than 30 % of the total subscriber base and/or the AGR in a licensed telecommunication service area.**
- **Exchange Data Records (EDR) shall be used in the calculation of wireline subscribers and Visitor Location Register (VLR) data, in the calculation of wireless subscribers for the purpose of computing market share based on subscriber base.**
- **The duly audited Adjusted Gross Revenue shall be the basis of computing revenue based market share for operators in the relevant market.**

4.35 Clause 9: *"No M&A activity shall be allowed if the number of UAS/CMTS access service providers reduces below four in the relevant market consequent upon such an M&A activity under consideration."*

4.36 Regarding minimum number of service providers post merger the different suggestions received by the Authority in the consultation process ranged from 4 including BSNL or MTNL to 6 operators in a service area. Some of the reasons given were that HHI index falls sharply till there are 5 operators in the market and

subsequently it flattens out. In view of this, there should be at-least 5 operators in the market. India today has more than ten operational license holders in each circle. It was opined that while the large number of operators has resulted in competition, the extent of consolidation in the next five years is not expected to be so rampant so as to drive the total number of operators to less than five.

4.37 In any market and more so in the Indian context, it will be undesirable that M&A activities result in the emergence of an overly dominant operator. Enhanced competition following the liberalisation of the telecom sector has brought benefits to the market. Ensuring the presence of sufficient number of competitive service providers in each service area and that they compete on an even keel is a key concern. Given that BSNL or MTNL will remain in every service area, offering both wireless and wire line services, it is potentially possible that only three private service providers will actually exist in a service area, if the minimum number of operators, post merger, is kept at four.

4.38 From economic efficiency point of view, the Herfindahl-Hirschman Index (HHI), is a commonly accepted measure of market concentration. The Authority has studied HHI data for the different service areas in 2001, 2004, 2007 and 2009. (Table 4.4)

HHI data in different service areas

City	Year							
	No. of Players	2001	No. of Players	2004	No. of Players	2007	No. of Players	2009
DELHI	3	0.47	6	0.22	6	0.18	8	0.17
MUMBAI	3	0.42	6	0.22	6	0.18	9	0.16
CHENNAI	2	0.50	6	0.20	6	0.20	Merged in TN	
KOLKATA	2	0.51	4	0.27	6	0.19	9	0.15
MH	2	0.52	6	0.21	6	0.17	8	0.17
GUJ	2	0.54	6	0.22	6	0.22	6	0.21
AP	2	0.50	6	0.19	6	0.19	8	0.18
KTK	2	0.51	6	0.22	6	0.24	9	0.21
TN	2	0.50	6	0.24	6	0.19	9	0.18
KERALA	2	0.51	5	0.21	6	0.17	9	0.16
PJB	2	1	6	0.28	7	0.19	7	0.17
HR	2	0.73	5	0.21	6	0.17	7	0.17
UP(W)	2	1	5	0.24	6	0.17	8	0.17
UP(E)	2	0.51	4	0.30	6	0.20	8	0.18
RAJ	2	0.65	6	0.23	7	0.19	8	0.20
MP	2	0.58	5	0.20	6	0.18	7	0.16
WB&A&N	1	1	5	0.27	7	0.18	9	0.18
HP	2	0.54	4	0.45	7	0.24	9	0.19
BIHAR	1	1	4	0.35	6	0.22	11	0.16
OR	1	1	5	0.36	6	0.21	10	0.16
ASSAM	1	1	2	0.51	4	0.24	7	0.22
NE	1	1	2	0.66	4	0.25	7	0.23
J&K	0		2	0.54	4	0.37	7	0.25

Table 4.4

4.39 Today, India has 12-14 license holders in each circle. While the large number of operators has resulted in increased competition, the rate of decrease of HHI (i.e. rate of increase of competitiveness of the market) in majority of the Metro, A and B service areas is

insignificant after 6-7 operators. Only in 'C' category service areas, where the teledensity is still low, there is reduction in HHI index beyond 6-7 operators. It is at this level that the competition level would be generally optimum and, thus, effective. Since beyond this level, generally, there is no considerable impact on the HHI number by the entry of more operators, any M&A activity which does not reduce the number of operators in the market below this number can be taken as not adverse to effective competition in the market.

4.40 **Accordingly, the Authority recommends that no M&A activity shall be allowed if the number of UAS/CMTS access service providers reduces below six in the relevant market consequent upon such an M&A activity under consideration.**

4.41 Clause 10:"*Consequent upon the Merger of licences in a service area, the post merger licensee entity shall be entitled to the total amount of spectrum held by the merging entities, subject to the condition that after merger, licensee shall meet, within a period of 3 months from date of approval of merger by the Licensor, the prevailing spectrum allocation criterion separately for GSM & CDMA technologies, as in case of any other UAS/CMTS licensee(s). In case of failure to meet the spectrum allocation criterion in the above mentioned period of 3 months, post merger Licensee shall surrender the excess spectrum, if any, failing which it may be treated as violation of terms & conditions of the licence agreement and action accordingly shall be taken. In addition, after the expiry of above mentioned period of 3 months, the applicable rate of spectrum charge shall be doubled every 3 months in case of excess spectrum held by post merger licensee. Further, the spectrum transfer charge, as may be specified by the Government, shall be payable within the prescribed period".*

4.42 Almost all stakeholders were of the view that there should be a maximum limit on the amount of spectrum which a resultant entity can hold. However, on the issue of quantum of the maximum limit there were different opinions. One of the

suggestions received by the Authority was that the resultant entity should not hold spectrum more than 25% of the total assigned spectrum, irrespective of technology mix and / or spectrum band deployed. Another suggestion was that if the Resultant entity exceeds this limit, it may be allowed to trade / share this spectrum with other operators especially if they have either paid the market discovered charges. Some stakeholders suggested that the resultant entity may be allowed to have 2x12.4 MHz for GSM and 2x10MHz for CDMA spectrum after merger which is the contracted spectrum of two resultant entities. One stakeholder submitted that operators having spectrum more than this should surrender excess spectrum within 3 months of merger. Another view was that out of this cap not more than 2x6.2 MHz should be in 900 MHz spectrum band.

4.43 Another stakeholder was of the view that licensees who have spectrum but no customers, should be allowed to surrender spectrum, if they wish, against refund of 70% of Entry Fee without interest, and their guarantees released, to enable the Government to put the surrendered spectrum to better use. One suggestion was that spectrum should be subjected to the limits prescribed for holding the maximum spectrum by a licensee in a service area. Another stakeholder while suggesting a limit of 15 MHz for GSM spectrum and 10 MHz for CDMA spectrum mentioned that the consolidated subscriber base after merger should determine the quantum of spectrum to be held by the new entity. There was also a suggestion that if a hard cap is to be imposed, this should not prevent M&A, but instead give rise to a condition that spectrum in excess of the cap must be disposed of within a reasonable period of time, say 12-24 months. Any cap

must be set in the context of the spectrum holdings of efficient international operators.

4.44 As decided earlier (Chapter III), the Authority is recommending a limit of 8 MHz of spectrum in GSM technology and 5 MHz in CDMA for whole of the country except Delhi and Mumbai where the limit is 10 MHz in GSM and 6.25 MHz in CDMA as maximum spectrum which can be assigned to an operator by the Government. Moreover, the minimum amount of spectrum with an existing service provider today is 4.4/2.5 MHz. Currently, service providers generally hold between 4.4 MHz to 10 MHz of GSM spectrum and 2.5 to 5 MHz of CDMA spectrum. The Authority would like to ensure that the ceiling on the maximum holding does not act as a barrier for merger. Keeping this as well as the prescribed limit for assignment of spectrum in view, **the Authority recommends that consequent upon the Merger of licences in a service area, the total spectrum held by the post merger Resultant entity shall not exceed 14.4 MHz for GSM technology. In respect of CDMA technology, the ceiling will be 10 MHz.**

Clause11: "*On merger, spectrum enhancement charge shall also be charged as applicable in case of any other UAS/CMTS licensee".*

4.45 The issue relating to the need and the amount of transfer charge in case of merger of two licensees was raised in the consultation paper. In response, most of the stakeholders were of the view that there should be a transfer charge on spectrum upon M&A. However, the modality and quantum of transfer charges varied across different stakeholders. Many stakeholders submitted that in case spectrum is acquired through market process, no transfer charges should be made applicable. Some stakeholders opined

that the transfer charges should not be levied on the spectrum upto 6.2 + 6.2 MHz, allotted ancillary to the UAS license, however, it should be imposed on the spectrum beyond 6.2 + 6.2 MHz awarded through an administrative process. There should not be any merger charges for companies who have only contracted spectrum upto 2x6.2 MHz. Few stakeholders also submitted that no distinction should be made in treatment of application of transfer charge whether the spectrum is acquired though auction or through Government assignment, and all the cases of spectrum transfer should attract Transfer Charges. This will ensure that spectrum is not misused and all operators have incentive to deploy most efficient techniques for spectrum utilization.

4.46 Another suggestion received from some stakeholders was that there should not be any transfer charges on spectrum upon M&A because the one time spectrum charges has already been paid by the licensee and recurring charges based on certain percentage of AGR will be paid by the new entity. Only change of title is taking place. If felt necessary, certain administrative charges may be levied, but it should not be very high. The stakeholders mentioned that there should be no transfer charge on spectrum upon Merger & Acquisition on the back of strict roll out obligations and restrictions on market share, AGR and maximum spectrum that can be held by the resultant entity. The regulation should be the same in case of M&A and trading and sharing of the spectrum. In addition, globally, no transfer charges are imposed on the M&A transactions in the telecom industry and there are no separate restrictions for M&A transactions besides the competition commission regulations.

4.47 On the issue of the amount of transfer charge, different views were expressed. One view was that the transfer charges in case of pan-India or on a large scale (e.g. more than 50% of circles) should have some discount or lesser rates/quantum than on individual or circle based charges. Another view was that a baseline should be established for the market price of spectrum (e.g. 3G auctions). The transfer charge should be set at market price less cumulative payments already made for the relevant block of spectrum in those circles.

4.48 One suggestion was that the transfer charges are effectively taxes on windfall gains; they should be set at a level which ensures that the tax does not present a significant barrier to consolidation of the industry eg 30%. Discount on transfer charges (Say 20%) for 2 years can be considered. Some stakeholders suggested that Transfer charges should be imposed on the spectrum beyond 2X6.2 MHz in GSM / 2 x 5 MHz in CDMA. The spectrum usage charges may be levied on the lesser of the spectrum holdings of the merging entities.

4.49 On the issue of whether each time the M&A should attract the transfer charge, a number of stakeholders were of the view that the transfer charges should be levied only once and should only apply on traded / transferred / shared spectrum which has not been acquired through market process. One of the stakeholders opined that if the charges are designed to address windfall gains and as a one-off adjustment to bring spectrum which has been acquired at "below market rates" into the market system, it inevitably follows that transfer charges should be one-time only. Another stakeholder suggested that transfer Charge should be a one-time levy only for the first such transfer /merger, and only

when spectrum has been assigned without an upfront charge and it should be under Rs. 100 crore per 1 MHz combined for all 22 Service Areas.

4.50 Few stakeholders opined that the prescribed transfer charges should be applicable each time an M&A takes place. One of the stakeholders mentioned that this Transfer Charge should apply on each incident of M&A (i.e. transfer of spectrum) and no distinction should be made in treatment of application of transfer charge whether the spectrum is acquired though auction or through Government assignment, and all the cases of spectrum transfer should attract Transfer Charges. This will ensure that spectrum is not misused and all operators have incentive to deploy most efficient techniques for spectrum utilization. A stakeholder suggested that spectrum transfer should be considered analogous to property transfer and as Duty is paid to Government every time property changes hand, similar should be the case in spectrum transfer.

4.51 The Authority is of the view that the service providers have been given spectrum upto the contracted quantity at less than market price, so as to promote healthy growth in the sector, faster telecom penetration and availabilty of this basic facility to all. Now, if two service providers decide to merge to take advantage of economy of scale and to acquire larger share of the market, the Government is entitled to get the market price of the spectrum which was earlier given at a price lower than the market price. It is separately recommending that all licensees having spectrum beyond the contracted spectrum will have to pay the current price for the spectrum. Therefore, whenever a merger/acquisition takes place between two licensees, the Resultant entity will be entitled

to only one block of 6.2MHz/5MHz (GSM/CDMA) at the original Entry Fee and for the rest, either of the merging parties will have to pay the 'Current price', duly deducting the contracted price already paid. If one of the merging entities has paid the current price for some spectrum held in excess of the contracted spectrum, that segment of the spectrum will not be considered for purpose of payment.

***Example**: In circle of 'A' category, if operator 'X' with 8 MHz has merged with operator 'Y' having 4.4MHz, the Resultant entity could be 'X or 'Y' or a totally new entity 'Z'. Either way, the Resultant entity is entitled to only one block of 6.2 MHz for the entry fee paid. The balance spectrum must be paid for at the Current price. If 'X' has already paid for the 1.8 MHz that was in excess of the contracted spectrum, the amount of spectrum for which payment is to be made would be (8+4.4 =12 .4) -(6.2+1.8 =8)= 4.4 MHz. And the sum to be paid will be 4.4MHz X current price/MHz of that service area- Entry fee originally paid for the service area. Otherwise, the amount of spectrum for which payment will have to be made will be (8+4.4=12.4)-(6.2) =6.2MHz*

4.52 In addition, the Resultant entity will also pay a spectrum transfer charge @ 5% of the difference between the transaction price and the total spectrum price.

***Example**: If the transaction price in the above case is Rs. 2000 crore, and the current price of spectrum is Rs.1500 crore, the spectrum transfer charge shall be 5% of the balance Rs. 500 crore, i.e. Rs.25 crore.*

4.53 Accordingly, the **Authority recommends that as the resultant entity is entitled to only one block of 6.2 MHz/ 5MHz for the Entry fee paid, the either of the parties tothe merger should pay the Spectrum price i.e. the difference between the Current price and the sum already paid, before permission for merger is granted.**

4.54 **It also recommends that the spectrum transfer charge, @5% of the difference between the transaction price and the total current price, shall be payable before permission is granted.**

4.55 Clause 12: *"Discretion to choose the band to surrender the spectrum beyond the ceiling will be of the new entity".* The Authority would suggest that this clause be slightly amended to read as follows: **If, as a result of the merger, the total spectrum held by the resultant entity is beyond the limits prescribed, the excess spectrum must be surrendered. Discretion to choose the band to surrender the spectrum beyond the ceiling will be of the resultant entity.**

4.56 Clause 13: *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 licensees before issue of the permission for merger of licences.*

4.57 Clause 14: "In case consequent to merger of licences in a service *area, the licensee becomes a "Significant Market Power" (SMP) post merger, then the extant rules & regulations applicable to SMPs would also apply to the resultant entity".*

4.58 **The Authority recommends that clause nos. 13 & 14 be retained in the M&A guidelines.**

4.59 Clause 15: *"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. However, in case of holding of spectrum for various technologies by the entity subsequent to M&A, spectrum charges & license fee etc. or any other criterion being followed by the licensor shall be applicable as in case of any other UAS/CMTS licensee".*

4.60 On careful review, the Authority is of the view that the clause 15 may be retained as such. However, in case of merger of an incumbent with a new licensee, who has just rolled out its services, the spectrum usage charges to be paid by the resultant entity would register an immediate increase and the resultant entity has to now pay the higher spectrum usage charges on the same revenue (its own revenue), as the revenue of the new licensee may not be significant. In order to facilitate mergers at an early date, the Authority is of the view that in so far as mergers that take place before 31.3.2011, the resultant entity will be required to pay, for the first year after merger, the spectrum usage charges at the rate applicable to the higher spectrum of the two merging entities at the time of merger. In the second year, the resultant entity will be liable to pay spectrum usage charges at a rate which is the average of the rate on the combined spectrum and the rate that was applicable to the higher spectrum of the two merging entities.

Example: In the example in above Para, operator X was liable to pay 5% as spectrum usage charges while operator Y was liable to pay 2% as spectrum usage charges. The charges on the combined spectrum would be at 9%. Instead, it is now proposed that on merger, the resultant entity will continue to pay for the first year @5% of the AGR and @ 7% (average of 5% and 9%) for the second year. From the third year onwards, spectrum usage charges will be 9%.

4.61 **Accordingly, the Authority recommends that in so far as mergers that take place before 31.3.2011, the resultant entity will be required to pay, for the first year after merger, the spectrum usage charges at the rate applicable to the higher spectrum of the two merging entities at the time of merger. In the second year, the resultant entity will be liable to pay spectrum usage charges at a rate which is the average**

of the rate on the combined spectrum and the rate that was applicable to the higher spectrum of the two merging entities.

4.62 Clause 16: *"For regulating acquisitions of equity stake of one access services licensee Company/ legal person/promoter company in the enterprise of another access services licensee in the same license area, present guidelines on Substantial Equity shall continue i.e. "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."*

4.63 **The Authority recommends that the provisions relating to substantial equity and cross holding be in conformity with the provisions of the UAS licence which is that "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'" and that a promoter company/ Legal person cannot have stakes in more than one LICENSEE Company for the same service area."**

4.64 Clause 17. *"Any permission for merger shall be accorded only after completion of 3 years from the effective date of the licences."*

4.65 This clause did not exist in the previous guidelines on Merger & Acquisition before 22nd April, 2008. This condition was imposed in order to ensure that the licensees fulfil their roll out obligations and to prevent any windfall gains consequent upon any M&A activity.

4.66 Recently, the Government has re-introduced Lock in period for sale of equity by inserting a new Clause 1.8 after Clause 1.7 of the Schedule to the Licence Agreement for Unified Access Services (UAS) to stipulate various conditions for sale of promoter's equity of the UAS licensee company.[36] The 2009 amendments to the UAS licence conditions were pursuant to these recommendations of the Authority The said Clause 1.8 of the License agreement is reproduced below:

> *"1.8: There shall be following conditions for sale of equity of the UAS licensee company:*
>
> *(i) There shall be a Lock-in-period for sale of equity of a person whose share capital is 10% or more in the UAS licensee company on the effective date of UAS licence and whose net-worth has been taken into consideration for determining the eligibility for grant of UAS license, till completion of three years from the effective date of the UAS licence or till fulfillment of all the rollout obligations under clause 34, whichever is earlier.*
>
> *(ii) Issue of additional equity share capital by the UAS licensee company by way of private placement/ public issues is permitted. However, such a person (on whom the Lock-in condition applies as per para (i) above) shall not transfer in any manner such as sale, assignment. etc., his share capital directly or indirectly to any other person during lock-in period i.e. the invested amount in the shareholding by the equity holder shall not be reduced in any circumstances during the lock-in period.*
>
> *(iii) In case of issue of fresh equity, within the lock-in period the declaration of dividend and/or special dividend shall be barred.*
>
> *(iv) The provision of lock-in period shall not apply, in pursuance to enforcement of pledge by the lending financial institutions/banks in the event of defaults committed by the UAS licensee company."*

[36] http://www.dot.gov.in/as/2009/Ammendment_lock-in-Period.pdf

4.67 On the issue of 'Lock–in' clause in UASL agreement, views differ amongst the stakeholders. One group of stakeholders was of the view that the present 'Lock-in' clause in UASL agreement is not a barrier to consolidation in the telecom sector. Their contention was also that the lock-in clause in UASL agreement has been incorporated very recently, after a long consultation process. This will ensure roll-out of networks and services by the new operators for the benefit of consumers. Therefore, there is no necessity of any modifications in the existing 'lock-in' clause. Some Stakeholders also commented that this clause does not allow achieving wind fall gain by a new UAS licensee. The existing lock-in clause will benefit the sector in the long run. Moreover, the existing lock-in regime also indicates that only serious players who meet the roll out obligations can operate.

4.68 Another group of stakeholders having contrary view were of the opinion that the Lock-in clause in the UASL agreement constitutes a high exit barrier for promoters, and therefore is not conducive to consolidation. Due to constraints in spectrum availability in a particular band and its release in dribbles, spectral inefficiencies are not allowing the full exploitation of the scarce resource; therefore, there is an urgent need to achieve consolidation and hence this exit barrier should be removed. Some of them also said that the lock-in clause in UASL agreement, will deter the growth of telecom sector. Therefore, they have suggested that the lock-in clause should be deleted. There was also the view that, that since the Resultant entity is paying the transfer charges, the existing lock-in clause restrictions may be removed. Lock-in period is necessary only if Government has provided subsidies to the company or companies attempting to merge acquire or sell licences.

4.69 Lock-in-clause was inserted in order to eliminate non-serious operators in view of the fact that spectrum comes bundled with the UAS license. Any indirect transfer of the license granted for the provision of telecom service to third parties with a view to making windfall profits needed to be prevented not only for the purpose of ensuring efficient utilization of this scarce resource but also for preventing any profit making by individual players on the basis of the spectrum made available to them along with such licence.

4.70 The Authority has examined the clauses for lock-in period. In so far as the clause17 in the M&A guidelines is concerned, the Authority is separately recommending, that spectrum held by the resultant entity, pursuant to merger/ acquisition, beyond 6.2 MHz/5 MHz is liable to be charged at the Current price. In view of this, **the Authority recommends that the stipulation regarding the minimum period of three years from the effective date of license for merger/acquisition be done away with.**

4.71 As regards the clause relating to Lock-in period, listed in the licence, for sale of equity shares, the Authority noted that there is no restriction on issue of additional equity share capital by the UAS licensee company by way of private placement/ public issues. While the bringing in of additional capital by way of public issues or private placements (in order to achieve economies of scale and compete in the market effectively) should not be impeded, it is equally important that the making of windfall gains out of a licence (or the spectrum which comes bundled with it) and exiting the field should be prevented. Such protective measures are generally in place in all important sectors of the economy with a view to prevent non-serious operators gaining

easy access to, and easy exit from, the market and also with a view to protect the interests of investors.

4.72 The Authority is of the opinion that promoters whose net worth and equity have been taken into consideration while determining the grant of licence should continue to hold at least 51% of the equity in the licensee company for a period of 5 years or till the roll-out obligations are completed, whichever is earlier. It should be open to the promoters to bring in additional equity into the licensee company for the purpose of business. One stipulation that can be introduced is that the licensee company is barred from advancing loans to any other sister company in which the licensee company or the promoters of the company have a shareholding of more than 10%. This is to prevent the funds coming into the licensee company being diverted. In the event the promoter/s desire to reduce the share below 51%, it shall only be by way of a specific and prior permission from the licensor. This promotion is being suggested since Telecom sector allows 74% foreign equity, any dilution beyond 51% being with the permission of the FIPB. Since it is possible that the divesting of more than 49% of the equity and be to an Indian, it is being suggested that the licensor's permission be taken.

4.73 **Accordingly, the Authority recommends that the licence condition in the UAS licence be amended to stipulate that the promoters whose net worth/equity has been taken into consideration for determining the eligibility of the licence shall not dilute their equity below 51% for a period of 5 years or till the roll-out conditions have been fully accomplished, whichever is earlier. Any reduction below 51% shall be with the prior and specific permission of the licensor.**

4.74 Clause 18: "*The duration of licence of the resultant entity in the respective service area will be equal to the remaining duration of the licence of the two merging licensees whichever is less on the date of merger.*

For example, if licence of company 'A' is merging with licence of company 'B', then, the remaining duration of licence of 'A' or the remaining duration of licence of 'B', whichever is less, will be applicable for the resultant entity in the respective service area."

4.75 Some of the stake holders have pointed this out as too restrictive and an instance of how a well-intentioned regulatory intervention can deter efficiency-enhancing actions by firms.

4.76 The Authority has considered the issue in the light of the objective it seeks to achieve. The provision is apparently aimed at preventing a licensee from indirectly extending the validity period of his licence by merging with another licensee in the service area or by acquiring another licensee's business. It has to be kept in mind that the merger of a licence is pursuant to the merger of companies under the Companies Act. A merger of two licensee companies does not *ipso facto* entitle them to the merger of the two licences held by them individually before the merger. In other words, merger or acquisition of licences is pursuant to and not part of the merger or acquisition, as the case may be, of the Licensee Company or companies. It is worthwhile to recall in this context that the licence conditions expressly prohibit any assigning or transferring of the licence, either directly or indirectly. The licence agreement further provides that the licensee cannot enter into any agreement for sub-Licence and/or partnership relating to any subject matter of the LICENCE to any third party either in whole or in part i.e. no sub-leasing/partnership/third party interest shall be created. Whenever amalgamation or restructuring i.e. merger or demerger

is sanctioned and approved by the High Court or Tribunal as per the law in force, in accordance with the provisions of sections 391 to 394 of the Companies Act, 1956, the licence agreement provides that the Licensee may transfer or assign the License Agreement with prior written approval of the Licensor to be granted on fulfilment of the conditions specified in the agreement.

4.77 In the case of a merger of two licensee companies in a service area, while the resultant entity can legitimately expect to benefit from the economies of scale and scope which such merger may bring about, such legitimate expectation cannot extend to the grant of an automatic extension of the licence period for that portion of the licence which would have expired first, but for the merger. The resultant entity cannot claim a right to carry on the licensed activity for the entire remaining period of the licence which would have expired on a later date. The licensor would, therefore, be within its right in putting a condition either to restrict or extend the validity of the combined licence pursuant to such merger or acquisition, subject to such conditions as it may deem fit. However, upon careful consideration of the import of this clause as it exists now, it is seen that the restriction of the licence period in this case is not supported by any corresponding benefit which compensates the resultant entity for the loss of that part of its licence period for which one of the entities would have otherwise carried on the licensed activity. In cases where a licensee has received a licence on payment of an entry fee which is valid for a specified period, the curtailment of such licence period subsequently, merely on the ground of merger with another licensee (with a licence valid for a lesser period), may prevent any meaningful M&A activity from taking place in the market. This condition appears to be too harsh and can be

construed as an impediment in the path of M&A activities in the telecom sector. In case a licensee, who has more than ten years left in its original licence period, wants to acquire or to merge with a licensee who has lesser period of validity of its licence left, the result of such a merger would be that the combined licence would leave the resultant entity with the lesser period of licence in spite of the fact that the first entity may have paid the entry fee (which included payment for committed spectrum) for the entire period of its original licence. The position would become worse in case a service provider entity wants to acquire another entity, whose licence period may expire in the near future, with a view to utilizing the network infrastructure of the second entity (i.e., merely for the acquisition of assets). Such an arrangement, under the present M&A guidelines, would lead to a situation where the licence period of the entity which has taken over the assets upon such M&A, would get curtailed drastically. This could not have been the intention of the Government while framing the present M&A guidelines.

4.78 No significant mergers and acquisitions can happen in the telecom sector till we put in place a forward looking regulatory regime which-

(a) facilitates consolidation in all respects, i.e. both in terms of infrastructure and in terms of combined use of spectrum, for achieving better economies of scale and lesser costs for the provision of service; and

(b) does not impose unduly restrictive conditions which neither serve the purpose of such consolidation nor promote the larger causes of consumer interest and overall economic development.

Therefore, there is a clear need to revisit this clause in the M&A guidelines.

4.79 A revisit of clause 18 of the M&A Guidelines as suggested in the preceding paragraph would raise questions as to how the dichotomy of different licence periods can be addressed in a manner which ensures that there is no loss of revenue to the exchequer on account of licence fee/entry fee on the one hand and there is no perceived loss of value for the merging entities in terms of the duration of licence more than the perceived advantages of the proposed M&A activity. The period of licence can be extended in such cases till the expiry of the later of the two validity periods. If the spectrum of one is without payment of the current price, then the difference (i.e., current price minus what was paid) must be paid up before permission for merger.

4.80 **Therefore, the Authority recommends that the duration of licence of the resultant entity in the respective service area will be equal to the higher of the two periods on the date of merger. This does not however entitle the resultant entity to retain the entire spectrum till the expiry of licence period. The Authority recommends that while a fresh licence can be issued in the name of the resultant entity, the Wireless operating licences will be issued separately for the two sets of spectrum retaining the respective validity.**

Example: If the validity of the licence and the spectrum of operator X is till 2012 and that of Y till 2020, the resultant entity will be given a licence to the year 2020 and two separate Wireless operating licences in the name of the resultant entity, one for the spectrum of X till 2012 and for Y's spectrum till 2020. The first

Wireless operating licence will be renewed in 2012 for a period of 8 years.

4.81 In view of the foregoing, the Authority recommends that the following should be the guidelines "intra service area Merger of Cellular Mobile Telephone Service (CMTS)/ Unified Access Services (UAS) Licences":

i. **Prior approval of the Licensor shall be necessary for merger of the licence.**

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

iii. **Merger of licence(s) shall be permitted in the following category of licences:(i) Cellular Mobile Telephone Service (CMTS) Licence with Cellular Mobile Telephone Service (CMTS) Licence; (ii) Unified Access Services Licence (UASL) with Unified Access Services Licence (UASL); (iii) Cellular Mobile Telephone Service (CMTS) Licence with Unified Access Services Licence (UASL); and (iv) Unified licence with Unified licence.**

Merged licences in all the categories above shall be in UASL category only. In case of Unified licences, this shall not apply.

iv. **The relevant market for determining the market share will no longer be classified separately as 'Wire line' and 'Wireless'. It will be defined in future as the entire access market.**

v. **For determination of market power, market share of both subscriber base and Adjusted Gross Revenue of licensee in the relevant market shall be considered.**

vi. **The market share of the Resultant entity in the relevant market shall not be greater than 30 % of the total subscriber base and/or the AGR in a licensed telecommunication service area.**

vii. **Exchange Data Records (EDR) shall be used in the calculation of wireline subscribers and Visitor Location Register (VLR) data, in the calculation of wireless subscribers for the purpose of computing market share based on subscriber base.**

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

ix. **No M&A activity shall be allowed if the number of UAS/CMTS access service providers reduces below six in the relevant market consequent upon such an M&A activity under consideration.**

x. **Consequent upon the Merger of licences in a service area, the total spectrum held by the post merger Resultant entity shall not exceed 14.4 MHz for GSM technology. In respect of CDMA technology, the ceiling will be 10 MHz.**

xi. **As the resultant entity is entitled to only one block of 6.2 MHz/ 5MHz for the Entry fee paid, either of the parties to the merger should pay the Spectrum price i.e. the difference between the Current price and the sum already paid, before permission for merger is granted.**

xii. **The spectrum transfer charge, @5% of the difference between the transaction price and the total current price, shall be payable before permission is granted.**

xiii. If, as a result of the merger, the total spectrum held by the resultant entity is beyond the limits prescribed, the excess spectrum must be surrendered. Discretion to choose the band to surrender the spectrum beyond the ceiling will be of the resultant entity.

xiv. 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 licensees before issue of the permission for merger of licences.

xv. If consequent to merger of licences in a service area, the licensee becomes a "Significant Market Power" (SMP) post merger, then the extant rules & regulations applicable to SMPs would also apply to the resultant entity.

xvi. In so far as mergers that take place before 31.3.2011, the resultant entity will be required to pay, for the first year after merger, the spectrum usage charges at the rate applicable to the higher spectrum of the two merging entities at the time of merger. In the second year, the resultant entity will be liable to pay spectrum usage charges at a rate which is the average of the rate on the combined spectrum and the rate that was applicable to the higher spectrum of the two merging entities.

xvii. The provisions relating to substantial equity and cross holding be in conformity with the provisions of the UAS licence which is that "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' and that a promoter company/ Legal person cannot have stakes in more than one LICENSEE Company for the same service area."

xviii. The stipulation regarding the minimum period of three years from the effective date of license for merger/acquisition be done away with.

xix. The licence condition in the UAS licence be amended to stipulate that the promoters whose net worth/equity has been taken into consideration for determining the eligibility of the licence shall not dilute their equity below 51% for a period of 5 years or till the roll-out conditions have been fully accomplished, whichever is earlier. Any reduction below 51% shall be with the prior and specific permission of the licensor.

xx. The duration of licence of the resultant entity in the respective service area will be equal to the higher of the two periods on the date of merger. This does not however entitle the resultant entity to retain the entire spectrum till the expiry of licence period. The Authority recommends that while a fresh licence can be issued in the name of the resultant entity, the Wireless operating licences will be issued separately for the two sets of spectrum retaining the respective validity.

4.82 On the issue of merger and acquisition and transfer, the Second Committee recommended that *"Since there is scarcity of spectrum, and since the market may operate more efficiently if it is allowed to discover the optimal number of operators, merger/transfer/sharing of spectrum should be permitted amongst UAS/CMTS licensees."* While there is no doubt that consolidation could be a means to

overcome the scarcity of spectrum, the Authority is of the opinion that spectrum sharing should be permitted only in a limited way. It is not recommending trading of spectrum in view of the reasons given in Para 4.141.

4.83 The second committee further recommended that *"Spectrum may be transferred / merged in any quantity any time after assignment subject to the condition that the buyer/ resultant entity cannot have spectrum holding of more than 25% of the total assigned spectrum in the 2G spectrum bands as mentioned above in each LSA. If the spectrum was assigned to the seller either as start-up spectrum without an auction, or as additional spectrum without an up-front charge, the transfer/ merger should attract a transfer charge which will be computed based on Table VI-1 for each category of LSA. The application for transfer/merger of spectrum must be made by the licensee to whom the spectrum has been assigned, and upon grant of permission, the requisite transfer / merger charge must be paid before effecting transfer. The same charge should apply irrespective of whether the spectrum is being transferred, or acquired through a merger. In the case of merger, transfer charge will be payable on the lesser of the 2G spectrum holdings of the merging entities."*

4.84 Regarding maximum spectrum holding by a licensee consequent upon merger, the Authority does not agree with the abovementioned recommendations of the Second Committee. Presently the number of service providers in a service area is 12-14 and the Authority is recommending a minimum of six service providers in a service area after merger. Therefore, allowing the resultant entity to have 25% of the total assigned spectrum may lead to hoarding of spectrum and non level playing field amongst service providers. Keeping in mind the presence of at least six players in each service area, the Authority has recommended a cap of 14.4 MHz for GSM and 10 MHz for CDMA.

4.85 The Second Committee's next recommendation is that "*The fee shown in Table VI-1 is for 1+ 1 MHz of spectrum for the full 20-year lifetime of the assignment. The fee has to be reduced pro-rata*

based on the number of years remaining till expiry of the assigned spectrum. The fee is the same for both the 800/900 MHz and 1800 MHz bands."

The *transfer charge should be payable only for the first such transfer/ merger, and only when spectrum has been assigned without an upfront charge. Spectrum assigned through auction, or start-up spectrum received through auction of UAS/CMTS license, or spectrum for which market price is paid or agreed to be paid, will not attract any charge when transferred.*

The transfer */merger / sharing charge indicated in Table VI-1 may be revised by the licensor annually based on price discovery from auctions and other similar inputs.*

4.86 The Authority does not agree with the Second Committee. The Authority is of the view that whenever a merger/acquisition takes place the resultant entity is entitled to only one block of committed spectrum of 2X6.2 MHz for GSM and 2X5 MHz for CDMA, and for the rest, it will have to pay the difference between the current price and the sum already paid, before permission for merge is granted. The spectrum transfer charge being recommended by the Authority is based on the criterion that the service providers have been given contracted spectrum at a less than market rate. In case of merger of two entities, the Government is entitled to get the market price of the spectrum which was earlier given at a cheaper rate. In addition, the spectrum transfer charge @ 5% of the difference between the transaction price and the total spectrum price, shall be payable, before permission is granted.

4.87 *The* Committee has recommended that *"In order to activate the market at the earliest, the transfer / merger / sharing charge should be discounted by 20 % for one year from the date of announcement of policy."*

4.88 The Authority does not agree with the second committee on the issue of discounting transfer / merger / sharing charge by 20 %

for one year from the date of announcement of policy and the applicability of transfer charge only for the first such transfer/ merger, and only when spectrum has been assigned without an upfront charge. The Authority is, on the other hand, recommending an incentive for mergers that take place before the end of 31.3.2011. However, the incentive proposed is in the form of a reduction in the spectrum usage charges to be paid.

4.89 *The* second committee has recommended that "*Paragraphs 10, 11 and 17 of the guidelines for mergers & acquisitions of UAS/CMTS licenses issued by the Government vide order No. 20-100/2007-AS-I dated 22nd April, 2008 should be deleted. Paragraph 18 should also be deleted when the Recommendation (n) is implemented."*

4.90 The Authority does not agree with the recommendations of the Second Committee that Clause 10, 11 and 18 of the present M&A guidelines should be deleted. Clause 10 allows the resultant entity to retain the total amount of spectrum held by the merging entities. However, now the Authority is recommending a limit of 14.4 MHz for GSM and 10 MHz for CDMA as discussed in Para 4.84. Clause 11 mentions that similar to any other UAS/CMTS licensee, spectrum enhancement charge will be levied on merger also. The Authority is recommending payment of current price on merger for spectrum held in excess of contracted spectrum and a limit of 14.4 MHz for GSM and 10 MHz for CDMA. Therefore, it is recommending that this clause may be deleted. The Authority agrees with the recommendations of Second Committee regarding deletion of Clause 17 of the guidelines for M&A as it wants to facilitate M&A activity and has also recommended charging of additional spectrum beyond the contracted amount at the current price. Clause 18 mentions about duration of merged license. In this regard the Authority has recommended that the duration of

licence of the resultant entity in the respective service area will be equal to the higher of the two periods on the date of merger.

4.91 *Unless a UAS/CMTS licensee transfers/merges the entire 2G spectrum assigned, the unmet roll-out obligations of the seller should continue to hold. Penalties, if any, are liable to be paid by the seller prior to the date of the sale will remain payable by the seller. In case of sale of full spectrum holding no further penalties should be imposed on the seller after the date of the sale for unmet roll-out obligation."*

4.92 The Authority is not recommending part-merger. As such, it is not in agreement with the above recommendation of the Second Committee.

B- Spectrum Sharing

4.93 Sharing through pooling is a concept wherein operators pool their respective spectrum for usage in one or more areas. However, the exclusive right of usage remains with the primary holder who has been allocated spectrum by the Government. Spectrum sharing is required either when sufficient demand exists for spectrum, causing congestion, and technical means exist to permit different users to co-exist or when the new operators pool their resources to cut initial roll out cost in terms of reduced number of BTS and other infrastructure. This also helps them in faster roll out of their services and to take advantage of economy of scale by sharing the spectrum.

4.94 Operators may use spectrum sharing in many different ways depending on the total spectrum available with them, status of roll out in the service area, percentage of their coverage, congestion in the network, type of services being provided and willingness of other operators to share the spectrum. The business model of spectrum sharing will be very different from

case to case basis. Spectrum sharing can be either (i) Short term spectrum sharing - wherein two new service providers pool their spectrum resources to quickly roll out their services and enhance the coverage area while economizing on the cost of the network. Pooling of the spectrum permits them to reduce number of BTS initially in the network, resulting in reduced network rollout cost. As the number of the subscribers increase and return on investment starts coming to the operators, the network can be further expended and sharing of the spectrum may be terminated or (ii) Area specific spectrum sharing - when the spectrum sharing is employed by established service providers in areas where they are facing congestion to provide better services. In such case of spectrum sharing the likely direct economic gains to the service providers will be minimal, and focus would be to improve QoS.

4.95 Another way of spectrum sharing could be by encouraging Mobile Virtual Network Operators (MVNOs). Generally MVNO is an entity that provides mobile phone service but neither has its own radio spectrum nor the entire infrastructure required to provide mobile telephone service. MVNOs operate through commercial arrangements with licensed service providers and buy bulk minutes of traffic and resell them to their own subscribers in their own brand. TRAI, in its recommendations on "Mobile Virtual Network Operator" dated 6th August 2008, recommended introduction of MVNO as a distinct service provider with its own licensing and regulatory framework.

4.96 The spectrum sharing and spectrum trading are two different phenomena though both focus towards increasing spectrum utilization efficiency. Internationally, while spectrum trading has

been well defined and detailed regulatory framework is prescribed, spectrum sharing is generally treated as part of active infrastructure sharing.

4.97 TRAI, in its recommendations on Infrastructure Sharing dated 11th April, 2007, has noted that *"Sharing of the allocated spectrum can also be considered as one form of active infrastructure sharing but it is not being considered at present. At present spectrum allocation policy is based on total number of subscribers and traffic. This is being allocated with due diligence and care. As such, sharing of the spectrum is not being envisaged at present."*

4.98 Presently, sharing of active infrastructure amongst Service providers based on mutual agreements entered amongst them is permitted. However, active infrastructure sharing is limited to antenna, feeder cable, Node B, radio Access Network (RAN) and transmission system only. Sharing of spectrum is not permitted.

4.99 The telecom sector in India has undergone a major change since Infrastructure sharing was recommended. In January, 2008, a number of new UAS Licences were given which has resulted in a sudden increase in the demand for spectrum. This has put a premium on improving the efficient and optimal use of spectrum and has necessitated exploration of other means to achieve the same.

4.100 Permitting spectrum sharing is one of the mechanisms for increasing efficiency in spectrum utilization and temporarily fulfilling the demand for spectrum. However, in the Indian environment, it has a number of attendant issues which require to be deliberated upon. In case of allowing the sharing of spectrum, each service provider gets the benefit of aggregate spectrum, but in cases where, at the time of sharing of spectrum, one or both of the service providers have not fulfilled the roll out

obligations, this may lead to questions of enforcement against one or both of them. Allowing the sharing of spectrum at such point may change the status of service providers in respect of their rollout obligations. In such a situation, the question would be as to who will be responsible for completing the rollout obligation and what will be rollout obligation for both service providers after sharing the spectrum. Some preconditions are required to be put before service providers are allowed to share the spectrum.

4.101 Spectrum being a scarce resource, the possibility of making "windfall gain", by an operator having the unutilized spectrum, by sharing such spectrum with another operator who needs it, cannot be ruled out. Allowing liberal sharing of spectrum may generate an opportunity to make profits for spectrum holder. Another issue could be the rate of spectrum usage charge which the operators sharing the spectrum will need to pay.

4.102 In order to address these concerns, the Authority has raised the issue of need for permitting sharing of Spectrum among the service providers, the framework for permitting it in case it was to be permitted, and the charges payable for the same in the consultation paper.

4.103 In their response, most of the stakeholders were in favour of allowing spectrum sharing, albeit with certain conditions. Some of stakeholders were of the view that spectrum sharing has the potential to generate significant efficiencies by permitting better utilization of existing spectrum, enabling service providers to achieve lower costs of production. They also mentioned that spectrum sharing is especially useful in cases where a service provider has not received initial allocation of spectrum. However, spectrum sharing should be allowed within a timeframe, so as not

to encourage players to consider it as a permanent way of hoarding spectrum. One view was that if spectrum sharing is to be permitted, it should only be permitted in terms of short term leasing of the spectrum by one entity to another in its licensed service area, on mutually agreed terms and conditions, with prior permission of the Government, after paying the applicable sharing charges. In such sharing, responsibility of the compliance with various terms and conditions of the license agreements, including those of spectrum license, shall continue to be that of the original allottee of the spectrum.

4.104 Some stakeholders favoured sharing of spectrum subject to the condition that the service providers together do not become Significant Market Power, i.e., they do not have more than 35% in terms of subscriber base and 25% in terms of Adjusted Gross Revenue or if combined spectrum is less than 2 x 12.4 MHz for GSM out of which not more than 6.2 MHz is in the 900 MHz band. One view was that the spectrum sharing framework should also ensure that Government revenues are protected and spectrum guidelines do not encourage operators to enter into an agreement which bypasses the payment of regulatory fees to the Government.

4.105 Stakeholders not in favour of sharing submitted that it is technically very difficult to comply with the security requirements while implementing the sharing of spectrum through pooling. Existing policy of Spectrum Usage charges based on amount of spectrum held by an operator will result in undue advantage to new operators sharing the spectrum and may also disturb the level playing field. Rather than having such a situation, it would be far better if the consolidation in the sector is permitted

through the merger and acquisition route. It will be extremely difficult to enforce the roll-out obligations and other licensing conditions on the pooling operators including those applicable for spectrum such as interference, power limits and transmission within assigned frequencies etc.

4.106 On the issue of spectrum sharing charges, stakeholders held divergent views. Some stakeholders favoured its regulation while others did not. Those who favoured the regulation of spectrum sharing charges were of the opinion that sharing charges may be prescribed at the same level as transfer charges for M&A or spectrum trading. While sharing charges may be prescribed on a per MHz basis, they should be levied /applied on the smaller of the spectrum blocks being shared. Some were of the opinion that the spectrum sharing charges need to be determined so as to factor in inflation and based on the total value of the spectrum sharing arrangement made by the two operators. The charges should be made payable by the party that is receiving the money under this arrangement. One stakeholder was of the opinion that as spectrum sharing is meant to increase efficient utilization of spectrum and quicker roll-out of services, the charges should be prescribed to recover administrative cost only and should not further burden the operators who are already paying Licence Fee, Spectrum charges, M&A transfer charges, etc.

4.107 Those who did not favour its regulation argued that the charges should be left to operators as the sharing charges are complex considerations varying with each sharing initiative. They were of the view that spectrum sharing should not attract charges/taxes, as the gains from spectrum sharing are efficiency gains (which regulators should encourage) and not windfall gains. Besides, the

spectrum is not being transferred, and the sharing licensees are still subject to the existing license terms. Imposing charges on arrangements which are likely to be experimental would raise a very significant barrier to a potentially efficient set of arrangements.

4.108 As regards fulfilment of the roll out obligations, some stakeholders were of the view that completion of roll out obligations should not be a precondition for sharing. The other view was that as the main objective of facilitating spectrum sharing is to allow and encourage licensees to use spectrum efficiently, a service provider who does not meet the rollout obligations at the end of three years may be discouraged to profit from spectrum trading/sharing.

International Experience

New Zealand

4.109 In New Zealand the Radiocommunications Act 1989 was pioneering and it radically changed the landscape of spectrum management. Managed spectrum (MSPs) parks have been established to allow access to number of users in a common band of spectrum on shared and, as far as possible, self managed basis. The objective of MSP is to encourage the efficient use of spectrum, innovation and flexibility and to provide for low cost compliance and administration.

Brazil

4.110 In January 2008, ANATEL in Brazil issued 4 licenses per licensed area for 3G wireless deployment in the whole country. Operators are allowed to share network components such as towers as well as spectrum in order to provide services in municipalities with less than 30,000 inhabitants. Spectrum sharing arrangements must be authorized by ANATEL. The rules governing the 3G auction in Brazil refer expressly to spectrum sharing as a means of providing coverage in rural and remote areas (i.e. the municipalities with less than 30,000 inhabitants).

Nigeria

4.111 In Nigeria, sharing of spectrum among various services and users is encouraged in order to satisfy the growing needs for frequency spectrum resource. The following methods of sharing are allowed:

- Time sharing
- Geographical coverage/spatial separation
- Modulation mode where practicable
- Orthogonal propagation/Polarization (microwave links)
- Antenna directivity (Microwave Links)

4.112 The Authority is of the opinion that allowing sharing of spectrum by the new operators is another form of facilitating consolidation of spectrum. Along with allowing merger which is primarily for the large operators, sharing of spectrum will enable the new operators to effectively compete with others. In order to facilitate consolidation in the telecom sector, permitting sharing of spectrum would appear to provide a reasonable solution subject to stipulation of relevant administrative guidelines by the Government. These include the maximum limit of spectrum holding after share, number of entities that can consolidate, the

Government charges on the shared spectrum, the tenure of share, the amount of allocated spectrum that can be shared, and eligibility criteria for taking part in share of spectrum.

4.113 A two-participant share itself is a novelty in India and hence a triple or higher service provider consolidation of spectrum would become too complex to administer in the absence of requisite experience. Therefore, initially only two participants may be allowed to share spectrum.

4.114 Since spectrum lease/share is a new phenomenon, there is always the likelihood of a mid-course review / correction and hence five year tenure, to start with, would be a reasonable period for lease/share of spectrum. Renewal on a case-to-case basis can be allowed subject to fulfilment of stipulated criteria like payment of dues, etc., for a further period of five years.

4.115 Sharing of spectrum will be limited to the access spectrum only; the access service licensees, i.e., only CMTS/UASL holders shall be eligible to share their spectrum. On the issue of spectrum sharing fee, the Authority is of the view that both the parties should pay to the Government the prorated current price for spectrum beyond 6.2/5 MHz, in the ratio of the spectrum held by them individually.

Example- If two parties X and Y having 4.4 MHz of spectrum each decide to share the spectrum, each of the parties will individually pay for half of the market determined price of 2.6 MHz (8.8-6.2).

4.116 Spectrum usage charges will be levied on both the operators individually but on the total spectrum held by both the operators together. In other words, if an operator X having 4.4MHz of

spectrum shares 4.4 MHz of spectrum of another operator Y, then both X and Y will be liable to pay spectrum usage charges applicable to 8.8 MHz of spectrum. The rationale for this is that it is not possible to determine the exact quantity of spectrum that is being utilised by the respective parties.

4.117 In order to ensure that permission to share spectrum may not be used as an backdoor entry for spectrum trading, the Authority also recommends that the before entering into spectrum sharing arrangement, the service providers will take the permission of the Government and the permission will not be given for more than 5 years to start with. There shall be no renewal.

4.118 **Accordingly, the Authority recommends that the following guidelines be adopted for spectrum sharing:**

- **Spectrum sharing will be permitted but in each case, it will be in the same licence service area and will be with the prior permission of the licensor, strictly in accordance with the guidelines being laid out.**
- **Permission for spectrum sharing will be given for a maximum period of 5 years. There shall be no renewal.**
- **Spectrum sharing will be allowed only between parties each of whom does not have more than 4.4MHz /2.5 MHz (GSM/CDMA) of spectrum.**
- **Sharing will be allowed only if there are at least six operators in the LSA, post-sharing arrangement.**
- **Spectrum sharing will not be permitted among licensees having 3G spectrum.**

- **Spectrum sharing would involve both the service providers utilising the spectrum. Leasing of spectrum is not permitted.**
- **Spectrum can be shared only between two spectrum holders. In other words, a non-licensee or licensee who has not been assigned access spectrum as yet cannot be a party to spectrum sharing.**
- **Parties sharing the spectrum will be deemed to be sharing their entire spectrum. In other words, even if the licensees are sharing partial spectrum, it will be taken as sharing of entire spectrum for the purpose of charging.**
- **Both the parties will pay to the Government the prorated current price for spectrum beyond 6.2/5 MHz, in the ratio of the spectrum held by them individually.**
- **Spectrum usage charges will be levied on both the operators individually but on the total spectrum held by both the operators together. In other words, if an operator X having 4.4MHz of spectrum shares 4.4 MHz of spectrum of another operator Y, then both X and Y will be liable to pay spectrum usage charges applicable to 8.8 MHz of spectrum.**

4.119 The Second Committee in its report made the following recommendations regarding spectrum sharing :

> *"Sharing of 2G spectrum amongst UAS/CMTS licensees will become feasible if the annual spectrum usage charges are made uniform for all bands irrespective of amount of spectrum held, as recommended below (paragraph (r)). Along with Recommendation (r), sharing of 2G spectrum amongst UAS/CMTS licensees should be permitted on payment of 'sharing charges' to the Government for the quantity of spectrum shared, in the same manner and of like amount as applicable in case of transfer or merger of the spectrum. It*

should be permitted when two or three GSM or CDMA operators share their entire 2G spectrum holding in a license area. When two licensees share spectrum, sharing charges shall be levied on the smaller of the two spectrum blocks being shared. In case three operators share spectrum, sharing charges shall be levied on the smaller two spectrum blocks being shared. Sharing of spectrum is not permitted amongst UAS/CMTS licensees who opt not to pay an up-front charge for additional spectrum assigned to them prior to 17.1.2008 beyond 6.2 + 6.2 MHz.

Since spectrum sharing arrangements may sometimes unravel, the policy may also provide for retention of sharing charges only to the extent leviable for the actual period (part of the year will be taken as full year) of the sharing on a prorata basis, and refund of the difference. In case of subsequent sale or merger of the spectrum, transfer charges or merger charges as the case may be will be payable, prorata on the balance period of the spectrum assignment.

In case of sharing of spectrum, each licensee will have the benefit of the aggregate shared spectrum. For the purpose of assessing the total 2G spectrum holding of a UAS/CMTS licensee, the total shared spectrum will be counted in the hands of each licensee. In case one of the licensees sharing spectrum has already fulfilled the roll-out obligations, there will be no further penalties on any of the licensees sharing spectrum for unmet rollout obligations. In the case where none of the licensees has fulfilled the rollout obligations, penalties for unfulfilled rollout obligations will be applicable on each licensee separately.

In order to activate the market at the earliest, the transfer / merger / sharing charge should be discounted by 20 % for one year from the date of announcement of policy.

The transfer /merger / sharing charge indicated in Table VI-1 may be revised by the licensor annually based on price discovery from auctions and other similar inputs."

4.120 The Second Committee has recommended sharing charges for the quantity of spectrum shared in the same manner as applicable in case of transfer or merger of the spectrum. The Authority is of the view that as sharing is a temporary arrangement unlike trading/merger, the criteria for levy of spectrum charges, both for

excess spectrum beyond the committed amount and annual spectrum usage charges cannot be equated with that for merger of two licensees. Accordingly, unlike merger, in spectrum sharing the Authority is recommending that both the parties will pay to the Government the prorated current price for spectrum beyond 6.2/5 MHz, in the ratio of the spectrum held by them individually.

4.121 The Second Committee has also recommended levying of uniform spectrum usage charges as a precondition for allowing sharing of spectrum. The Authority does not agree with this recommendation as it is of the opinion that the precondition of uniform spectrum usage charge for permitting sharing of spectrum has little merit. It is of the view that the technical and economic benefit arising out of the pooled spectrum will be enjoyed by both the entities, therefore the applicable spectrum usage charge on total spectrum held by both the licensees will have to be paid by both the licensees. On the issue of roll-out obligations, the Authority is of the opinion that the roll-out obligations are imposed on the operators to ensure faster network deployment and efficient usage of spectrum and therefore in no case it should be relaxed.

C- Spectrum Trading

4.122 Historically, in most of the countries, the Regulator has used command and control mechanism to decide the allocation of spectrum. In recent times, a number of countries have adopted the market mechanism for spectrum assignment. However, it is being increasingly felt that this system does not allow spectrum licence holders the flexibility to respond quickly to changes in the market demand and technology, resulting in chunks of spectrum

lying underutilised, creating artificial scarcity. It is felt that this approach has become increasingly unsuitable particularly with emerging technologies. Some countries like Australia, Canada, New Zealand, and Guatemala have permitted spectrum trading in the secondary market as an additional means of spectrum distribution.

4.123 Spectrum trading allows parties to transfer their spectrum rights and obligations to another party, in return for a financial or market benefit. It allows the present user to decide when and to whom the spectrum authorization will be transferred and what sum it will receive in return. The market, not the regulator, determines the value.

4.124 In a consultancy report commissioned by the European Commission, the consulting firm Analysys identified the following methods for transferring rights of use.

- Sale – Ownership of the usage right is transferred to another party.
- Buy back – A usage right is sold to another party with an agreement that the seller will buy back the usage right at a fixed point in the future.
- Leasing – The usage right is transferred to another party for a defined period of time but ownership remains with the original rights holder
- Mortgage – The usage right is used as collateral for a loan, analogous to taking out a mortgage on an apartment or a house.

4.125 In order to ascertain the opinion of the stakeholders on the subject of permitting trading of spectrum, the Authority has, in

the consultation paper, raised the issue of need to permit spectrum trading in the country and the parameters and the methodology required to be defined for putting in place a framework to allow trading.

4.126 In response, many stakeholders favoured permitting of spectrum trading to encourage spectrum consolidation and to improve spectral efficiency. One of the reasons given was that due to the current small allocations to operators and the uncertainties over the availability of further spectrum, spectral efficiency is suffering and that, therefore, trading is essential to allow operators to find efficiency of scale. Spectrum trading allows much more specific and targeted reallocations of spectrum than what can be achieved through M&A activity. One view was that spectrum trading should be done in line with prevalent International practices and an appropriate legal, regulatory, commercial and technical framework needs to be put in place for its implementation. It was also mentioned that trading should be permitted only for the spectrum which is bought through auction.

4.127 Some stakeholders opined that while allowing spectrum trading, the applicable rollout obligations must be taken into consideration and the operators, who have not fulfilled the rollout obligations, should not be allowed to trade their spectrum. Spectrum given to licensees, who failed to fulfil roll out obligation, should be taken back by the licensor and, thereafter, be auctioned at market price for allotment to other eligible operators.

4.128 On the issue of spectrum trading charges, some of the stakeholders mentioned that Spectrum trading charges should be benchmarked based on price determined through 3G spectrum

auction, while others felt that this is not a matter for the regulator to decide and should be left to the market forces.

4.129 Those operators who were not in favour of allowing spectrum trading argued that it will increase the risk of possibility of concentration of spectrum and market power; that trading will invite non-licensed entities to invest in Spectrum; and that it requires implementation of a successful trading platform in the form of a secondary market requiring creation of an extensive automated infrastructure in the form of an exchange/online registry which entails considerable regulatory costs that are not warranted at this stage. It was also pointed out that most national regulatory authorities except a few countries such as Australia, New Zealand and United States have so far not permitted spectrum trading and that these countries too have not witnessed any significant efficiency gains in spectrum. They felt that the objectives of spectrum consolidation can be effectively achieved through mergers and acquisitions and that a more effective option for the country is permitting spectrum sharing which also contributes to efficient spectrum management.

4.130 Stakeholders not in favour of spectrum trading also opined that spectrum trading of 2G spectrum is not desirable in the Indian context, as 2G spectrum beyond the contracted amount have been allotted free of cost to some operators, whereas new operators have not been allotted even the startup spectrum in some places. Allowing spectrum trading in this scenario will result in improper gain to old operators. Some of the stakeholders mentioned that spectrum trading would lead to hoarding of spectrum and will disturb the market dynamics. One view was that spectrum trading should be allowed only in respect of 3G

and BWA spectrum which is to be auctioned. Since spectrum at present is allocated based on a strict subscriber linked criteria and the total spectrum allocated to any entity is minimal and less than the average spectrum allocation in other countries, there is hardly any possibility of an operator having any spare spectrum to be traded. Consolidation of spectrum should be encouraged by facilitating M&A.

International Experience

United Kingdom[37]:

4.131 Trading of 2G & 3G spectrum is not permitted in UK. Spectrum trading in other bands was initially introduced in December 2004 for the national and regional Business Radio ('BR'), broadband fixed wireless access and terrestrial fixed links licences. **There are no restrictions on who may apply to participate in a trade for any of the currently tradable licences.**

USA :

4.132 In the United States the licensees in the Wireless Radio Services covered may lease some or all of their spectrum usage rights to third parties, for any amount of spectrum and in any geographic area encompassed by the license, and for any period of time within the term of the license.

Australia:

[37] OFCOM consultation on Simplifying Spectrum Trading (Sept 2009)

4.133 Spectrum licences can be traded in the market. Licensees are free to negotiate in the open market with other interested persons to buy and sell spectrum for any legal purpose. Spectrum licences may be combined or sub-divided to form new licences, although they may not be subdivided smaller than a standard trading unit (STU). A spectrum licence can be sold in whole or in part by geographic area or by bandwidth or by both. Licences may also be leased in whole or in part to third parties. A licensee can extend the geographic coverage and/or bandwidth of their licence by acquiring an adjacent spectrum licence from another licensee. In this case the two spectrum licences may be combined into one new licence.

EU[38]

4.134 Article 9 of the current EU Framework Directive allows Member States to provide for the transfer of spectrum rights and imposes certain requirements. The intention to transfer spectrum rights has to be notified to national regulatory Authority (NRA) and the transfers must take place in accordance with procedures laid down by the NRA and be made public.

France[39]

4.135 Spectrum trading is allowed in certain bands used for civil telecommunication with rules in line with the European Radio Spectrum Policy Group opinion, wherein no change of use of spectrum is permitted.

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[38] OFCOM consultation on Simplifying Spectrum Trading (Sept 2009)

[39] Is Market-Based model the ultimate solution for spectrum management – Presentation by Eric Fournier, Director-Spectrum Planning and International Affairs, Agence Nationale des Fréquences France

New Zealand[40]:

4.136 New Zealand was one of the first countries to put in place a legislative framework that assigns spectrum as tradable property rights. The Radio Communications Act 1989 put in place a two-tier market-based mechanism for managing spectrum access--Management rights, which give the rightholder unencumbered use of a nationwide block of spectrum with the right to assign spectrum licences within that block; and Spectrum licences within a management right, which may carry conditions of use, but otherwise are tradable property.

Canada:

4.137 Spectrum trading was permitted in the year 2005. The licences are transferable and can be divided and aggregated. They are issued for periods of up to 10 year and are generally renewable under certain circumstances.

Guatemala[41] :

4.138 Guatemala decided in 1996 to adopt a simple but effective spectrum market which, in the case of non-public sector spectrum, gave private parties exclusive control over use of bandwidth and confined the regulator to defining, issuing and protecting spectrum rights. The frequency use title could be leased, sold, subdivided or aggregated at will and lasts for 15 years (renewable on request); they are thus virtually private

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[40] www.rsm.govt.nz

[41] SPECTRUM MANAGEMENT FOR A CONVERGING WORLD: CASE STUDY ON GUATEMALA by ITU

property. Regulation is restricted to setting aside bands for use by the state and adjudicating interference disputes which are not resolved by mediation.

4.139 TRAI in its recommendations on "Spectrum related issues" dated 13th May 2005 recommended that spectrum trading may not be permitted at this stage and depending upon market conditions the issue may be considered at a later stage through a consultation process.

4.140 In its recommendations on "Review of license terms and conditions and capping of number of access providers" dated 28th August 2007, the Authority observed that spectrum trading will make use of spectrum more efficiently as it allows user to trade with new wireless users who require it most and there is a urgent need to strengthen the monitoring system to avoid hoarding and interference.

4.141 The Authority has carefully studied the responses of the stakeholders and the International practices along with the volume of trading activity in the countries where trading has been permitted and has observed the following:

- In countries where spectrum trading is permitted, the spectrum is normally assigned through market mechanism, i.e. auction. However, in India, the 2G spectrum till date has been either given along with the licence or given based on Subscriber Linked Criteria, without any additional charges for the spectrum. These licensees have not competed in the open market to buy spectrum. Now, to allow them to trade the scarce spectrum at a premium would not be proper. Regarding spectrum for 3G and BWA services, though the spectrum will

be given through the auction process, but presently, the amount of spectrum available is limited and there is a restriction that no licensee can acquire more than one block of spectrum either in auction or subsequently through M&A. As such allowing trading in these bands will be premature and may not be of any benefit to the industry.

- Presently, there are operators who have been given licenses some years back and have a stable and mature network and there are also operators, on the other hand, who have to either roll out their network or are in the process of doing so. It is possible that allowing spectrum trading at this juncture might result in anti-competitive conduct through consolidation/hoarding of spectrum or through an incumbent precluding the newcomers from providing service by buying out the spectrum necessary for such services. This would adversely affect the consumers and the growth of telecom services in India.

- Spectrum – a national asset with sovereign right over it by the Government has only been assigned on a "right to use" basis for a fixed period to the service provider. A licensee has no ownership right to enable it to 'trade' in it. Accordingly, acquisition of spectrum through sale/purchase is not possible in the current context.

4.142 In view of observations made above, the Authority is of the view that it is premature to consider introducing spectrum trading in India and therefore, **recommends that spectrum trading should not be allowed in India, at least at this stage. This will be re-examined at a later date.**

4.143 The Second Committee in its report made the following recommendations regarding merger/transfer of spectrum:

- *Since there is scarcity of spectrum, and since the market may operate more efficiently if it is allowed to discover the optimal number of operators, merger/transfer of spectrum should be permitted amongst UAS/CMTS licensees.*
- *Spectrum may be transferred / merged in any quantity any time after assignment subject to the condition that the buyer/ resultant entity cannot have spectrum holding of more than 25% of the total assigned spectrum in the 2G spectrum bands as mentioned above in each LSA. The transfer/ merger should attract a charge which will be computed for each LSA based on recommendations of the committee. The application for transfer/merger of spectrum must be made by the licensee to whom the spectrum has been assigned, and upon grant of permission, the requisite transfer/merger charge must be paid before effecting transfer. The same fee should apply irrespective of whether the spectrum is being transferred, or acquired through a merger, or shared.*
- *The transfer charge should be payable only for the first such transfer/ merger, and only when spectrum has been assigned without an upfront charge. Spectrum assigned through auction, or start-up spectrum received through auction of UAS/CMTS license, or spectrum for which market price is paid or agreed to be paid, will not attract any charge when transferred.*

4.144 The Authority does not agree with the recommendations of the Second Committee regarding permitting trading/transfer of spectrum in view of the reasons given in Para 4.141.

Chapter V: Spectrum Management

5.1 The country has made rapid strides in telecommunications using the wireless technology. From around a few million, the number of wireless mobile subscribers have grown to over 580 million in nearly a decade. During this period, a dozen operators have commenced wireless mobile services. Starting as an entirely Government controlled Telecommunication set up, the country has moved predominantly towards private sector operators in this area.

5.2 Recent advances in wireless Technology have enabled faster data communication and convergence of voice, video and text. It is now well acknowledged that the proliferation in voice and data communications using hand held devices has resulted in high demand for Radio frequency Spectrum. The current scenario, especially in our country is characterized by a large number of operators with increasing appetite for spectrum, chasing the dwindling and scarce spectrum in various usable bands. This development is in line with international experience of spectrum scarcity and the consequent action by the concerned administrations to discover new sources of spectrum in other bands.

5.3 In the quest for spectrum, most countries and notably the developed ones have set up strong spectrum management structure and linked regulations. The objectives of spectrum management include: optimization of RF spectrum usage through increase in spectrum efficiency and rationalization of bands; interference control and regulation, introduction of new wireless

technologies; monitoring and coordination with stakeholders; coordination with other countries.

5.4 In the above background, the task before the Government in our country is to balance the available spectrum with the requirements of existing and emerging operators while factoring in newer and future technologies, for equitable growth and availability of state of the art systems at affordable rates to the people. In practical terms, this involves setting up a strong spectrum management system. It is noted that, worldwide, the Telecom Regulators are charged with this task.

5.5 In our context, the spectrum allocation and monitoring is carried out by the WPC Division of the Department of Telecommunications. The WPC Division allocates radio spectrum, monitors its use and, under the overall control of DoT, manages the resource. The DoT as licensor, grants licenses to service providers under Section 4 of the IT Act 1885 and the WPC allocates spectrum on a 'right to use' basis in terms of license conditions. There are a number of operators in each circle and interconnection issues become significant for smooth functioning of the entire telecom network.

5.6 TRAI as the Regulator has the responsibility to oversee interconnection and enforce license conditions. Both functions involve monitoring activities at the circle level, while the currently functioning monitoring organizations are WMO and TERM units which are under the control of DoT. For effective enforcement of license conditions and interconnection, constant monitoring at

operational level is a pre-requisite. In the absence of these units, it would be very difficult to exercise proper control and enforce license and other conditions. The existing organizational structure evolved over decades is a legacy of erstwhile governmental monopoly over telecommunication. Gradual liberalization over these years has led to a preponderance of private operators with corresponding decline in government controlled telecom operators. In the current scenario, the organizational setup and chain of command of the monitoring agencies may require modifications to assist the Regulator to discharge its functions effectively. On the one hand the DoT as licensor has entrusted the responsibility of enforcing license conditions and interconnection to the Regulator while on the other hand the monitoring agencies with the requisite experience and skills are administered by DoT.

5.7 A way out would be to place the Telecom Enforcement Resource and Monitoring (TERM) units under the control of TRAI which will ensure immediate availability of skilled and experienced units to the Regulator. This will extend the reach of TRAI to the circles and provide valuable monitoring and control additionalities to the Regulator at the operational level.

5.8 The WMO monitors frequency usage of operators and others routinely. It has the equipment and expertise. This Organisation is required to be strengthened to keep pace with technological advancement on one hand and multiplicity of operators and operating radio spectrum frequencies. The spectrum bands are getting crowded and multiple band operations with data and voice usage requires stricter vigil over interference. The WMO requires greater human resource and its development. Telecommunication

has an extremely rapid technological turnover and to keep abreast with the latest requires constant training and technical upgradation of the WMO officials. Besides, with greater need for monitoring and coordination of radio frequency spectrum, there is a case for more manpower and career progression. A few suggested areas are :

- Upgradation of the post of Wireless Advisor;
- Establishment of unmanned monitoring stations in Central Business districts and along coastal areas;
- Enhanced participation of WPC and WMO officials in ITU/APT;
- Augmentation of manpower in Regional Offices of Deputy Wireless Advisor.

It should be possible for the Regulator to access and source the expertise of WMO in its endeavour to discharge its mandatory functions.

5.9 Currently the 3G Auction is underway. The 2G spectrum is scarce and its technology is less efficient. The 2G licenses issued long time back will start expiring in the coming years. This is the time to look forward and plan spectrum refarming to rationalize and release large chunks of more useful spectrum for 3G and future technologies. This is an area which requires the immediate attention of the country and TRAI as the Regulator is uniquely placed to undertake the task of refarming. The refarming is an important activity in the overall spectrum management. The Authority has discussed spectrum review and refarming of spectrum as well as spectrum audit in chapter-I as part of

spectrum usage monitoring activity. Efficient spectrum usage through technology and planning by the operators is an area which requires urgent attention in our country and is an integral part of the spectrum audit exercise suggested in these recommendations.

5.10 In most countries the Regulator is responsible for spectrum management. The Authority, while keeping this aspect in view has examined the areas where a beginning could be made and has identified the following functions which it would be carrying out by itself :

- Spectrum Audit
- Interference monitoring and control
- Spectrum refarming
- Identification of newer technologies

5.11 The Authority, therefore, recommends that TRAI be strengthened by placing the TERM units under its control, and enabling TRAI to carry some of the functions through the Wireless Monitoring Organisation (WMO), even as WMO continues to function under the control of WPC Wing of the DoT.

5.12 The Authority further recommends that WPC Organisation be suitably strengthened. A few suggested areas are :

- **Upgradation of the post of Wireless Advisor;**
- **Establishment of unmanned remote monitoring units in Central Business Districts and along coastal areas;**
- **Enhanced participation of WMO/WPC officials in ITU/APT;**

- **Augmentation of manpower in Regional Offices of Deputy Wireless Advisor.**

Chapter VI: Summary of Recommendations

Chapter 1: Spectrum requirement and availability

6.1 The Authority should be entrusted with the task of carrying out a review of the present usage of spectrum available with government agencies. The objective of this exercise will be:

- **to identify the spectrum actually in use by them;**
- **to assess the efficiency of spectrum use;**
- **to identify possible alternative solutions;**
- **to examine the creation of a separate defence band;**
- **to draw up a suitable schedule for release of spectrum for Telecommunications. (Para 1.42)**

6.2 585-698 MHz may be earmarked for digital broadcasting services including Mobile TV. 698-806 MHz be earmarked only for IMT applications (Para 1.61)

6.3 Spectrum in 800 and 900 MHz bands should be refarmed at the time of renewal of the licenses. For holders of spectrum in 900 MHz band, substitute spectrum should only be assigned in 1800 MHz band and for licence holders of 800 MHz band, spectrum should be assigned in 450 /1900 MHz bands. (Para 1.73)

6.4 The Authority will carry out a separate consultation process on the issues involved in the refarming of 800/900 MHz spectrum and shall endeavour to give its recommendations before the licences come up for renewal. (Para 1.74)

6.5 The Authority would undertake the refarming exercise, at the end of which it would work out and recommend the process and timeframe for refarming. (Para 1.90)

6.6 A specific fund for spectrum refarming be created and that 50% of the realisation from all proceeds from spectrum including from the auction proceeds as well as from the Spectrum Usage charges should be transferred to this fund. (Para 1.93)

6.7 The Authority would undertake regular spectrum audit through appropriate means. The details of the audit procedure and frequency of the exercise would be finalised through a separate consultation process. (Para 1.98)

Chapter II: Licensing related issues

6.8 The contracted spectrum for all the access licences issued in or after 2001, is 6.2 MHz / 5 MHz in respect of GSM/CDMA respectively. (Para 2.47)

6.9 Keeping in view the scarcity of spectrum and the need to provide the contracted spectrum to the existing licensees, the Authority recommends that no more UAS licence linked with spectrum should be awarded. (Para 2.51)

6.10 The Authority would like the Government to note that the recommendation made by the Authority in para 2.51 above is subject to the court decisions in this regard. The applicants will however be free to apply for or opt for a Unified licence, which is being recommended for future licences separately. (Para 2.52)

6.11 All future licences should be unified licences and that spectrum be delinked from the licence. (Para 2.62)

6.12 The Authority has already recommended that in so far as future licensing is concerned, spectrum should be delinked from UAS licence. Accordingly, there is no need for any cap on the number of access service providers. This recommendation of no cap is only if the future licences are delinked from spectrum. Otherwise, the Authority's specific recommendation is that no more licences should be given. (Para 2.71)

6.13 There should be uniform licence fee across all telecom licenses and service areas. (Para 2.95)

6.14 IP-I category be also brought under the licensing regime with immediate effect. (Para 2.103)

6.15 'C' Category licence be reintroduced, with a District-wide jurisdiction to enable small operators including the cable operators to offer Internet service along with other services. (Para 2.110)

6.16 The Authority would be shortly initiating a consultation process to identify measures for the proper growth of the VAS industry, including bringing them under the licensing regime. (Para 2.117)

6.17 All licences/registrations viz. Basic/CMTS/UAS Licences in all the telecom service areas, NLD, ILD, ISP, ISP with IT and GMPCS and IP-I, PMRTS, Commercial VSAT, leftover IP-II licensees till their migration to NLD licence is finalized and IPLC should be brought under the purview of a uniform

licence fee regime. Pure value added services i.e., Voicemail/Audiotex/UMS need not however be brought under this regime. (Para 2.118)

6.18 The licence fee for all the services viz. Basic/CMTS/UAS Licences in all the telecom service areas, NLD, ILD, ISP, ISP with IT and GMPCS and IP-I licences, PMRTS, Commercial VSAT, leftover IP-II licensees till their migration to NLD licence be finalized and IPLC, in all the service areas, will progressively be brought to a uniform 6% of AGR over a four-year period, as shown in the table below. (Para 2.129)

6.19 Infrastructure providers – IP-I and the ISPs be levied a uniform licence fee which would be scaled upto 6% progressively over a three-year period, as shown in the table below. The Authority would however like the Government to examine the issues of double taxation, if any. (Para 2.130)

Uniform license fee

Service providers	2010-11	2011-12	2012-13	2013-14
UASL/CMTS in Metro	10%	9%	8%	6%
UASL/CMTS in Category 'A'	9%	8%	7%	6%
UASL/CMTS in Category 'B'	7%	6%	6%	6%
UASL/CMTS in Category 'C'	6%	6%	6%	6%
ISP	4%	5%	6%	6%
IP-I	4%	5%	6%	6%

Table

6.20 The Authority recommends that w.e.f 1.4.2010, the licence fee and spectrum usage charges payable by each such licensee shall be on actual AGR, subject to a minimum AGR

as shown in Table 2.13. This minimum figure would be reviewed by TRAI every year. (Para 2.133)

6.21 The existing roll out obligations in the CMTS/UAS licences be replaced by the following roll out obligations for all the service areas except the Metros. The rollout obligations for metros would continue to be in force. (Para 2.143)

Time	Habitation >10000	Habitation 5000-10000	Habitation 2000-5000
2 years from effective date	100%	50%	-
3 years from effective date	100%	100%	50%
4 years from effective date	100%	100%	100%

In the above roll out obligations, coverage of 90% or above habitations will be taken as compliance of the obligation.

6.22 A licensee may be allowed to cover the habitations having a population between 2000-5000 through intra service area roaming, subject to the condition that at least one third of the habitations shall be covered by its own network. (Para 2.144)

6.23 For the existing licensees, who have already completed more than 4 years but have not achieved the roll out obligations, the Authority recommends that they should be given one more year to complete the roll out in required number of habitations. (Para 2.145)

6.24 Failure to fulfil the rollout obligations would entail penalty in the form of additional spectrum usage charges at the rates indicated in Para 2.140. (Para 2.146)

6.25 In so far as Metros are concerned, the existing licence conditions will continue to apply. (Para 2.147)

6.26 Those licensees who have covered 50% of the habitations with a population of 500-2000 be given a reduction of 0.5% in the annual licence fee. And those licensees who have covered 100% (90% & above to be treated as 100%) of the habitations with a population of 500-2000 should be given a 2% discount in the annual licence fee. (Para 2.150)

6.27 The Universal Service Obligation Fund be utilised by the government for provision of telecommunications facilities in habitations having a population of less than 500 and to provide broadband to all the villages having a population of more than 1000 to start with and later extend the same to all habitations having a population of 500 and above. (Para 2.151)

6.28 In order to provide a level playing field between the old and new service providers the Authority recommends that the reduction in the licence fee shall be applicable only with effect from 1.4.2012 i.e. four years from the grant of licence to the new service providers. (Para 2.152)

6.29 A licensee must apply for renewal 30 months before its expiry and that the licensor must convey its decision preferably within 3 months but not later than 6 months from the date of application. (Para 2.163)

6.30 Existing UAS licences may be renewed for another 10 years at one time, as per the provisions of the existing licensing regime. (Para 2.164)

6.31 On renewal, the UAS licensee will be required to pay a Renewal fee which will be Rs. 2 crore for Metro and 'A' Circles, Rs. 1 crore for 'B' circles and Rs. 0.5 crore for 'C' circles. This Renewal fee does not cover the value of spectrum, which shall be paid for separately. (Para 2.165)

6.32 While renewing the licence, the Government should assign spectrum only upto the prescribed limit or the amount of spectrum assigned by it to the licensee before the renewal, whichever is less. Spectrum assigned by the Government to the licensee in excess of the Prescribed Limit shall be withdrawn. (Para 2.173)

6.33 The spectrum will be assigned at the current price, duly adjusted to the year of renewal. The Authority may review the situation and recommend to the Government the Current price from time to time. (Para 2.174)

6.34 Keeping in view the value of 900 MHz spectrum, the Authority recommends that on renewal of the licence, spectrum held by a licensee in the 900 MHz band shall be replaced by assignment of equal amount of spectrum in 1800 MHz. In case sufficient spectrum in 1800 MHz band is not available with the Government to replace the 900 MHz, the licensee will be allowed to retain the 900 MHz band spectrum on a purely temporary basis subject to the condition, and an undertaking by the licensee, that on availability of spectrum in the 1800 MHz, the spectrum given in the 900 MHz will be taken back by the Government at 6 months' notice. Renewal of the licence will be subject to, inter alia, this express condition. Similar action would be taken in respect of the

800 MHz band spectrum which would be replaced by spectrum in 1900 MHz/450 MHz band. (Para 2.175)

6.35 The framework under the new licensing regime should be as follows:

i. **<u>Unified licence</u> covering UASL/CMTS, NLD, ILD, Internet, IP-I and GMPCS;**

ii. **<u>Class licence</u> covering VSAT services; and**

iii. **<u>Licensing through Authorisation</u> covering PMRTS, Radio Paging and Voice Mail/Audio Tex/Unified Messaging Service.**

iv. **<u>Broadcasting licences</u> (Para 2.186)**

6.36 A Unified licensee shall be permitted to offer any/all services covered under 'Class licence' and 'Licensing through Authorization' but not vice-versa. Such a licensing regime will be service and technology neutral and shall permit a unified license holder to offer any or all telecom services. Spectrum, if required, is to be obtained separately. (Para 2.187)

6.37 There shall be two levels of Unified licence: National level and Service area level. National level unified licence shall permit the licensee to offer any or all of the abovementioned services in any/all service areas. Service area level unified licence, on the other hand restricts this option to the specified service area/s for which licence is given. Such licensees would not be permitted to offer NLD & ILD services. Both these licences will carry an obligation to pay licence fee at 6% of the AGR. (Para 2.188)

6.38 For Nationwide Unified licence an Entry Fee of Rs. 20 crore be levied. For Service area-wise licences, the Entry Fee may be Rs. 2 crore for the Metros and Category 'A' service areas, Rs. 1 crore for Category 'B' and Rs. 0.5 crore for Category 'C' service areas. In addition, Annual Licence fee of 6% on AGR will be levied. (Para 2.195)

6.39 The V-SAT licence will continue to have an Entry Fee of Rs. 30 lakh and an annual licence fee of 6% of AGR. The Entry Fee for licences through Authorisation will entail an Entry Fee of Rs. 10,000 and an annual licence fee of 1% of the AGR. (Para 2.196)

6.40 In case an existing licensee obtains a Unified License, the licensee shall surrender the old licence(s). However, in case of CMTS/UASL, the licensee will continue to retain the spectrum assigned for the validity period of the old license. (Para 2.197)

6.41 In respect of the unified licences, there will be no roll out obligations. But from the second year of the effective date of the license, the licensee will pay the licence fee at the applicable rate, subject to a minimum of 10% of the Entry fee. (Para 2.201)

Chapter III: Spectrum Assignment And Pricing

6.42 The limit on spectrum to be assigned to a service provider will be 2X8MHz for all service areas other than in Delhi and Mumbai where it will be 2X10MHz. Similarly for CDMA spectrum the Authority recommends that the limit on

spectrum will be 2X5MHz for all service areas and 2X6.25 MHz in the Metro areas of Delhi and Mumbai. As concluded in Chapter-II, the contracted Spectrum as per the license is 6.2MHz/5 MHz (GSM/CDMA) only. Therefore, even though the service provider will be assigned spectrum upto the Prescribed limit, Spectrum assigned beyond contracted amount will be paid for at the Current price. This will be equally applicable to the service providers who are already holding the excess spectrum and those who will be assigned beyond the contracted amount in future. (Para 3.28)

6.43 Spectrum beyond contractual quantity i.e. 2x6.2MHz may be assigned in the following tranches:-

- **For all the service areas, the additional spectrum may be assigned in a single tranche of 2x1.8MHz making a total 2x8MHz;**
- **For the metro service areas of Delhi and Mumbai, the additional spectrum may be assigned in two tranches; the first tranche of 2x1.8MHz, the making a total of 2x8MHz and then the second tranche of 2x2MHz making a total of 2x10MHz. (Para 3.34)**

6.44 The use of subscriber linked criteria be done away with for assignment of spectrum. (Para 3.43)

6.45 Spectrum in the 800,900 and 1800 MHz bands should not be subject to auction. (Para 3.46)

6.46 Spectrum in 800 and 900 MHz bands shall however may be subject to auction as and when it is refarmed. (Para 3.48)

6.47 The Government should bring additional blocks into 3G services at the earliest and offer the same at the highest price being discovered through the present auction to the remaining bidders in the order of bids. If, however, more than a year lapses from now for this exercise, a fresh auction needs to be conducted. (Para 3.50)

6.48 The eligibility conditions for assignment of additional spectrum beyond the initial start up spectrum, shall be as follows:

- **For assignment of spectrum beyond 2.5 MHz and upto 3.75 MHz of CDMA, the service providers should have made the commercial launch and have covered 25% of the district headquarters or any other town in the district in lieu thereof. (Para 3.52)**
- **For assignment of spectrum beyond 4.4 MHz and up to 6.2 MHz in respect of GSM as well as beyond 3.75 MHz and up to 5MHz in respect of CDMA, the service provider should have covered at least 50% of the District headquarters or any other town in a 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 coverage. The assignment is subject to the condition that the service provider will complete the prescribed roll out obligations for 2 years, within a period of 6 months from the date of assignment of additional spectrum. (Para 3.52)**
- **For assignment of spectrum from 6.2 to 8 MHz in respect of GSM and from 5 MHz to 6.25 MHz in respect of CDMA, the service providers should have completed the two**

years' roll-out target. The assignment is subject to the condition that the service providers will complete the roll-out target prescribed for three years within a period of one year from the date of assignment of additional spectrum. (Para 3.52)

- **In Delhi and Mumbai, the service provider would be entitled for additional GSM spectrum beyond 4.4 MHz upto 6.2 MHz on achievement of 90% street coverage of the Metro service area. Achievement of 5% and 10% of market share in the Metro service area would entitle the service provider for spectrum of 8 MHz and 10 MHz respectively. In respect of CDMA, the commercial launch and 90% street coverage would be the entitlement for spectrum from 2.5 MHz upto 3.75 MHz, and achievement of 5% and 10%of the market share in the Metro service area for 5 MHz and 6.25 MHz respectively. (Para 3.52)**

6.49 The subscriber linked criteria, as adopted by the Government in January 2008 be kept operational only for a period of six months to enable all operators who are already qualified for the additional spectrum based on the prevalent SLC or those who would be qualified within the next six months, to be assigned additional spectrum subject to availability and the Prescribed limit recommended earlier (Para 3.27). Assignment of additional spectrum to such service providers will be subject to the condition that they shall complete the 2 years' roll out obligation within a period of six months from the date of assignment of additional spectrum. (Para 3.54)

6.50 The inter-se priority between the different categories of operators shall be as follows:

a. **Licensees who have received the initial start up spectrum and have met the eligibility conditions for grant of additional spectrum up to 6.2/5 MHz will be given the top priority. The inter-se priority for such operators, subject to meeting the eligibility norms, would be the date of application for additional spectrum.**

b. **Licensees who have been assigned the committed spectrum but are waiting to get additional spectrum- up to the maximum permissible limit will be next in priority. The inter-se priority between operators within this group, subject to meeting the eligibility norms, would also be the date of application for additional spectrum.**

c. **Next in priority will be those who are waiting for the start up spectrum. The inter-se priority between such operators would be the date of UAS licence. (Para 3.61)**

6.51 Spectrum in bands other than 800, 900 and 1800 MHz could be considered for non-commercial use on a case by case basis, after due reference to and recommendation from TRAI. However, such assignment will be done very sparingly.

Users of all spectrum assigned for the non-commercial usage in the identified commercial bands will be levied an annual spectrum usage charge comparable to the charge being paid for the commercial services. (Para 3.69)

6.52 The 3G prices be adopted as the 'Current price' of spectrum in the 1800 MHz band. At the same time, Authority is separately initiating an exercise to further study this subject and would apprise the Government of its findings. (Para 3.82)

6.53 **The Current price of spectrum in the 900 MHz band be fixed at 1.5 times that of the 1800 MHz band. The Authority recommends that this be also fixed as the price of Spectrum in the 800 MHz band. (Para 3.91)**

6.54 **All the service providers having spectrum beyond the contracted quantum should pay excess spectrum charges at the Current price, pro-rated for the period of the remaining validity of their licence subject to a minimum of seven years. Service providers returning the excess spectrum shall be liable to return the 900 MHz spectrum if any and also pay the additional one-time charges at the Current price for a minimum period of three years. (Para 3.99)**

6.55 **The excess spectrum beyond 8 MHz would be charged at 1.3 times the current price. (Para 3.102)**

6.56 **Excess spectrum in 900 MHz band should be charged at 1.5 times that of excess spectrum in 1800 MHz band. It will equally apply in cases of 800 MHz band, if any. (Para 3.104)**

6.57 **The Authority does not favour the levy of uniform spectrum charges. The Authority, on the other hand, favours a continuation of the differential spectrum usage charges, with the operators having larger spectrum paying a higher percentage as compared to those with lesser spectrum. (Para 3.117)**

6.58 **Spectrum usage charges, both for GSM and CDMA spectrum, should be at the rate of 0.5% for every MHz up to the contracted spectrum and at the rate of 1% for every MHz in respect of spectrum beyond the contracted quantity, subject**

to a limit of 10% in respect of GSM and 7% in respect of CDMA. The Authority recommends that the changes effected on 25.2.2010 be suitably modified. (Para 3.122)

6.59 The spectrum usage charges will be reviewed after an interval of 2 years. (Para 3.127)

Chapter IV: Consolidation of spectrum

6.60 The following should be the guidelines "intra service area Merger of Cellular Mobile Telephone Service (CMTS)/ Unified Access Services (UAS) Licences":

i. Prior approval of the Licensor shall be necessary for merger of the licence.

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

iii. Merger of licence(s) shall be permitted in the following category of licences:(i) Cellular Mobile Telephone Service (CMTS) Licence with Cellular Mobile Telephone Service (CMTS) Licence; (ii) Unified Access Services Licence (UASL) with Unified Access Services Licence (UASL); (iii) Cellular Mobile Telephone Service (CMTS) Licence with Unified Access Services Licence (UASL); and (iv) Unified licence with Unified licence.

Merged licences in all the categories above shall be in UASL category only. In case of Unified licences, this shall not apply.

iv. The relevant market for determining the market share will no longer be classified separately as 'Wire line' and

'Wireless'. It will be defined in future as the entire access market.

v. **For determination of market power, market share of both subscriber base and Adjusted Gross Revenue of licensee in the relevant market shall be considered.**

vi. **The market share of the Resultant entity in the relevant market shall not be greater than 30 % of the total subscriber base and/or the AGR in a licensed telecommunication service area.**

vii. **Exchange Data Records (EDR) shall be used in the calculation of wireline subscribers and Visitor Location Register (VLR) data, in the calculation of wireless subscribers for the purpose of computing market share based on subscriber base.**

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

ix. **No M&A activity shall be allowed if the number of UAS/CMTS access service providers reduces below six in the relevant market consequent upon such an M&A activity under consideration.**

x. **Consequent upon the Merger of licences in a service area, the total spectrum held by the post merger Resultant entity shall not exceed 14.4 MHz for GSM technology. In respect of CDMA technology, the ceiling will be 10 MHz.**

xi. **As the resultant entity is entitled to only one block of 6.2 MHz/ 5MHz for the Entry fee paid, either of the parties to the merger should pay the Spectrum price i.e.**

the difference between the Current price and the sum already paid, before permission for merger is granted.

xii. The spectrum transfer charge, @5% of the difference between the transaction price and the total current price, shall be payable before permission is granted.

xiii. If, as a result of the merger, the total spectrum held by the resultant entity is beyond the limits prescribed, the excess spectrum must be surrendered. Discretion to choose the band to surrender the spectrum beyond the ceiling will be of the resultant entity.

xiv. 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 licensees before issue of the permission for merger of licences.

xv. If consequent to merger of licences in a service area, the licensee becomes a "Significant Market Power" (SMP) post merger, then the extant rules & regulations applicable to SMPs would also apply to the resultant entity.

xvi. In so far as mergers that take place before 31.3.2011, the resultant entity will be required to pay, for the first year after merger, the spectrum usage charges at the rate applicable to the higher spectrum of the two merging entities at the time of merger. In the second year, the resultant entity will be liable to pay spectrum usage charges at a rate which is the average of the rate on the combined spectrum and the rate that was applicable to the higher spectrum of the two merging entities.

xvii. The provisions relating to substantial equity and cross holding be in conformity with the provisions of the UAS licence which is that "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' and that a promoter company/ Legal person cannot have stakes in more than one LICENSEE Company for the same service area."

xviii. The stipulation regarding the minimum period of three years from the effective date of license for merger/acquisition be done away with.

xix. The licence condition in the UAS licence be amended to stipulate that the promoters whose net worth/equity has been taken into consideration for determining the eligibility of the licence shall not dilute their equity below 51% for a period of 5 years or till the roll-out conditions have been fully accomplished, whichever is earlier. Any reduction below 51% shall be with the prior and specific permission of the licensor.

xx. The duration of licence of the resultant entity in the respective service area will be equal to the higher of the two periods on the date of merger. This does not however entitle the resultant entity to retain the entire spectrum till the expiry of licence period. The Authority recommends that while a fresh licence can be issued in the name of the resultant entity, the Wireless operating

licences will be issued separately for the two sets of spectrum retaining the respective validity. (Para 4.81)

6.61 The following guidelines be adopted for spectrum sharing:

- **Spectrum sharing will be permitted but in each case, it will be in the same licence service area and will be with the prior permission of the licensor, strictly in accordance with the guidelines being laid out.**
- **Permission for spectrum sharing will be given for a maximum period of 5 years. There shall be no renewal.**
- **Spectrum sharing will be allowed only between parties each of whom does not have more than 4.4MHz /2.5 MHz (GSM/CDMA) of spectrum.**
- **Sharing will be allowed only if there are at least six operators in the LSA, post-sharing arrangement.**
- **Spectrum sharing will not be permitted among licensees having 3G spectrum.**
- **Spectrum sharing would involve both the service providers utilising the spectrum. Leasing of spectrum is not permitted.**
- **Spectrum can be shared only between two spectrum holders. In other words, a non-licensee or licensee who has not been assigned access spectrum as yet cannot be a party to spectrum sharing.**
- **Parties sharing the spectrum will be deemed to be sharing their entire spectrum. In other words, even if the licensees are sharing partial spectrum, it will be taken as sharing of entire spectrum for the purpose of charging.**

- **Both the parties will pay to the Government the prorated current price for spectrum beyond 6.2/5 MHz, in the ratio of the spectrum held by them individually.**
- **Spectrum usage charges will be levied on both the operators individually but on the total spectrum held by both the operators together. In other words, if an operator X having 4.4MHz of spectrum shares 4.4 MHz of spectrum of another operator Y, then both X and Y will be liable to pay spectrum usage charges applicable to 8.8 MHz of spectrum. (Para 4.118)**

6.62 Spectrum trading should not be allowed in India, at least at this stage. This will be re-examined at a later date. (Para 4.142)

Chapter V: Spectrum Management

6.63 TRAI be strengthened by placing the TERM units under its control, and enabling TRAI to carry some of the functions through the Wireless Monitoring Organisation (WMO), even as WMO continues to function under the control of WPC Wing of the DoT. (Para 5.11)

6.64 WPC Organisation be suitably strengthened. A few suggested areas are :

- **Upgradation of the post of Wireless Advisor;**
- **Establishment of unmanned remote monitoring units in Central Business Districts and along coastal areas;**
- **Enhanced participation of WMO/WPC officials in ITU/APT;**
- **Augmentation of manpower in Regional Offices of Deputy Wireless Advisor. (Para 5.12)**

No. 20-100/2007-AS-I (Vol-II)
Government of India
Ministry of Communications
Department of Telecommunications
Sanchar Bhavan, 20, Ashoka Road, New Delhi-110 001.

7th July, 2009

To

The Secretary, TRAI,
MTNL Exchange Building,
Jawahar Lal Nehru Marg, Minto Road,
New Delhi.

Sir,

TRAI, in its recommendations dated 28.08.2007 on "Review of license terms & conditions and capping of number of access providers", inter-alia in para 6.4, recommended 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. Accordingly, Government constituted a Committee on 7.11.2007 to recommend revised Subscriber Linked Criterion (SLC) for allocation of spectrum in a scientific and practicable manner. The Committee submitted its report on 18th December 2007 and a decision on the recommendations of Committee was taken and orders revising subscriber based criterion for allocation of spectrum were issued on 17th January 2008 as an interim measure. While taking the decision on recommendations of the said Committee Government also approved constitution of a new Committee. The new Committee was constituted in DoT on 16th June 2008 with members from TEC, C-DOT, Wireless and other wings of DOT, Professors from IIT, IIM, MDI, Ministry of Defence.

3. The Committee has submitted its Report on 13th May 2009 (Copy enclosed). The issues on which the Committee has given its recommendations were earlier deliberated in detail by TRAI also while giving its recommendations on "Review of license terms & conditions and capping of number of access providers" on 28th August 2007. The recommendations of the Committee have wider implications on Telecom Sector and to public at large. Moreover, all the recommendations are inter-linked or inter-depended. Therefore, recommendations of TRAI are sought on the recommendations/comments of the Report."

Further, the recommendation of the Committee also include Telecom licenses to be in perpetuality as long as the licensee pays the annual license fee and meets license conditions. TRAI may also recommend the terms and conditions of existing UAS/CMTS license for extending validity of these licenses perpetually or otherwise vis-à-vis 2G spectrum(GSM and/or CDMA) allocated and/or 3G spectrum owned by existing licensees, as the case may be.

4. 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 as mentioned in para 3 above.

7/7/2009

(A.K. Srivastava)
DDG(Access Services-I)
Tel : 23716874

Annexure-II

F.No.L-14016/72/2006-NT
Ministry of Communication & IT
Department of Telecommunications
(WPC Wing)
*****

Sanchar Bhavan,
New Delhi, dated 7 July, 2009

The Secretary
Telecom Regulatory Authority of India
3rd Floor, MTNL Doorsanchar Bhavan,
Jawahar Lal Nehru Marg,
New Delhi-110002

Subject: Clarification on TRAI's recommendations for auctioning of all spectrum other than 800,900,1800 MHz.

Sir,

I am directed to refer to para 2.79 of TRAI's recommendations dated 28.8.2007 on "Review of license terms and conditions and capping of number of access providers" wherein it has been stated that in the case of spectrum in bands other than 800, 900 and 1800 MHz i.e. bands that are yet to be allocated, Authority had recommended that in future all spectrum excluding the spectrum in 800, 900 and 1800 MHz bands should be auctioned so as to ensure efficient utilisation of this scarce resource.

2. WPC Wing has been assigning frequencies for different services / users and applications in various bands other than 800, 900 and 1800 MHz bands including government organisations. In addition to above, spectrum is also allotted for new technologies as and when required on case to case basis, which have not yet become commercial.

3. In view of above, TRAI is requested to furnish clarification on auctioning of all spectrum other than 800, 900 and 1800 MHz bands as stated in para 2.79 of their recommendation dated 28.8.2007 on "Review of license terms and conditions and capping of number of access providers" urgtently.

Yours faithfully,

(S. Chandrasekar)
Deputy Secretary to the Government of India

Annexure-III

No. 20-228/2009-AS-I
Government of India
Ministry of Communications
Department of Telecommunications
Sanchar Bhavan, 20, Ashoka Road, New Delhi-110 001.

22nd July, 2009

To

The Secretary, TRAI,
MTNL Exchange Building,
Jawahar Lal Nehru Marg, Minto Road,
New Delhi.

Sir,

On 13th April 2007, Government sought Recommendations of TRAI on the issue of limiting the number of Access providers in each service area and review of certain terms and conditions in the Access provider license including the issue of permitting service providers to offer access services using combination of technologies (CDMA,GSM and/or any other) under the same license.

2. TRAI, in its recommendations dated 28.08.2007 on " Review of license terms & conditions and capping of number of access providers", inter-alia recommended that *"No cap be placed on the number of access service providers in any service area."*

3. Government accepted the above recommendations of TRAI. However, there has been a spurt in the number of applications received by DOT for grant of UAS licenses after receipt of TRAI recommendations dated 28.08.2007. Therefore, on 24.09.2007, a cut-off date was announced as 1.10.2007 stating that no new UASL application will be received after this cut-off date till further orders. 575 applications for UASL licenses were received till the cut-off date, i.e. 01-10-2007, from 46 applicant companies in respect of 22 service areas in the country. In view of the volume of applications, it was decided to issue Letter of Intents (LOIs) to all eligible applicants for UASL who applied upto 25-9-2007 (i.e. the date on which the cut-off date for receipt of applications were made public through press) in each service area. Accordingly, so far 122 new UAS licences have been issued out of 232 UASL applications received upto 25.09.2007.

The balance 343 applications for grant of UAS licenses filed within the period of 26.09.2007 and 1.10.2007 are still pending with the Department.

4. Presently, the total Number of CMTS/UAS licences in a service area ranges from 12 to 14 and the total Number of pending UASL applications in a service area ranges from 13 to 19. Consideration of these pending applications will push the demand for spectrum in a substantial manner.

Contd - - -2/-

5. Hon'ble TDSAT, in para 116 of its judgement dated 31.03.2009, in Petition No. 286 of 2007 in the matter of COAI & Othrs. Vs. UOI & Othrs, has observed that:

> *".....Already, as indicated by TRAI itself, there are 6 to 9 operators in each service area and there is demand for additional spectrum. It is therefore puzzling as to why TRAI recommended a no cap policy on the number of service providers. In our view, DOT would be well advised to review this policy keeping in view the various relevant parameters and take an appropriate decision...."*

6. In view of the fact that sufficient competition seems to be already in place & 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 & maintain the Quality of Service, the Government is to take a view on the policy of no capping on the number of Access Service providers in each service area in terms of pending applications for grant of new UAS licences received from 26.09.2007 to 01.10.2007. Details enclosed in **Annexure-III**.

7. Therefore, 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 and keeping in view of the objective of NTP-99, on the issues mentioned in para 6 above.

22/7/09

(A.K. Srivastava)
DDG(Access Services-I)
Tel : 23716874
Fax:23372201

Annexure:

(i) List of Access service licences as on 30.06.2009 - **Annexure - I**.
(ii) Particulars of those applications who applied upto 25.09.2007 & who were not given licenses & their applications are still pending due to court cases etc. - **Annexure- II**.
(iii) Details of 343 pending applications for grant of UAS licenses filed within the period of 26.09.2007 and 1.10.2007- **Annexure -III**.

Service Areawise List of Access Services Licences-As on 30.06.2009

S.No.	Service Area	Name of Licensee Company	Type of Licence	Effective Date of Licence
1	Andhra Pradesh	Bharti Airtel Limited	UAS	12-Dec-1995
2	Andhra Pradesh	Idea Cellular Ltd.	CMTS	19-Dec-1995
3	Andhra Pradesh	Tata Teleservices Ltd.	UAS	30-Sep-1997
4	Andhra Pradesh	Bharat Sanchar Nigam Ltd.	CMTS	29-Feb-2000
5	Andhra Pradesh	Reliance Communications Ltd.	UAS	20-Jul-2001
6	Andhra Pradesh	Vodafone Essar South Ltd.	UAS	29-Sep-2001
7	Andhra Pradesh	Aircel Ltd.	UAS	5-Dec-2006
8	Andhra Pradesh	Datacom Solutions Pvt. Ltd.	UAS	25-Jan-2008
9	Andhra Pradesh	Etisalat DB Telecom Pvt. Ltd.	UAS	25-Jan-2008
10	Andhra Pradesh	Loop Telecom Private Ltd.	UAS	25-Jan-2008
11	Andhra Pradesh	Sistema Shyam TeleServices Ltd.	UAS	25-Jan-2008
12	Andhra Pradesh	Spice Communications Ltd.	UAS	25-Jan-2008
13	Andhra Pradesh	Unitech Wireless (South) Pvt. Ltd.	UAS	25-Jan-2008
14	Assam	Reliance Telecom Ltd.	UAS	12-Dec-1995
15	Assam	Bharat Sanchar Nigam Ltd.	CMTS	29-Feb-2000
16	Assam	Dishnet Wireless Ltd.	UAS	21-Apr-2004
17	Assam	Bharti Airtel Limited	UAS	8-Jul-2004
18	Assam	Vodafone Essar Spacetel Ltd.	UAS	5-Dec-2006
19	Assam	Datacom Solutions Pvt. Ltd.	UAS	25-Jan-2008
20	Assam	Idea Cellular Ltd.	UAS	25-Jan-2008
21	Assam	Loop Telecom Private Ltd.	UAS	25-Jan-2008
22	Assam	S Tel Ltd.	UAS	25-Jan-2008
23	Assam	Sistema Shyam TeleServices Ltd.	UAS	25-Jan-2008
24	Assam	Tata Teleservices Ltd.	UAS	25-Jan-2008
25	Assam	Unitech Wireless (East) Pvt. Ltd.	UAS	25-Jan-2008
26	Bihar	Reliance Telecom Ltd.	UAS	12-Dec-1995
27	Bihar	Bharat Sanchar Nigam Ltd.	CMTS	29-Feb-2000
28	Bihar	Reliance Communications Ltd.	UAS	20-Jul-2001
29	Bihar	Tata Teleservices Ltd.	UAS	30-Jan-2004
30	Bihar	Bharti Airtel Limited	UAS	10-Feb-2004
31	Bihar	Dishnet Wireless Ltd.	UAS	21-Apr-2004
32	Bihar	Vodafone Essar Spacetel Ltd.	UAS	5-Dec-2006
33	Bihar	Aditya Birla Telecom Ltd.	UAS	6-Dec-2006
34	Bihar	Datacom Solutions Pvt. Ltd.	UAS	25-Jan-2008
35	Bihar	Loop Telecom Private Ltd.	UAS	25-Jan-2008
36	Bihar	S Tel Ltd.	UAS	25-Jan-2008
37	Bihar	Sistema Shyam TeleServices Ltd.	UAS	25-Jan-2008
38	Bihar	Unitech Wireless (East) Pvt. Ltd.	UAS	25-Jan-2008
39	Bihar	Allianz Infratech (P) Ltd.	UAS	31-Jul-2008
40	Chennai	Aircel Cellular Limited	CMTS	29-Nov-1994
41	Chennai	Bharat Sanchar Nigam Ltd.	CMTS	29-Feb-2000
42	Chennai	Tata Teleservices Ltd.	UAS	31-Aug-2001
43	Chennai	Vodafone Essar South Ltd.	UAS	26-Sep-2001
44	Delhi	Bharti Airtel Limited	UAS	29-Nov-1994
45	Delhi	Vodafone Essar Mobile Services Ltd.	UAS	29-Nov-1994
46	Delhi	Mahanagar Telephone Nigam Ltd.	CMTS	10-Oct-1997
47	Delhi	Reliance Communications Ltd.	UAS	20-Jul-2001

S.No.	Service Area	Name of Licensee Company	Type of Licence	Effective Date of Licence
48	Delhi	Tata Teleservices Ltd.	UAS	31-Aug-2001
49	Delhi	Idea Cellular Ltd.	CMTS	5-Oct-2001
50	Delhi	Aircel Ltd.	UAS	5-Dec-2006
51	Delhi	Datacom Solutions Pvt. Ltd.	UAS	25-Jan-2008
52	Delhi	Etisalat DB Telecom Pvt. Ltd.	UAS	25-Jan-2008
53	Delhi	Loop Telecom Private Ltd.	UAS	25-Jan-2008
54	Delhi	Sistema Shyam TeleServices Ltd.	UAS	25-Jan-2008
55	Delhi	Spice Communications Ltd.	UAS	25-Jan-2008
56	Delhi	Unitech Wireless (Delhi) Pvt.Ltd.	UAS	25-Jan-2008
57	Gujarat	Idea Cellular Ltd.	CMTS	12-Dec-1995
58	Gujarat	Vodafone Essar Gujarat Ltd.	UAS	19-Dec-1995
59	Gujarat	Reliance Communications Ltd.	UAS	30-Sep-1997
60	Gujarat	Bharat Sanchar Nigam Ltd.	CMTS	29-Feb-2000
61	Gujarat	Tata Teleservices Ltd.	UAS	31-Aug-2001
62	Gujarat	Bharti Airtel Limited	UAS	28-Sep-2001
63	Gujarat	Aircel Ltd.	UAS	5-Dec-2006
64	Gujarat	Datacom Solutions Pvt. Ltd.	UAS	25-Jan-2008
65	Gujarat	Etisalat DB Telecom Pvt. Ltd.	UAS	25-Jan-2008
66	Gujarat	Loop Telecom Private Ltd.	UAS	25-Jan-2008
67	Gujarat	Sistema Shyam TeleServices Ltd.	UAS	25-Jan-2008
68	Gujarat	Unitech Wireless (West) Pvt. Ltd.	UAS	25-Jan-2008
69	Haryana	Idea Cellular Ltd.	CMTS	12-Dec-1995
70	Haryana	Vodafone Essar Digilink Ltd.	UAS	12-Dec-1995
71	Haryana	Bharat Sanchar Nigam Ltd.	CMTS	29-Feb-2000
72	Haryana	Reliance Communications Ltd.	UAS	20-Jul-2001
73	Haryana	Bharti Airtel Limited	UAS	28-Sep-2001
74	Haryana	Tata Teleservices Ltd.	UAS	30-Jan-2004
75	Haryana	Dishnet Wireless Ltd.	UAS	14-Dec-2006
76	Haryana	Datacom Solutions Pvt. Ltd.	UAS	25-Jan-2008
77	Haryana	Etisalat DB Telecom Pvt. Ltd.	UAS	25-Jan-2008
78	Haryana	Loop Telecom Private Ltd.	UAS	25-Jan-2008
79	Haryana	Sistema Shyam TeleServices Ltd.	UAS	25-Jan-2008
80	Haryana	Spice Communications Ltd.	UAS	25-Jan-2008
81	Haryana	Unitech Wireless (North) Pvt. Ltd.	UAS	25-Jan-2008
82	Himachal Pradesh	Bharti Airtel Limited	UAS	12-Dec-1995
83	Himachal Pradesh	Reliance Telecom Ltd.	UAS	12-Dec-1995
84	Himachal Pradesh	Bharat Sanchar Nigam Ltd.	CMTS	29-Feb-2000
85	Himachal Pradesh	Reliance Communications Ltd.	UAS	20-Jul-2001
86	Himachal Pradesh	Idea Cellular Ltd.	CMTS	5-Oct-2001
87	Himachal Pradesh	Tata Teleservices Ltd.	UAS	30-Jan-2004
88	Himachal Pradesh	Dishnet Wireless Ltd.	UAS	21-Apr-2004
89	Himachal Pradesh	Vodafone Essar Spacetel Ltd.	UAS	5-Dec-2006
90	Himachal Pradesh	Datacom Solutions Pvt. Ltd.	UAS	25-Jan-2008
91	Himachal Pradesh	Loop Telecom Private Ltd.	UAS	25-Jan-2008
92	Himachal Pradesh	S Tel Ltd.	UAS	25-Jan-2008
93	Himachal Pradesh	Sistema Shyam TeleServices Ltd.	UAS	25-Jan-2008
94	Himachal Pradesh	Unitech Wireless (North) Pvt. Ltd.	UAS	25-Jan-2008
95	Jammu & Kashmir	Bharat Sanchar Nigam Ltd.	CMTS	29-Feb-2000
96	Jammu & Kashmir	Bharti Airtel Limited	UAS	10-Feb-2004

S.No.	Service Area	Name of Licensee Company	Type of Licence	Effective Date of Licence
97	Jammu & Kashmir	Dishnet Wireless Ltd.	UAS	21-Apr-2004
98	Jammu & Kashmir	Reliance Communications Ltd.	UAS	6-Sep-2004
99	Jammu & Kashmir	Vodafone Essar Spacetel Ltd.	UAS	5-Dec-2006
100	Jammu & Kashmir	Datacom Solutions Pvt. Ltd.	UAS	25-Jan-2008
101	Jammu & Kashmir	Idea Cellular Ltd.	UAS	25-Jan-2008
102	Jammu & Kashmir	Loop Telecom Private Ltd.	UAS	25-Jan-2008
103	Jammu & Kashmir	S Tel Ltd.	UAS	25-Jan-2008
104	Jammu & Kashmir	Sistema Shyam TeleServices Ltd.	UAS	25-Jan-2008
105	Jammu & Kashmir	Tata Teleservices Ltd.	UAS	25-Jan-2008
106	Jammu & Kashmir	Unitech Wireless (North) Pvt. Ltd.	UAS	25-Jan-2008
107	Karnataka	Bharti Airtel Limited	UAS	15-Feb-1996
108	Karnataka	Spice Communications Ltd.	UAS	9-Apr-1996
109	Karnataka	Bharat Sanchar Nigam Ltd.	CMTS	29-Feb-2000
110	Karnataka	Reliance Communications Ltd.	UAS	20-Jul-2001
111	Karnataka	Tata Teleservices Ltd.	UAS	31-Aug-2001
112	Karnataka	Vodafone Essar South Ltd.	UAS	26-Sep-2001
113	Karnataka	Aircel Ltd.	UAS	5-Dec-2006
114	Karnataka	Datacom Solutions Pvt. Ltd.	UAS	25-Jan-2008
115	Karnataka	Etisalat DB Telecom Pvt. Ltd.	UAS	25-Jan-2008
116	Karnataka	Idea Cellular Ltd.	UAS	25-Jan-2008
117	Karnataka	Loop Telecom Private Ltd.	UAS	25-Jan-2008
118	Karnataka	Sistema Shyam TeleServices Ltd.	UAS	25-Jan-2008
119	Karnataka	Unitech Wireless (South) Pvt. Ltd.	UAS	25-Jan-2008
120	Kerala	Idea Cellular Ltd.	CMTS	12-Dec-1995
121	Kerala	Vodafone Essar Cellular Ltd.	UAS	12-Dec-1995
122	Kerala	Bharat Sanchar Nigam Ltd.	CMTS	29-Feb-2000
123	Kerala	Reliance Communications Ltd.	UAS	20-Jul-2001
124	Kerala	Bharti Airtel Limited	UAS	28-Sep-2001
125	Kerala	Tata Teleservices Ltd.	UAS	30-Jan-2004
126	Kerala	Dishnet Wireless Ltd.	UAS	14-Dec-2006
127	Kerala	Datacom Solutions Pvt. Ltd.	UAS	25-Jan-2008
128	Kerala	Etisalat DB Telecom Pvt. Ltd.	UAS	25-Jan-2008
129	Kerala	Loop Telecom Private Ltd.	UAS	25-Jan-2008
130	Kerala	Sistema Shyam TeleServices Ltd.	UAS	25-Jan-2008
131	Kerala	Unitech Wireless (South) Pvt. Ltd.	UAS	25-Jan-2008
132	Kolkata	Bharti Airtel Limited	UAS	29-Nov-1994
133	Kolkata	Vodafone Essar East Ltd.	UAS	29-Nov-1994
134	Kolkata	Bharat Sanchar Nigam Ltd.	CMTS	29-Feb-2000
135	Kolkata	Reliance Communications Ltd.	UAS	20-Jul-2001
136	Kolkata	Reliance Telecom Ltd.	UAS	27-Sep-2001
137	Kolkata	Tata Teleservices Ltd.	UAS	30-Jan-2004
138	Kolkata	Dishnet Wireless Ltd.	UAS	14-Dec-2006
139	Kolkata	Datacom Solutions Pvt. Ltd.	UAS	25-Jan-2008
140	Kolkata	Idea Cellular Ltd.	UAS	25-Jan-2008
141	Kolkata	Loop Telecom Private Ltd.	UAS	25-Jan-2008
142	Kolkata	Sistema Shyam TeleServices Ltd.	UAS	25-Jan-2008
143	Kolkata	Unitech Wireless (Kolkata) Pvt. Ltd.	UAS	25-Jan-2008
144	Madhya Pradesh	Idea Cellular Ltd.	CMTS	12-Dec-1995
145	Madhya Pradesh	Reliance Telecom Ltd.	UAS	12-Dec-1995

S.No.	Service Area	Name of Licensee Company	Type of Licence	Effective Date of Licence
146	Madhya Pradesh	Bharat Sanchar Nigam Ltd.	CMTS	29-Feb-2000
147	Madhya Pradesh	Reliance Communications Ltd.	UAS	20-Jul-2001
148	Madhya Pradesh	Bharti Airtel Limited	UAS	28-Sep-2001
149	Madhya Pradesh	Tata Teleservices Ltd.	UAS	12-Feb-2004
150	Madhya Pradesh	Dishnet Wireless Ltd.	UAS	14-Dec-2006
151	Madhya Pradesh	Vodafone Essar Spacetel Ltd.	UAS	20-Mar-2007
152	Madhya Pradesh	Datacom Solutions Pvt. Ltd.	UAS	25-Jan-2008
153	Madhya Pradesh	Loop Telecom Private Ltd.	UAS	25-Jan-2008
154	Madhya Pradesh	Sistema Shyam TeleServices Ltd.	UAS	25-Jan-2008
155	Madhya Pradesh	Unitech Wireless (West) Pvt. Ltd.	UAS	25-Jan-2008
156	Madhya Pradesh	Allianz Infratech (P) Ltd.	UAS	31-Jul-2008
157	Maharashtra	Idea Cellular Ltd.	CMTS	12-Dec-1995
158	Maharashtra	Vodafone Essar Cellular Ltd.	UAS	19-Dec-1995
159	Maharashtra	Tata Teleservices (Maharashtra) Ltd.	UAS	30-Sep-1997
160	Maharashtra	Bharat Sanchar Nigam Ltd.	CMTS	29-Feb-2000
161	Maharashtra	Reliance Communications Ltd.	UAS	20-Jul-2001
162	Maharashtra	Bharti Airtel Limited	UAS	28-Sep-2001
163	Maharashtra	Aircel Ltd.	UAS	5-Dec-2006
164	Maharashtra	Datacom Solutions Pvt. Ltd.	UAS	25-Jan-2008
165	Maharashtra	Etisalat DB Telecom Pvt. Ltd.	UAS	25-Jan-2008
166	Maharashtra	Loop Telecom Private Ltd.	UAS	25-Jan-2008
167	Maharashtra	Sistema Shyam TeleServices Ltd.	UAS	25-Jan-2008
168	Maharashtra	Spice Communications Ltd.	UAS	25-Jan-2008
169	Maharashtra	Unitech Wireless (West) Pvt. Ltd.	UAS	25-Jan-2008
170	Mumbai	Loop Mobile (India) Ltd.	CMTS	29-Nov-1994
171	Mumbai	Vodafone Essar Ltd.	UAS	29-Nov-1994
172	Mumbai	Tata Teleservices (Maharashtra) Ltd.	UAS	30-Sep-1997
173	Mumbai	Mahanagar Telephone Nigam Ltd.	CMTS	10-Oct-1997
174	Mumbai	Reliance Communications Ltd.	UAS	20-Jul-2001
175	Mumbai	Bharti Airtel Limited	UAS	28-Sep-2001
176	Mumbai	Idea Cellular Ltd.	UAS	5-Dec-2006
177	Mumbai	Aircel Ltd.	UAS	6-Dec-2006
178	Mumbai	Datacom Solutions Pvt. Ltd.	UAS	25-Jan-2008
179	Mumbai	Etisalat DB Telecom Pvt. Ltd.	UAS	25-Jan-2008
180	Mumbai	Sistema Shyam TeleServices Ltd.	UAS	25-Jan-2008
181	Mumbai	Unitech Wireless (Mumbai) Pvt. Ltd.	UAS	25-Jan-2008
182	North East	Bharti Hexacom Ltd.	CMTS	12-Dec-1995
183	North East	Reliance Telecom Ltd.	UAS	12-Dec-1995
184	North East	Bharat Sanchar Nigam Ltd.	CMTS	29-Feb-2000
185	North East	Dishnet Wireless Ltd.	UAS	21-Apr-2004
186	North East	Vodafone Essar Spacetel Ltd.	UAS	5-Dec-2006
187	North East	Datacom Solutions Pvt. Ltd.	UAS	25-Jan-2008
188	North East	Idea Cellular Ltd.	UAS	25-Jan-2008
189	North East	Loop Telecom Private Ltd.	UAS	25-Jan-2008
190	North East	S Tel Ltd.	UAS	25-Jan-2008
191	North East	Sistema Shyam TeleServices Ltd.	UAS	25-Jan-2008
192	North East	Tata Teleservices Ltd.	UAS	25-Jan-2008
193	North East	Unitech Wireless (East) Pvt. Ltd.	UAS	25-Jan-2008
194	Orissa	Reliance Telecom Ltd.	UAS	12-Dec-1995

S.No.	Service Area	Name of Licensee Company	Type of Licence	Effective Date of Licence
195	Orissa	Bharat Sanchar Nigam Ltd.	CMTS	29-Feb-2000
196	Orissa	Reliance Communications Ltd.	UAS	20-Jul-2001
197	Orissa	Tata Teleservices Ltd.	UAS	30-Jan-2004
198	Orissa	Bharti Airtel Limited	UAS	10-Feb-2004
199	Orissa	Dishnet Wireless Ltd.	UAS	21-Apr-2004
200	Orissa	Vodafone Essar Spacetel Ltd.	UAS	5-Dec-2006
201	Orissa	Datacom Solutions Pvt. Ltd.	UAS	25-Jan-2008
202	Orissa	Idea Cellular Ltd.	UAS	25-Jan-2008
203	Orissa	Loop Telecom Private Ltd.	UAS	25-Jan-2008
204	Orissa	S Tel Ltd.	UAS	25-Jan-2008
205	Orissa	Sistema Shyam TeleServices Ltd.	UAS	25-Jan-2008
206	Orissa	Unitech Wireless (East) Pvt. Ltd.	UAS	25-Jan-2008
207	Punjab	Bharti Airtel Limited	UAS	12-Dec-1995
208	Punjab	Spice Communications Ltd.	UAS	9-Apr-1996
209	Punjab	HFCL Infotel Ltd.	UAS	30-Sep-1997
210	Punjab	Bharat Sanchar Nigam Ltd.	CMTS	29-Feb-2000
211	Punjab	Reliance Communications Ltd.	UAS	20-Jul-2001
212	Punjab	Vodafone Essar South Ltd.	UAS	5-Oct-2001
213	Punjab	Tata Teleservices Ltd.	UAS	30-Jan-2004
214	Punjab	Dishnet Wireless Ltd.	UAS	14-Dec-2006
215	Punjab	Etisalat DB Telecom Pvt. Ltd.	UAS	25-Jan-2008
216	Punjab	Idea Cellular Ltd.	UAS	25-Jan-2008
217	Punjab	Loop Telecom Private Ltd.	UAS	25-Jan-2008
218	Punjab	Sistema Shyam TeleServices Ltd.	UAS	25-Jan-2008
219	Punjab	Unitech Wireless (North) Pvt. Ltd.	UAS	25-Jan-2008
220	Rajasthan	Vodafone Essar Digilink Ltd.	UAS	12-Dec-1995
221	Rajasthan	Bharti Hexacom Ltd.	UAS	22-Apr-1996
222	Rajasthan	Sistema Shyam TeleServices Ltd.	UAS	4-Mar-1998
223	Rajasthan	Bharat Sanchar Nigam Ltd.	CMTS	29-Feb-2000
224	Rajasthan	Reliance Communications Ltd.	UAS	20-Jul-2001
225	Rajasthan	Idea Cellular Ltd.	CMTS	5-Oct-2001
226	Rajasthan	Tata Teleservices Ltd.	UAS	30-Jan-2004
227	Rajasthan	Aircel Ltd.	UAS	5-Dec-2006
228	Rajasthan	Datacom Solutions Pvt. Ltd.	UAS	25-Jan-2008
229	Rajasthan	Etisalat DB Telecom Pvt. Ltd.	UAS	25-Jan-2008
230	Rajasthan	Loop Telecom Private Ltd.	UAS	25-Jan-2008
231	Rajasthan	Unitech Wireless (North) Pvt. Ltd.	UAS	25-Jan-2008
232	Tamilnadu (excluding Chennai Service Area)	Vodafone Essar Cellular Ltd.	UAS	12-Dec-1995
233	Tamilnadu (excluding Chennai Service Area)	Aircel Ltd.	CMTS	31-Dec-1998
234	Tamilnadu (excluding Chennai Service Area)	Bharat Sanchar Nigam Ltd.	CMTS	29-Feb-2000
235	Tamilnadu (excluding Chennai Service Area)	Tata Teleservices Ltd.	UAS	31-Aug-2001
236	Tamilnadu (including Chennai Service Area)	Reliance Communications Ltd.	UAS	26-Sep-2001
237	Tamilnadu (including Chennai Service Area)	Bharti Airtel Limited	UAS	28-Sep-2001
238	Tamilnadu (including Chennai Service Area)	Datacom Solutions Pvt. Ltd.	UAS	25-Jan-2008
239	Tamilnadu (including Chennai Service Area)	Etisalat DB Telecom Pvt. Ltd.	UAS	25-Jan-2008
240	Tamilnadu (including Chennai Service Area)	Idea Cellular Ltd.	UAS	25-Jan-2008
241	Tamilnadu (including Chennai Service Area)	Loop Telecom Private Ltd.	UAS	25-Jan-2008
242	Tamilnadu (including Chennai Service Area)	Sistema Shyam TeleServices Ltd.	UAS	25-Jan-2008

S.No.	Service Area	Name of Licensee Company	Type of Licence	Effective Date of Licence
243	Tamilnadu (including Chennai Service Area)	Unitech Wireless (Tamil Nadu) Pvt. Ltd.	UAS	25-Jan-2008
244	Uttar Pradesh (East)	Vodafone Essar Digilink Ltd.	UAS	12-Dec-1995
245	Uttar Pradesh (East)	Bharat Sanchar Nigam Ltd.	CMTS	29-Feb-2000
246	Uttar Pradesh (East)	Reliance Communications Ltd.	UAS	20-Jul-2001
247	Uttar Pradesh (East)	Idea Cellular Ltd.	CMTS	5-Oct-2001
248	Uttar Pradesh (East)	Tata Teleservices Ltd.	UAS	30-Jan-2004
249	Uttar Pradesh (East)	Bharti Airtel Limited	UAS	10-Feb-2004
250	Uttar Pradesh (East)	Dishnet Wireless Ltd.	UAS	14-Dec-2006
251	Uttar Pradesh (East)	Datacom Solutions Pvt. Ltd.	UAS	25-Jan-2008
252	Uttar Pradesh (East)	Etisalat DB Telecom Pvt. Ltd.	UAS	25-Jan-2008
253	Uttar Pradesh (East)	Loop Telecom Private Ltd.	UAS	25-Jan-2008
254	Uttar Pradesh (East)	Sistema Shyam TeleServices Ltd.	UAS	25-Jan-2008
255	Uttar Pradesh (East)	Unitech Wireless (East) Pvt. Ltd.	UAS	25-Jan-2008
256	Uttar Pradesh (West)	Idea Cellular Ltd.	CMTS	12-Dec-1995
257	Uttar Pradesh (West)	Bharat Sanchar Nigam Ltd.	CMTS	29-Feb-2000
258	Uttar Pradesh (West)	Reliance Communications Ltd.	UAS	20-Jul-2001
259	Uttar Pradesh (West)	Bharti Airtel Limited	UAS	28-Sep-2001
260	Uttar Pradesh (West)	Tata Teleservices Ltd.	UAS	30-Jan-2004
261	Uttar Pradesh (West)	Vodafone Essar South Ltd.	UAS	13-Feb-2004
262	Uttar Pradesh (West)	Dishnet Wireless Ltd.	UAS	14-Dec-2006
263	Uttar Pradesh (West)	Datacom Solutions Pvt. Ltd.	UAS	25-Jan-2008
264	Uttar Pradesh (West)	Etisalat DB Telecom Pvt. Ltd.	UAS	25-Jan-2008
265	Uttar Pradesh (West)	Loop Telecom Private Ltd.	UAS	25-Jan-2008
266	Uttar Pradesh (West)	Sistema Shyam TeleServices Ltd.	UAS	25-Jan-2008
267	Uttar Pradesh (West)	Unitech Wireless (North) Pvt. Ltd.	UAS	25-Jan-2008
268	West Bengal	Reliance Telecom Ltd.	UAS	12-Dec-1995
269	West Bengal	Bharat Sanchar Nigam Ltd.	CMTS	29-Feb-2000
270	West Bengal	Reliance Communications Ltd.	UAS	20-Jul-2001
271	West Bengal	Tata Teleservices Ltd.	UAS	30-Jan-2004
272	West Bengal	Bharti Airtel Limited	UAS	11-Feb-2004
273	West Bengal	Vodafone Essar South Ltd.	UAS	23-Mar-2004
274	West Bengal	Dishnet Wireless Ltd.	UAS	21-Apr-2004
275	West Bengal	Datacom Solutions Pvt. Ltd.	UAS	25-Jan-2008
276	West Bengal	Idea Cellular Ltd.	UAS	25-Jan-2008
277	West Bengal	Loop Telecom Private Ltd.	UAS	25-Jan-2008
278	West Bengal	Sistema Shyam TeleServices Ltd.	UAS	25-Jan-2008
279	West Bengal	Unitech Wireless (East) Pvt. Ltd.	UAS	25-Jan-2008

CMTS: Cellular Mobile Telephone Service **UAS:** Unified Access Services

Note: In addition to above, one Basic Service Licence has been granted to M/s. Bharat Sanchar Nigam Limited (BSNL) for All India except Delhi & Mumbai service areas and one Basic Service Licence has been granted to M/s. Mahanagar Telephone Nigam Limited (MTNL) for Delhi & Mumbai service areas

SUMMARY OF LICENSEES	
BASIC LICENSEES	**2**
CMTS LICENSEES	**38**
UAS LICENSEES	**241**
TOTAL LICENSEES	**281**

Particulars of those who applied upto 25.09.2007 & who were not given licenses & whose applications are still pending due to court cases

S. No.	Name of Company	Number of Pending Applications	Status of Court Case	Remarks
1.	ByCell Telecomm India Pvt. Ltd.	5	Company has filed a petition in High Court of Delhi. Next date of hearing is 25.09.2009.	5 LOIs issued but UAS licence agreements are not signed so far because of security related issues.
2.	HFCL Infotel Ltd.	21	Company has filed a petition in High Court of Delhi. The Court disposed-off the petition with direction to DOT to consider the representation of the company.	As per direction of High Court of Delhi, applications of the company are under re-examination.
3.	Parsvnath Developers Limited	22	Company has filed a petition in High Court of Delhi. Hearing over.	Judgment of the High Court of Delhi is awaited.
4.	Allianz Infratech (P) Ltd.	20	Company has filed a petition in High Court of Delhi. Next date of hearing is 08.10.2009.	Paid-up equity of the company was in-sufficient. Out of the 22 applications, 2 UAS licence were signed in August 2008 within the paid up equity of Rs. 10 crore.

Details of 343 Pending UASL Applications received from 26.09.2007 to 01.10.2007

S.No.	SERVICE AREA	COMPANY	DATE OF APPLICATION
1	Delhi	Videocon Industries Limited	26-Sep-2007
2	Gujarat	Videocon Industries Limited	26-Sep-2007
3	Kolkata	Videocon Industries Limited	26-Sep-2007
4	Maharashtra	Videocon Industries Limited	26-Sep-2007
5	Mumbai	Videocon Industries Limited	26-Sep-2007
6	Uttar Pradesh (East)	Videocon Industries Limited	26-Sep-2007
7	Uttar Pradesh (West)	Videocon Industries Limited	26-Sep-2007
8	West Bengal	Videocon Industries Limited	26-Sep-2007
9	Andhra Pradesh	Bhubaneshwar I.T. Park Developers Ltd.	28-Sep-2007
10	Assam	Bhubaneshwar I.T. Park Developers Ltd.	28-Sep-2007
11	Bihar	Bhubaneshwar I.T. Park Developers Ltd.	28-Sep-2007
12	Delhi	Bhubaneshwar I.T. Park Developers Ltd.	28-Sep-2007
13	Gujarat	Bhubaneshwar I.T. Park Developers Ltd.	28-Sep-2007
14	Haryana	Bhubaneshwar I.T. Park Developers Ltd.	28-Sep-2007
15	Himachal Pradesh	Bhubaneshwar I.T. Park Developers Ltd.	28-Sep-2007
16	Jammu & Kashmir	Bhubaneshwar I.T. Park Developers Ltd.	28-Sep-2007
17	Karnataka	Bhubaneshwar I.T. Park Developers Ltd.	28-Sep-2007
18	Kerala	Bhubaneshwar I.T. Park Developers Ltd.	28-Sep-2007
19	Kolkata	Bhubaneshwar I.T. Park Developers Ltd.	28-Sep-2007
20	Madhya Pradesh	Bhubaneshwar I.T. Park Developers Ltd.	28-Sep-2007
21	Maharashtra	Bhubaneshwar I.T. Park Developers Ltd.	28-Sep-2007
22	Mumbai	Bhubaneshwar I.T. Park Developers Ltd.	28-Sep-2007
23	North East	Bhubaneshwar I.T. Park Developers Ltd.	28-Sep-2007
24	Orissa	Bhubaneshwar I.T. Park Developers Ltd.	28-Sep-2007
25	Punjab	Bhubaneshwar I.T. Park Developers Ltd.	28-Sep-2007
26	Rajasthan	Bhubaneshwar I.T. Park Developers Ltd.	28-Sep-2007
27	Tamilnadu (including Chennai)	Bhubaneshwar I.T. Park Developers Ltd.	28-Sep-2007
28	Uttar Pradesh (East)	Bhubaneshwar I.T. Park Developers Ltd.	28-Sep-2007
29	Uttar Pradesh (West)	Bhubaneshwar I.T. Park Developers Ltd.	28-Sep-2007
30	West Bengal	Bhubaneshwar I.T. Park Developers Ltd.	28-Sep-2007
31	Andhra Pradesh	JSW Power Trading Company Limited	28-Sep-2007
32	Delhi	JSW Power Trading Company Limited	28-Sep-2007
33	Gujarat	JSW Power Trading Company Limited	28-Sep-2007
34	Haryana	JSW Power Trading Company Limited	28-Sep-2007
35	Karnataka	JSW Power Trading Company Limited	28-Sep-2007
36	Kerala	JSW Power Trading Company Limited	28-Sep-2007
37	Madhya Pradesh	JSW Power Trading Company Limited	28-Sep-2007
38	Maharashtra	JSW Power Trading Company Limited	28-Sep-2007
39	Mumbai	JSW Power Trading Company Limited	28-Sep-2007
40	Orissa	JSW Power Trading Company Limited	28-Sep-2007
41	Punjab	JSW Power Trading Company Limited	28-Sep-2007
42	Rajasthan	JSW Power Trading Company Limited	28-Sep-2007
43	Tamilnadu (including Chennai)	JSW Power Trading Company Limited	28-Sep-2007
44	Uttar Pradesh (East)	JSW Power Trading Company Limited	28-Sep-2007
45	Uttar Pradesh (West)	JSW Power Trading Company Limited	28-Sep-2007
46	Orissa	Ortel Communications Ltd.	28-Sep-2007
47	Andhra Pradesh	S Tel Ltd.	28-Sep-2007
48	Delhi	S Tel Ltd.	28-Sep-2007
49	Gujarat	S Tel Ltd.	28-Sep-2007
50	Haryana	S Tel Ltd.	28-Sep-2007
51	Karnataka	S Tel Ltd.	28-Sep-2007
52	Kerala	S Tel Ltd.	28-Sep-2007
53	Kolkata	S Tel Ltd.	28-Sep-2007

S.No.	SERVICE AREA	COMPANY	DATE OF APPLICATION
54	Madhya Pradesh	S Tel Ltd.	28-Sep-2007
55	Maharashtra	S Tel Ltd.	28-Sep-2007
56	Mumbai	S Tel Ltd.	28-Sep-2007
57	Punjab	S Tel Ltd.	28-Sep-2007
58	Rajasthan	S Tel Ltd.	28-Sep-2007
59	Tamilnadu (including Chennai)	S Tel Ltd.	28-Sep-2007
60	Uttar Pradesh (East)	S Tel Ltd.	28-Sep-2007
61	Uttar Pradesh (West)	S Tel Ltd.	28-Sep-2007
62	West Bengal	S Tel Ltd.	28-Sep-2007
63	Haryana	Tulip IT Services Ltd.	28-Sep-2007
64	Madhya Pradesh	Tulip IT Services Ltd.	28-Sep-2007
65	Orissa	Tulip IT Services Ltd.	28-Sep-2007
66	Rajasthan	Tulip IT Services Ltd.	28-Sep-2007
67	Uttar Pradesh (West)	Tulip IT Services Ltd.	28-Sep-2007
68	West Bengal	Tulip IT Services Ltd.	28-Sep-2007
69	Andhra Pradesh	Videocon Industries Limited	28-Sep-2007
70	Haryana	Videocon Industries Limited	28-Sep-2007
71	Himachal Pradesh	Videocon Industries Limited	28-Sep-2007
72	Karnataka	Videocon Industries Limited	28-Sep-2007
73	Kerala	Videocon Industries Limited	28-Sep-2007
74	Punjab	Videocon Industries Limited	28-Sep-2007
75	Rajasthan	Videocon Industries Limited	28-Sep-2007
76	Tamilnadu (including Chennai)	Videocon Industries Limited	28-Sep-2007
77	Assam	ACME Tele Power Ltd.	1-Oct-2007
78	Bihar	ACME Tele Power Ltd.	1-Oct-2007
79	Himachal Pradesh	ACME Tele Power Ltd.	1-Oct-2007
80	Jammu & Kashmir	ACME Tele Power Ltd.	1-Oct-2007
81	Madhya Pradesh	ACME Tele Power Ltd.	1-Oct-2007
82	North East	ACME Tele Power Ltd.	1-Oct-2007
83	Orissa	ACME Tele Power Ltd.	1-Oct-2007
84	Punjab	ACME Tele Power Ltd.	1-Oct-2007
85	Rajasthan	ACME Tele Power Ltd.	1-Oct-2007
86	Uttar Pradesh (East)	ACME Tele Power Ltd.	1-Oct-2007
87	Uttar Pradesh (West)	ACME Tele Power Ltd.	1-Oct-2007
88	West Bengal	ACME Tele Power Ltd.	1-Oct-2007
89	Haryana	Anjney Loys Pvt Ltd.	1-Oct-2007
90	Kerala	Anjney Loys Pvt Ltd.	1-Oct-2007
91	Rajasthan	Anjney Loys Pvt Ltd.	1-Oct-2007
92	Andhra Pradesh	AT&T Global Network Services India Pvt. Ltd.	1-Oct-2007
93	Assam	AT&T Global Network Services India Pvt. Ltd.	1-Oct-2007
94	Bihar	AT&T Global Network Services India Pvt. Ltd.	1-Oct-2007
95	Delhi	AT&T Global Network Services India Pvt. Ltd.	1-Oct-2007
96	Gujarat	AT&T Global Network Services India Pvt. Ltd.	1-Oct-2007
97	Haryana	AT&T Global Network Services India Pvt. Ltd.	1-Oct-2007
98	Himachal Pradesh	AT&T Global Network Services India Pvt. Ltd.	1-Oct-2007
99	Jammu & Kashmir	AT&T Global Network Services India Pvt. Ltd.	1-Oct-2007
100	Karnataka	AT&T Global Network Services India Pvt. Ltd.	1-Oct-2007
101	Kerala	AT&T Global Network Services India Pvt. Ltd.	1-Oct-2007
102	Kolkata	AT&T Global Network Services India Pvt. Ltd.	1-Oct-2007
103	Madhya Pradesh	AT&T Global Network Services India Pvt. Ltd.	1-Oct-2007
104	Maharashtra	AT&T Global Network Services India Pvt. Ltd.	1-Oct-2007
105	Mumbai	AT&T Global Network Services India Pvt. Ltd.	1-Oct-2007
106	North East	AT&T Global Network Services India Pvt. Ltd.	1-Oct-2007
107	Orissa	AT&T Global Network Services India Pvt. Ltd.	1-Oct-2007

S.No.	SERVICE AREA	COMPANY	DATE OF APPLICATION
108	Punjab	AT&T Global Network Services India Pvt. Ltd.	1-Oct-2007
109	Rajasthan	AT&T Global Network Services India Pvt. Ltd.	1-Oct-2007
110	Tamilnadu (including Chennai)	AT&T Global Network Services India Pvt. Ltd.	1-Oct-2007
111	Uttar Pradesh (East)	AT&T Global Network Services India Pvt. Ltd.	1-Oct-2007
112	Uttar Pradesh (West)	AT&T Global Network Services India Pvt. Ltd.	1-Oct-2007
113	West Bengal	AT&T Global Network Services India Pvt. Ltd.	1-Oct-2007
114	Andhra Pradesh	Avnija Properties Ltd.	1-Oct-2007
115	Assam	Avnija Properties Ltd.	1-Oct-2007
116	Bihar	Avnija Properties Ltd.	1-Oct-2007
117	Delhi	Avnija Properties Ltd.	1-Oct-2007
118	Gujarat	Avnija Properties Ltd.	1-Oct-2007
119	Haryana	Avnija Properties Ltd.	1-Oct-2007
120	Himachal Pradesh	Avnija Properties Ltd.	1-Oct-2007
121	Jammu & Kashmir	Avnija Properties Ltd.	1-Oct-2007
122	Karnataka	Avnija Properties Ltd.	1-Oct-2007
123	Kerala	Avnija Properties Ltd.	1-Oct-2007
124	Kolkata	Avnija Properties Ltd.	1-Oct-2007
125	Madhya Pradesh	Avnija Properties Ltd.	1-Oct-2007
126	Maharashtra	Avnija Properties Ltd.	1-Oct-2007
127	Mumbai	Avnija Properties Ltd.	1-Oct-2007
128	North East	Avnija Properties Ltd.	1-Oct-2007
129	Orissa	Avnija Properties Ltd.	1-Oct-2007
130	Punjab	Avnija Properties Ltd.	1-Oct-2007
131	Rajasthan	Avnija Properties Ltd.	1-Oct-2007
132	Tamilnadu (including Chennai)	Avnija Properties Ltd.	1-Oct-2007
133	Uttar Pradesh (East)	Avnija Properties Ltd.	1-Oct-2007
134	Uttar Pradesh (West)	Avnija Properties Ltd.	1-Oct-2007
135	West Bengal	Avnija Properties Ltd.	1-Oct-2007
136	Delhi	Balasore Alloys Ltd.	1-Oct-2007
137	Kolkata	Balasore Alloys Ltd.	1-Oct-2007
138	Andhra Pradesh	BPTP Ltd.	1-Oct-2007
139	Bihar	BPTP Ltd.	1-Oct-2007
140	Delhi	BPTP Ltd.	1-Oct-2007
141	Gujarat	BPTP Ltd.	1-Oct-2007
142	Haryana	BPTP Ltd.	1-Oct-2007
143	Karnataka	BPTP Ltd.	1-Oct-2007
144	Kerala	BPTP Ltd.	1-Oct-2007
145	Madhya Pradesh	BPTP Ltd.	1-Oct-2007
146	Maharashtra	BPTP Ltd.	1-Oct-2007
147	Mumbai	BPTP Ltd.	1-Oct-2007
148	Orissa	BPTP Ltd.	1-Oct-2007
149	Punjab	BPTP Ltd.	1-Oct-2007
150	Rajasthan	BPTP Ltd.	1-Oct-2007
151	Tamilnadu (including Chennai)	BPTP Ltd.	1-Oct-2007
152	Uttar Pradesh (East)	BPTP Ltd.	1-Oct-2007
153	Uttar Pradesh (West)	BPTP Ltd.	1-Oct-2007
154	Andhra Pradesh	ByCell Telecomm India Pvt. Ltd.	1-Oct-2007
155	Delhi	ByCell Telecomm India Pvt. Ltd.	1-Oct-2007
156	Gujarat	ByCell Telecomm India Pvt. Ltd.	1-Oct-2007
157	Haryana	ByCell Telecomm India Pvt. Ltd.	1-Oct-2007
158	Himachal Pradesh	ByCell Telecomm India Pvt. Ltd.	1-Oct-2007
159	Jammu & Kashmir	ByCell Telecomm India Pvt. Ltd.	1-Oct-2007
160	Karnataka	ByCell Telecomm India Pvt. Ltd.	1-Oct-2007

S.No.	SERVICE AREA	COMPANY	DATE OF APPLICATION
161	Kerala	ByCell Telecomm India Pvt. Ltd.	1-Oct-2007
162	Kolkata	ByCell Telecomm India Pvt. Ltd.	1-Oct-2007
163	Madhya Pradesh	ByCell Telecomm India Pvt. Ltd.	1-Oct-2007
164	Maharashtra	ByCell Telecomm India Pvt. Ltd.	1-Oct-2007
165	Mumbai	ByCell Telecomm India Pvt. Ltd.	1-Oct-2007
166	Punjab	ByCell Telecomm India Pvt. Ltd.	1-Oct-2007
167	Rajasthan	ByCell Telecomm India Pvt. Ltd.	1-Oct-2007
168	Tamilnadu (including Chennai)	ByCell Telecomm India Pvt. Ltd.	1-Oct-2007
169	Uttar Pradesh (East)	ByCell Telecomm India Pvt. Ltd.	1-Oct-2007
170	Uttar Pradesh (West)	ByCell Telecomm India Pvt. Ltd.	1-Oct-2007
171	Andhra Pradesh	Cellebrum.com Pvt. Ltd.	1-Oct-2007
172	Assam	Cellebrum.com Pvt. Ltd.	1-Oct-2007
173	Bihar	Cellebrum.com Pvt. Ltd.	1-Oct-2007
174	Delhi	Cellebrum.com Pvt. Ltd.	1-Oct-2007
175	Gujarat	Cellebrum.com Pvt. Ltd.	1-Oct-2007
176	Haryana	Cellebrum.com Pvt. Ltd.	1-Oct-2007
177	Himachal Pradesh	Cellebrum.com Pvt. Ltd.	1-Oct-2007
178	Jammu & Kashmir	Cellebrum.com Pvt. Ltd.	1-Oct-2007
179	Karnataka	Cellebrum.com Pvt. Ltd.	1-Oct-2007
180	Kerala	Cellebrum.com Pvt. Ltd.	1-Oct-2007
181	Kolkata	Cellebrum.com Pvt. Ltd.	1-Oct-2007
182	Madhya Pradesh	Cellebrum.com Pvt. Ltd.	1-Oct-2007
183	Maharashtra	Cellebrum.com Pvt. Ltd.	1-Oct-2007
184	Mumbai	Cellebrum.com Pvt. Ltd.	1-Oct-2007
185	North East	Cellebrum.com Pvt. Ltd.	1-Oct-2007
186	Orissa	Cellebrum.com Pvt. Ltd.	1-Oct-2007
187	Punjab	Cellebrum.com Pvt. Ltd.	1-Oct-2007
188	Rajasthan	Cellebrum.com Pvt. Ltd.	1-Oct-2007
189	Tamilnadu (including Chennai)	Cellebrum.com Pvt. Ltd.	1-Oct-2007
190	Uttar Pradesh (East)	Cellebrum.com Pvt. Ltd.	1-Oct-2007
191	Uttar Pradesh (West)	Cellebrum.com Pvt. Ltd.	1-Oct-2007
192	West Bengal	Cellebrum.com Pvt. Ltd.	1-Oct-2007
193	Gujarat	Electrotherm (India) Ltd.	1-Oct-2007
194	Rajasthan	Gontermann-Peipers (India) Ltd.	1-Oct-2007
195	Andhra Pradesh	HTMT Telecom Pvt. Ltd.	1-Oct-2007
196	Delhi	HTMT Telecom Pvt. Ltd.	1-Oct-2007
197	Gujarat	HTMT Telecom Pvt. Ltd.	1-Oct-2007
198	Haryana	HTMT Telecom Pvt. Ltd.	1-Oct-2007
199	Karnataka	HTMT Telecom Pvt. Ltd.	1-Oct-2007
200	Kerala	HTMT Telecom Pvt. Ltd.	1-Oct-2007
201	Kolkata	HTMT Telecom Pvt. Ltd.	1-Oct-2007
202	Maharashtra	HTMT Telecom Pvt. Ltd.	1-Oct-2007
203	Mumbai	HTMT Telecom Pvt. Ltd.	1-Oct-2007
204	Punjab	HTMT Telecom Pvt. Ltd.	1-Oct-2007
205	Rajasthan	HTMT Telecom Pvt. Ltd.	1-Oct-2007
206	Tamilnadu (including Chennai)	HTMT Telecom Pvt. Ltd.	1-Oct-2007
207	Uttar Pradesh (West)	HTMT Telecom Pvt. Ltd.	1-Oct-2007
208	Andhra Pradesh	Ispat Industry Ltd.	1-Oct-2007
209	Gujarat	Ispat Industry Ltd.	1-Oct-2007
210	Karnataka	Ispat Industry Ltd.	1-Oct-2007
211	Maharashtra	Ispat Industry Ltd.	1-Oct-2007
212	Mumbai	Ispat Industry Ltd.	1-Oct-2007

S.No.	SERVICE AREA	COMPANY	DATE OF APPLICATION
213	Tamilnadu (including Chennai)	Ispat Industry Ltd.	1-Oct-2007
214	Assam	Meta Telecom Pvt. Ltd	1-Oct-2007
215	Bihar	Meta Telecom Pvt. Ltd	1-Oct-2007
216	North East	Meta Telecom Pvt. Ltd	1-Oct-2007
217	Orissa	Meta Telecom Pvt. Ltd	1-Oct-2007
218	Uttar Pradesh (East)	Meta Telecom Pvt. Ltd	1-Oct-2007
219	Uttar Pradesh (West)	Meta Telecom Pvt. Ltd	1-Oct-2007
220	West Bengal	Meta Telecom Pvt. Ltd	1-Oct-2007
221	Andhra Pradesh	Moser Baer Infrastructure Limited	1-Oct-2007
222	Assam	Moser Baer Infrastructure Limited	1-Oct-2007
223	Bihar	Moser Baer Infrastructure Limited	1-Oct-2007
224	Delhi	Moser Baer Infrastructure Limited	1-Oct-2007
225	Gujarat	Moser Baer Infrastructure Limited	1-Oct-2007
226	Haryana	Moser Baer Infrastructure Limited	1-Oct-2007
227	Himachal Pradesh	Moser Baer Infrastructure Limited	1-Oct-2007
228	Jammu & Kashmir	Moser Baer Infrastructure Limited	1-Oct-2007
229	Karnataka	Moser Baer Infrastructure Limited	1-Oct-2007
230	Kerala	Moser Baer Infrastructure Limited	1-Oct-2007
231	Kolkata	Moser Baer Infrastructure Limited	1-Oct-2007
232	Madhya Pradesh	Moser Baer Infrastructure Limited	1-Oct-2007
233	Maharashtra	Moser Baer Infrastructure Limited	1-Oct-2007
234	Mumbai	Moser Baer Infrastructure Limited	1-Oct-2007
235	North East	Moser Baer Infrastructure Limited	1-Oct-2007
236	Orissa	Moser Baer Infrastructure Limited	1-Oct-2007
237	Punjab	Moser Baer Infrastructure Limited	1-Oct-2007
238	Rajasthan	Moser Baer Infrastructure Limited	1-Oct-2007
239	Tamilnadu (including Chennai)	Moser Baer Infrastructure Limited	1-Oct-2007
240	Uttar Pradesh (East)	Moser Baer Infrastructure Limited	1-Oct-2007
241	Uttar Pradesh (West)	Moser Baer Infrastructure Limited	1-Oct-2007
242	West Bengal	Moser Baer Infrastructure Limited	1-Oct-2007
243	Andhra Pradesh	Next Generation Telecommunications (Pvt.) Ltd.	1-Oct-2007
244	Assam	Next Generation Telecommunications (Pvt.) Ltd.	1-Oct-2007
245	Bihar	Next Generation Telecommunications (Pvt.) Ltd.	1-Oct-2007
246	Delhi	Next Generation Telecommunications (Pvt.) Ltd.	1-Oct-2007
247	Gujarat	Next Generation Telecommunications (Pvt.) Ltd.	1-Oct-2007
248	Haryana	Next Generation Telecommunications (Pvt.) Ltd.	1-Oct-2007
249	Himachal Pradesh	Next Generation Telecommunications (Pvt.) Ltd.	1-Oct-2007
250	Jammu & Kashmir	Next Generation Telecommunications (Pvt.) Ltd.	1-Oct-2007
251	Karnataka	Next Generation Telecommunications (Pvt.) Ltd.	1-Oct-2007
252	Kerala	Next Generation Telecommunications (Pvt.) Ltd.	1-Oct-2007
253	Kolkata	Next Generation Telecommunications (Pvt.) Ltd.	1-Oct-2007
254	Madhya Pradesh	Next Generation Telecommunications (Pvt.) Ltd.	1-Oct-2007
255	Maharashtra	Next Generation Telecommunications (Pvt.) Ltd.	1-Oct-2007
256	Mumbai	Next Generation Telecommunications (Pvt.) Ltd.	1-Oct-2007
257	North East	Next Generation Telecommunications (Pvt.) Ltd.	1-Oct-2007
258	Orissa	Next Generation Telecommunications (Pvt.) Ltd.	1-Oct-2007
259	Punjab	Next Generation Telecommunications (Pvt.) Ltd.	1-Oct-2007
260	Rajasthan	Next Generation Telecommunications (Pvt.) Ltd.	1-Oct-2007
261	Tamilnadu (including Chennai)	Next Generation Telecommunications (Pvt.) Ltd.	1-Oct-2007
262	Uttar Pradesh (East)	Next Generation Telecommunications (Pvt.) Ltd.	1-Oct-2007
263	Uttar Pradesh (West)	Next Generation Telecommunications (Pvt.) Ltd.	1-Oct-2007
264	West Bengal	Next Generation Telecommunications (Pvt.) Ltd.	1-Oct-2007
265	Andhra Pradesh	Prithvi Information Solutions Ltd.	1-Oct-2007

S.No.	SERVICE AREA	COMPANY	DATE OF APPLICATION
266	Assam	Prithvi Information Solutions Ltd.	1-Oct-2007
267	Bihar	Prithvi Information Solutions Ltd.	1-Oct-2007
268	Delhi	Prithvi Information Solutions Ltd.	1-Oct-2007
269	Gujarat	Prithvi Information Solutions Ltd.	1-Oct-2007
270	Haryana	Prithvi Information Solutions Ltd.	1-Oct-2007
271	Himachal Pradesh	Prithvi Information Solutions Ltd.	1-Oct-2007
272	Jammu & Kashmir	Prithvi Information Solutions Ltd.	1-Oct-2007
273	Karnataka	Prithvi Information Solutions Ltd.	1-Oct-2007
274	Kerala	Prithvi Information Solutions Ltd.	1-Oct-2007
275	Kolkata	Prithvi Information Solutions Ltd.	1-Oct-2007
276	Madhya Pradesh	Prithvi Information Solutions Ltd.	1-Oct-2007
277	Maharashtra	Prithvi Information Solutions Ltd.	1-Oct-2007
278	Mumbai	Prithvi Information Solutions Ltd.	1-Oct-2007
279	North East	Prithvi Information Solutions Ltd.	1-Oct-2007
280	Orissa	Prithvi Information Solutions Ltd.	1-Oct-2007
281	Punjab	Prithvi Information Solutions Ltd.	1-Oct-2007
282	Rajasthan	Prithvi Information Solutions Ltd.	1-Oct-2007
283	Tamilnadu (including Chennai)	Prithvi Information Solutions Ltd.	1-Oct-2007
284	Uttar Pradesh (East)	Prithvi Information Solutions Ltd.	1-Oct-2007
285	Uttar Pradesh (West)	Prithvi Information Solutions Ltd.	1-Oct-2007
286	West Bengal	Prithvi Information Solutions Ltd.	1-Oct-2007
287	Jammu & Kashmir	RSK Enterprises Pvt. Ltd.	1-Oct-2007
288	Andhra Pradesh	Satvik Hightech Builders Pvt Ltd.	1-Oct-2007
289	Assam	Satvik Hightech Builders Pvt Ltd.	1-Oct-2007
290	Bihar	Satvik Hightech Builders Pvt Ltd.	1-Oct-2007
291	Delhi	Satvik Hightech Builders Pvt Ltd.	1-Oct-2007
292	Gujarat	Satvik Hightech Builders Pvt Ltd.	1-Oct-2007
293	Haryana	Satvik Hightech Builders Pvt Ltd.	1-Oct-2007
294	Himachal Pradesh	Satvik Hightech Builders Pvt Ltd.	1-Oct-2007
295	Jammu & Kashmir	Satvik Hightech Builders Pvt Ltd.	1-Oct-2007
296	Karnataka	Satvik Hightech Builders Pvt Ltd.	1-Oct-2007
297	Kerala	Satvik Hightech Builders Pvt Ltd.	1-Oct-2007
298	Kolkata	Satvik Hightech Builders Pvt Ltd.	1-Oct-2007
299	Madhya Pradesh	Satvik Hightech Builders Pvt Ltd.	1-Oct-2007
300	Maharashtra	Satvik Hightech Builders Pvt Ltd.	1-Oct-2007
301	Mumbai	Satvik Hightech Builders Pvt Ltd.	1-Oct-2007
302	North East	Satvik Hightech Builders Pvt Ltd.	1-Oct-2007
303	Orissa	Satvik Hightech Builders Pvt Ltd.	1-Oct-2007
304	Punjab	Satvik Hightech Builders Pvt Ltd.	1-Oct-2007
305	Rajasthan	Satvik Hightech Builders Pvt Ltd.	1-Oct-2007
306	Tamilnadu (including Chennai)	Satvik Hightech Builders Pvt Ltd.	1-Oct-2007
307	Uttar Pradesh (East)	Satvik Hightech Builders Pvt Ltd.	1-Oct-2007
308	Uttar Pradesh (West)	Satvik Hightech Builders Pvt Ltd.	1-Oct-2007
309	West Bengal	Satvik Hightech Builders Pvt Ltd.	1-Oct-2007
310	Assam	Silicon Infowavs Pvt Ltd.	1-Oct-2007
311	Himachal Pradesh	Silicon Infowavs Pvt Ltd.	1-Oct-2007
312	Jammu & Kashmir	Silicon Infowavs Pvt Ltd.	1-Oct-2007
313	North East	Silicon Infowavs Pvt Ltd.	1-Oct-2007
314	Uttar Pradesh (East)	Silicon Infowavs Pvt Ltd.	1-Oct-2007
315	Uttar Pradesh (West)	Silicon Infowavs Pvt Ltd.	1-Oct-2007
316	Andhra Pradesh	Sterlite Infrastructure Pvt. Ltd.	1-Oct-2007
317	Assam	Sterlite Infrastructure Pvt. Ltd.	1-Oct-2007
318	Bihar	Sterlite Infrastructure Pvt. Ltd.	1-Oct-2007
319	Delhi	Sterlite Infrastructure Pvt. Ltd.	1-Oct-2007

S.No.	SERVICE AREA	COMPANY	DATE OF APPLICATION
320	Gujarat	Sterlite Infrastructure Pvt. Ltd.	1-Oct-2007
321	Haryana	Sterlite Infrastructure Pvt. Ltd.	1-Oct-2007
322	Himachal Pradesh	Sterlite Infrastructure Pvt. Ltd.	1-Oct-2007
323	Jammu & Kashmir	Sterlite Infrastructure Pvt. Ltd.	1-Oct-2007
324	Karnataka	Sterlite Infrastructure Pvt. Ltd.	1-Oct-2007
325	Kerala	Sterlite Infrastructure Pvt. Ltd.	1-Oct-2007
326	Kolkata	Sterlite Infrastructure Pvt. Ltd.	1-Oct-2007
327	Madhya Pradesh	Sterlite Infrastructure Pvt. Ltd.	1-Oct-2007
328	Maharashtra	Sterlite Infrastructure Pvt. Ltd.	1-Oct-2007
329	Mumbai	Sterlite Infrastructure Pvt. Ltd.	1-Oct-2007
330	North East	Sterlite Infrastructure Pvt. Ltd.	1-Oct-2007
331	Orissa	Sterlite Infrastructure Pvt. Ltd.	1-Oct-2007
332	Punjab	Sterlite Infrastructure Pvt. Ltd.	1-Oct-2007
333	Rajasthan	Sterlite Infrastructure Pvt. Ltd.	1-Oct-2007
334	Tamilnadu (including Chennai)	Sterlite Infrastructure Pvt. Ltd.	1-Oct-2007
335	Uttar Pradesh (East)	Sterlite Infrastructure Pvt. Ltd.	1-Oct-2007
336	Uttar Pradesh (West)	Sterlite Infrastructure Pvt. Ltd.	1-Oct-2007
337	West Bengal	Sterlite Infrastructure Pvt. Ltd.	1-Oct-2007
338	Assam	Videocon Industries Limited	1-Oct-2007
339	Bihar	Videocon Industries Limited	1-Oct-2007
340	Jammu & Kashmir	Videocon Industries Limited	1-Oct-2007
341	Madhya Pradesh	Videocon Industries Limited	1-Oct-2007
342	North East	Videocon Industries Limited	1-Oct-2007
343	Orissa	Videocon Industries Limited	1-Oct-2007

No. 17-3/2009/LF
Government of India
Ministry of Communications & IT
Department of Telecommunications
Sanchar Bhavan, 20, Ashoka Road, New Delhi-110 001.

2nd December, 2009

To,

Secretary, TRAI,
MTNL Exchange Building,
Jawahar Lal Nehru Marg, Minto Road,
New Delhi.

Sir,

In the interest of simplicity, transparency, ending arbitrage in the rate of licence fee, expanding the licence fee base, and ensuring a level playing field between different services, Government is envisaging a single uniform licence fee rate for various telecom service providers. TRAI is requested to furnish their recommendations on removing the arbitrage from the prevailing licence fee structures across various service providers with due consideration of the revenue receipts of the Government and the growth of telecom services in India.

2. It may be pointed out that a Committee of Department of Telecom was constituted on 5th May, 2009 for the purpose which submitted its report on 31st August, 2009 **(Copy enclosed)**.

3. TRAI is requested to furnish their recommendations on above in terms of clause 11(1)(a) of TRAI Act 1997 (as amended).

Encl: as above.

A.K. Srivastava
2/12/2009
(A.K. Srivastava)
DDG(Access Services-I)
Tel : 23716874

सत्यमेव जयते

हिन्दी का मान : राष्ट्र का सम्मान

J.S. Deepak
Joint Secretary
Tel: 23717411
Fax: 23372049

Confidential

भारत सरकार
संचार और सूचना प्रौद्योगिकी मंत्रालय
दूरसंचार विभाग
संचार भवन, 20, अशोक रोड
नई दिल्ली-110 001
Government of India
Ministry of Communications & IT
Department of Telecommunications
Sanchar Bhawan, 20 Ashok Road
New Delhi-110 001
WEBSITE : www.dotindia.com
www.investindiatelecom.com

DO. N 23 /JS(T)/2009
Dated 31 August 2009

Dear Sir,

This has reference to Department of Telecommunication's letter No. 17-3/2009-LF dated 5th May 2009 constituting a committee to review license fee rates and to work out uniform license fee rate under my chairmanship. The Committee, after detailed deliberations, has finalized its report, which is placed below for your kind information.

With regards,

Yours sincerely,

31/8/09

(J.S. Deepak)

Encl: as above

Shri R. Ashok,
Member (Finance)
Telecom Commission
Department of Telecommunications
Sanchar Bhawan
NEW DELHI

Report of the Committee on Uniform License Fee Rates

1. Introduction

1.1 Indian telecom sector has had a phenomenal growth in the last few years mainly on account of expansion of mobile voice telephony. The next phase of growth is likely to be in the area of data services and other value added services. To facilitate this, a number of reforms would be required. Some of them like introduction of internet telephony have met with a roadblock in the absence of a uniform license fee structure for various service licenses. To look at this issue, a committee was constituted on May 5, 2009 to review the various license fee rates applicable to the different licenses issued by the Department of Telecom (DoT) and to work out a uniform licence fee rate. The committee comprised the following officers:

(i)	Shri J.S. Deepak	Joint Secretary (T) - Chairman
(ii)	Shri A.K. Srivastava	DDG (AS-I)
(iii)	Shri P.K. Mittal	DDG(AS-II)
(iv)	Shri Manish Sinha	DDG (LF)

1.2 [illegible] Director (LF-III).

The terms of reference of the Committee comprised the following:

(a) The types of licenses that can be included for enforcing a uniform rate of license fee structure such as UASL, NLD, ILD, ISP with IT, and ISP etc.
(b) Discover a flat rate of license fee for all such identified licenses to end the arbitrage in the rates for various licenses.
(c) Analyze the financial effect of such a change in the license fee structure on the budget of the department.

1.3 The Committee was also informed that the uniform rate determined for license fees should not adversely impact the license fee revenue contribution to the general exchequer.

1.4 The Committee held its first meeting on 25.5.2009, subsequent meetings on 15.6.2009 and 13.08.2009. It reviewed the current license fee regime and its historical perspective. A brief review of the license fee regime and the committee's recommendations are included in this report.

2. Background

2.1 In 1999, DoT permitted telecom operators to migrate to a revenue share regime from an auction derived fixed license fee regime, to tackle a crisis that resulted from very high bids in the auction of telecom licenses. This was

necessitated as the anticipated revenue stream of operators had not materialized and they could not honour their bids. Since then DoT has been prescribing different licence fee rates for different service areas as well as telecom services so as to provide an incentive to backward regions and services like internet and long distance telephony. Thus there are different rates of license fees that have been prescribed in the different licenses issued by Department of Telecommunications. Further, licence fee is assessed on the revenue after allowing for certain deductions and is stated in terms of a percentage of adjusted gross revenue (AGR). The DoT does not track individual transactions relating to voice calls, internet access etc as with hundreds of millions of users and billions of transactions, this is just not possible. Therefore, the audited revenue statements are accepted as the correct declaration of the gross revenue and a summary assessment is done by DOT headquarters and CCA offices based on the various audit notes appended to the statements. Verification of deductions claimed by the various licensees is however carried out by the CCA offices as a part of the assessment process.

2.2 At present, the license fee rates prescribed for different categories of licenses are listed below:

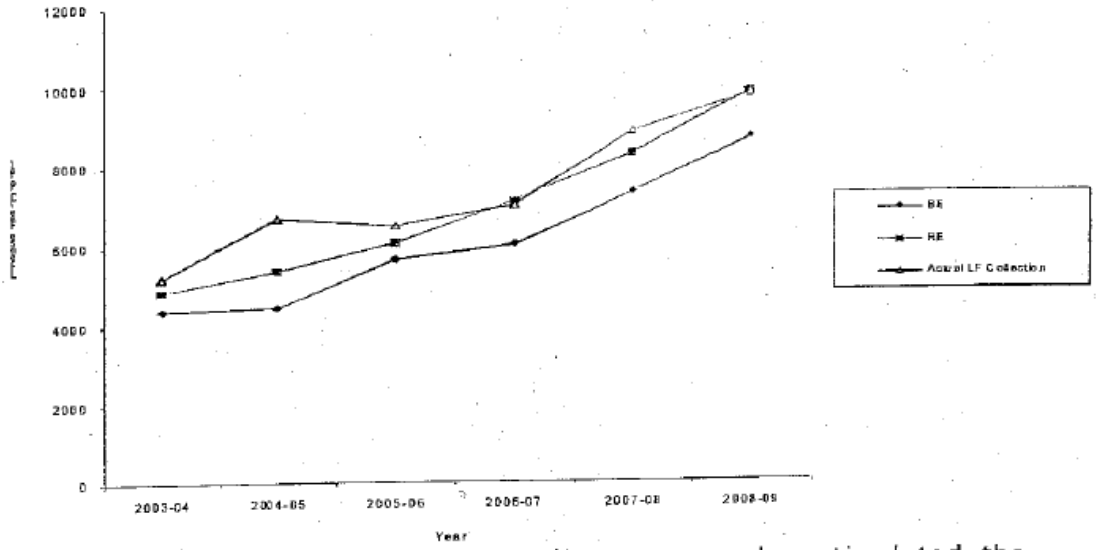
Type of License	License Fee as Percentage of AGR
UASL, CMTS, Basic for Category A and Metro Service Areas	10%
UASL, CMTS, Basic for Category B	8%
UASL, CMTS, Basic for Category C	6%
NLD, ILD, ISP(with telephony), Comm. VSAT	6%
PMRTS	5%
ISP	Re. 1/- per annum
CMRTS	Rs.300/- per annum per terminal subject to a minimum of Rs.25,000/- per annum
GMPCS	10%
IP-II	6%
IP-I	NIL (Registration only)

2.3 The rates of license fees have been reduced progressively in the past to support the telecommunications industry. The migration from the fixed license fee regime to revenue share in the year 1999 has been a major support extended by the government to the industry in a time when it was found that the license holders had voluntarily bid an amount that they found later to be too high. The revenue share regime was further eased by lowering the percentage rates applicable on the AGR. A further rebate of 2% for four years with effect from 1.4.2004 was provided to two cellular operators in telecom

circles that were awarded licenses before 1999. The percentage rates of revenue share over a period of time are as follows:

Category	Service	Rate of license fee (1.8.99 to 24.1.2001)	Rate of license fee (25.1.2001 to 30.3.2004)	Rate of license fee* (from 1.4.2004)
Metro & A	Cellular*/Basic/UASL	Provisional license fee @ 15% of AGR (8% for A&N, J&K)	12%	10%
B	Cellular/Basic/UASL		10%	8%
C	Cellular/Basic/UASL		8%	6%

2.4 Thus it is evident that the license fee rates have been reduced over the years since the inception of this revenue share regime in 1999. Reduction in the rate of license fees has resulted in slower growth of license fee collections as shown in the chart below. As seen in the chart, the license fee collections that had mostly exceeded both budget and revised estimates, now exhibit a trend of lower than the revised estimate.



2.5 The reduction along with other policy measures has stimulated the phenomenal growth of the telecom industry. However, today EBITDA margins of some of the UASL/CMTS operators are as high as 42% indicating a robust level of profits and obviating the need for further reduction in the licence fee rate to stimulate the sector.

2.6 As per DoT licence conditions, a company or a group of companies may hold multiple licenses for providing different types of telecom services. For instance, a UAS licensee may also hold licenses for ISP, ISP-IT, NLD, ILD etc. Each of these licenses would generate a revenue stream for the company or group owning these licenses through various subsidiaries. Since the rates of license fee as a percentage of AGR for different services vary, different revenue streams attract different rates of license fees. Today, almost all the major UASL holders are what can be called integrated operators i.e. holding multiple licenses in the same entity or amongst associate entities. This creates an opportunity for creative accounting whereby revenues from one stream can be booked as revenues from another stream, attracting a lesser rate of license fee in the same entity or in an associate company to reduce the total license fees payable. There have been several instances where allegations have been made by Member of Parliament, NGOs and competitors suggesting widespread cross booking of revenues from one stream to another. This has compelled the DoT to order special audits of the accounts of a number of licensee companies or groups. Thus there appears to be a strong case for plugging leakage of revenue by booking revenues for services which attract a lower licence fee so that the opportunity for arbitrage is eliminated.

2.7 Rates of licence fees not only vary across services but also between one telecom service area and another. For instance, in Metros and Category 'A' telecom service areas, which relate to the economically advanced regions, the licence fee is payable at 10% of AGR while in a less developed category 'C' telecom circle, it is payable at the rate of 6%. The rationale for this differential rate of licence fee appears to be the desire to incentivise the growth of telephony in less developed areas by providing an opportunity to operators to pass down the licence fee concession to customers in the form of lower tariffs. However, considering the fact that competition has driven down tariffs considerably and a difference in 2% or 4% of AGR often means a different of a few paise per local call translating to less than Rs. 2 per subscriber per month, which is insignificant. On the other hand, unification of licence fee rates will lead to a simplification in the licence fee structure and result in a much more transparent management of the process. With maturity of the Indian telecommunications market with revenues upwards of Rs. 1,10,000 crores and hundreds of licensees, the need for incentives by way of rebates in license fees and differential rates of license fees may not be required. Necessary support provision of non-remunerative services is already available through the USO Fund.

3. Issues

3.1 It is beyond doubt that the definition of AGR should be simple, comprehensive and verifiable with clearly defined deductions that are admissible. Further, in all cases a level playing field should be available to

different players through similar revenue rates and permissible deductions. Finally, there should be no chance of revenue leakage through arbitrage arising out of different licence fee rates for different services. The license fee regime should ensure that opportunities for creative accounting either by understating revenues by transferring them to sister concerns paying license fee at lesser rates, or by inflating deductions should not be available to licensees. An effective license fee regime should have built-in safeguards against possible misuse of the license conditions. Special audit is an option always available to the licensor for safeguarding its interest and of checking evasion of revenue. However, this is an option that should be used as an exception and not as a norm. The committee discussed the desirability of ensuring a level playing field among the various licensees and of eliminating arbitrage opportunities. With a view to setting up such safeguards, the committee has considered the issues of:

(a) removing difference in license fee rates for some of the licenses issued by the department,
(b) rationalizing the definition of deductions permissible in the case of ISP with IT license, and
(c) including IP-I registered companies under the revenue share regime.

3.2 While considering these changes, the committee has also kept in mind that its terms of reference restrict it to suggest ways of rationalizing the license fee structure without adversely affecting the total license fees contribution to the general exchequer. However, the committee realizes that any reform or rationalization is bound to marginally impact revenues positively or negatively but this impact would be miniscule as compared to the advantages and the fact that it will bring a level playing situation and plug leakage in revenue which in turn, can lead to other reforms being envisaged by the Department of Telecommunications.

3.3 The Committee identified the following issues related to the terms of reference, which need to be considered:

(a) License Fee Structure and its Impact on Revenue Realisation and Level Playing Field.

3.4 TRAI has written in detail on 21 November 2008 regarding cross booking of revenues in the case of a large telecom operator and its subsidiaries. This is a case where the operator owns different licenses and is able to book revenues to its advantage through commercial agreements that favour the entity holding license with lower license fee rates or even nil license fee rates. Thus for instance, an entity holding both licenses, UASL and ISP, may book portions of revenues, which attract a license fee at the rate of 10/8/6% to revenues of ISP, which do not attract any license fee, thereby reducing its license fee liabilities

substantially. To identify such instances and to ensure that correct license fees are paid by all licensees, TRAI has recommended special audit of all multiple licensees to ensure that there is no leakage of revenue.

3.5 The committee was informed of another instance where as a result of an inspection conducted by TERM Cell, Delhi, it has been found that another UASL operator has used its NLD network to provide ISP services. However, the revenues that would accrue to the NLD licensee for providing NLD connectivity have not been booked in the accounts of the NLD licensee. This has reduced the revenues of the NLD licensee causing loss of NLD license fees.

3.6 Allegations have also been received from other organizations indicating similar cases of license fee evasion.

3.7 The various associations of the operators have also been requesting for a uniform license fee structure.

3.8 From the above cases, it is clear that whenever a transaction is not recorded as a commercial transaction, an opportunity is created for incorrect representation of the gross revenue of an operator. The use of common infrastructure in its operation by two separate licensed entities of a group company provides a ready arbitrage opportunity as one service has a license fee rate of 6% and the other has a Re 1 per annum rate.

3.9 Similarly, a UAS licensee has to pay a license fee of 10/8/6% depending on the service area even for all internet services unlike an ISP operator that pays only a nominal amount of Re 1/-. Further, the licensee does not have any admissible deductions on account of internet access or content charges as is the case with ISP-IT licenses. This is against the spirit of level playing field in the telecom sector. All licensees providing the same service under similar circumstances must be charged the same license fees. On the issue of level playing field between the ISP operators, TRAI has also suggested in its recommendations on "Review of Internet services" dated 10th May 2007 in para 4.5.3 that

" A uniform annual license fee equivalent to 6% of AGR on all ISPs including revenues earned from provision of Internet Access, Value Added Services and Broadband in ISP domain. This will ensure level playing field vis-à-vis other telecom operators."

The government has already given a long period of free license for ISP so as to encourage growth of internet. With the industry now having matured with a large number of players and increasing revenues, it can be brought at par with other licenses.

3.10 Taking this argument forward the same should be extended to UASL by levying the same license fee for different categories of telecom circles.

3.11 The level playing field will encourage the UASL players to provide broadband under their UAS license rather than take recourse to designing products that can be operated under the ISP license. In any case operators like BSNL are providing a lead in provision of broadband and there is a need to remove any hindrance to the UASL operators to provide broadband in all areas. Such a rationalization will not impact the backward areas in Category "C' circles as most all- India operators will find the rates balanced after a reduction in rates for the metro and category 'A' circles which have shown a concentration of growth efforts so far.

3.12 Having made the case for uniform license fee, it needs to be decided what this rate should be and how it would impact different license categories.

3.13 The committee was informed that the annual AGR and license fee figures for the three years was as per the tables shown below. This data is based on nearest estimates from the LF branch.

Category	LF Rate (%)	License Fees	AGR
A	10	39,958,946,654	399,589,466,540
B	8	18,287,048,895	228,588,111,188
C	6	3,871,118,064	64,518,634,400
Total		62,117,113,613	692,696,212,128
Average	8.967439481		

2007-08			
Category	LF Rate (%)	License Fees	AGR
A	10	48,054,090,520	480,540,905,200
B	8	23,775,807,862	297,197,598,275
C	6	4,688,284,632	78,138,077,200
Total		76,518,183,014	855,876,580,675
Average	8.940329101		

2008-09			
Category	LF Rate (%)	License Fees	AGR
A	10	56,672,301,015	566,723,010,147
B	8	22,312,676,402	278,908,455,029
C	6	5,637,753,086	93,962,551,435
Total		84,622,730,503	939,594,016,611
Average	9.006307938		

3.14 Thus the weighted average of the LF paid in the years 2006-07, 2007-08, and 2008-09 for the various circles under the UASL/CMTS/BS licenses is 8.97%,

8.94%, and 9.01% respectively. So, if the average rate for a unified license fee for UASL only is to be arrived at, it would logically be 9%.

3.15 In case average over licenses including NLD, ILD, and ISP-IT is taken the average rate of license fee works out to 8.55% showing a difference of 0.45% over the calculation of UASL/CMTS/BS figures. Details are as follows:

2008-09			
Category	LF Rate (%)	License Fees	AGR
A	10	56,67,23,01,015	5,66,72,30,10,147
B	8	22,31,26,76,402	2,78,90,84,55,029
C	6	5,63,77,53,086	93,96,25,51,435
NLD	6	6,82,15,00,000	1,13,69,16,66,667
ILD	6	2,61,02,00,000	43,50,33,33,333
ISP-IT	6	71,17,00,000	11,86,16,66,667
Total		94,76,61,30,503	11,08,65,06,83,278
Average	8.54788004		

Note: Above table does not include figures for pure ISP and IP-I licenses.

3.16 If a uniform license fee rate of 8.55% is to be taken, the total license fee for the year 2008-09 would work out to Rs. 9,476.6 crores, while, with a uniform license fee rate of 8.5%, the total license fee for the year 2008-09 would work out to Rs. 9,423.5 crores. The marginal reduction in the license fees by Rs. 53.1 crore in the latter case will be compensated by inclusion of license fee on AGR from plain ISP and IP-I licenses, which would certainly provide a revenue of more than Rs. 53.1 crore. Thus, 8.5% appears to be the most logical rate for the unified license fee without impacting the total license fee revenues.

3.17 Since 1994 the telecom industry has matured significantly both in terms of revenue growth and competitive edge. The government has lent support to the industry with various measures including several rebates in the license fee from time to time. Now, with revenues of approximately Rs. 1, 10,000 crore, telecom industry has come into its own. There are now about 329 Basic/UASL, 78 CMTS, 22 NLD, 15 ILD, 125 ISP with IT and several more other types of licenses. Gross Revenues of NLD licensees have gone up from Rs. 7267 crore in 2007-08 to Rs. 11367 crore in 2008-09. Similarly, from the reports received in respect of ISP with IT licenses, gross revenues of these licensees went up from Rs. 47 crore in 2005-06 to Rs. 2,506 crore in 2007-08. The Indian telecommunications market now boasts of a large number of service providers of all varieties and corresponding high revenues that have seen secular growth

over the last decade. There appears little justification for any further continuation of rebates that tend to distort the market.

3.18 A revision of license fee rate at the uniform revenue share would have no adverse implication for Basic/UASL/CMTS licensees since the average rate that is applicable to them in reducing from 9% to 8.5%. In case of NLD license, increase of license fee rate from 6% to 8.5% would increase the license fees marginally. The impact would be of the order of Rs. 340 crore per year for NLD, Rs. 130 crore for ILD, and Rs. 200 crore for ISP with IT licenses even if the permissible deductions are redefined and all revenues including access revenue and revenue from VAS, broadband and other content are included for determining the adjusted gross revenue for application of license fee.

(b) Admissible Deductions and its Impact on Revenue Realization and Level Playing Field.

3.19 License fees payable to the government are calculated as a percentage of Gross Revenue of the license after allowing deductions pertaining to three items:

(a) Actual payments made to other operators for interconnect usage charges.

(b) Actual payments made to other operators on account of roaming charges.

(c) Service tax and sales tax actually paid to the government if these were included in the Gross Revenue.

3.20 In case of ISP-IT license, other types of expenses are also allowed for deduction as listed below:.

"Charges from pure Internet service, activation charges from pure internet subscribers. Pure Internet Services shall mean any method / device / technology to provide access to Internet unless explicitly prohibited and all content available including web-hosting, web-collocation which is available on internet without access restriction."

3.21 Any increase in claim for deductions causes a corresponding decrease in applicable license fees. Several cases have come to notice where amounts higher than what is permissible under the definition of deductions have been claimed leading to evasion of license fees.

3.22 A study of the gross revenue, AGR, and license fees of ISP-IT licensees shows that such allegations need to be examined. The relevant figures for the year 2007-08 are listed below.

Sl No	Licensee Company	Gross Revenue	AGR	License Fees
1	Bharti Airtel Ltd.	935,82,20,234	73,06,10,067	4,38,36,604
2	VSNL	706,34,73,470	23,80,71,874	1,42,84,312

3.23 The table above shows that Bharti and VSNL claimed over 92% and 96% respectively of the gross revenue as deductions that did not attract license fees. The companies paid only 0.5% and 0.2% of their gross revenue as license fees. The deductions include the revenue stream from access services and content services which are the main sources of revenue for the ISP operator. The assigning of proportion of revenue to that of revenue from Internet Telephony from each Internet call is as per the commercial arrangement shown by the operator and such transactions are only subject to verification by the prescribed audit procedure. There is no verification process designed separately for such deductions. The cases of other licensees are similar. There is thus clearly a huge opportunity here to indulge in creative accounting and reduce the AGR by overstating deductions.

3.24 As noted previously, deductions allowed under the ISP with IT license result in deductions of over 90%. Moreover, when the ISP license carries a license fee, the definition of AGR of ISP with IT will also have to be rationalized. So, only the deductions that are mentioned in para 3.19 may be permitted in case of ISP as well as ISP with IT

(c) Corporate Structure and its Impact on Revenue Realisation and Level Playing Field.

3.25 The corporate structure of an operator and the manner in which activities are placed in subsidiary/associate companies also affects the license fee collections. Licensees have resorted to spinning off business units so as to carry out their business without having to pay license fees thereby undermining the revenues of the general exchequer. The IP-I registration does not attract any license fees and provides a shelter for the other license revenues by way of booking of rental revenue from utilization of infrastructure provided to other licensees. This would be applicable in the case of Tower companies owned by UAS/CMTS/Basic license holders. Cross booking of revenues is possible between a UAS/Basic/CMTS/NLD/ILD licensee and an IP-I registered company. It is pertinent to note that the technical expert from Institute of Chartered Accountants of India consulted for firming up the definition of AGR had advised that the revenue of all subsidiaries of Licensee Company be included for

charging license fees to preclude such cross booking and license fee evasion possibilities. Excerpt from the paper 'Revenue: Concept, Measurement and Validation' submitted by the expert from ICAI is reproduced.

"There may be cases where one or more of the revenue-generating activities of an operator is transferred to a subsidiary of the operator, another subsidiary of the holding company of the operator or to another concern over which the operator or the holding company of the operator or a fellow subsidiary has a significant influence (hereinafter termed as 'related parties'). In such a case, if the other enterprise does not happen to be a licensee, substantial revenue loss to the government may take place through deliberate hiving-off of activities that do not require a license. To take care of such a situation, the revenue of the related parties should also be computed and included in the revenue of the operator provided the aforesaid parties are not themselves paying license fee on revenue sharing basis."

3.26 As the opportunities for arbitrage widens with the hiving off of activities into subsidiary/associate firms, it is necessary in the interest of level playing field as well as for preventing leakage of revenue that all activities of telecom operators are brought under the realm of license fee regime.

3.27 The IP-1 Infrastructure Providers can provide assets like dark fiber, Right of Way, duct space and towers. These are activities that form an integral part of working and maintaining telecommunications networks that by Article 4 of the Indian Telegraph Act can be licensed by the Central Government on a consideration that the Government may think fit. It is noticed that this opportunity has been used by a number of operators to hive off these activities into non-licensed or registered entities which do not have a liability to pay license fee on the income generated on the utilization of these assets to maintain the telegraph network. These companies have moved assets into separate entities to hive off the rental income from the purview of the revenue share regime. Thus the committee felt that there is justification for including IP-I registration into licensing regime and for charging the average rate of license fee for the license.

4. Recommendations

4.1 On the basis of above analysis, it is felt that the interest of simplicity, transparency, preventing leakage of revenue, expanding the licence fee base, and ensuring a level playing field between different services, there is a strong case of combining the different licence fee rates into a single uniform rate. In order to arrive at this single rate without having an adverse impact on the licence fee revenue contribution to the general exchequer, the following recommendations are made.

Licence Fee

4.2 A unified licence fee of 8.5% of AGR from all licences issued by the Department of Telecom be levied except CMRTS and Captive VSAT licenses. This will include

(i) All basic/CMTS/UAS Licenses in all the telecom service areas whether metro, category A, B or C.
(ii) NLD, ILD, ISP, ISP with IT, and GMPCS.
(iii) IP-I licenses
(iv) PMRTS, Commercial VSAT, leftover IP-II licensees till their migration to NLD license is finalized.

CMRTS and Captive VSAT licenses are being left out of the unified revenue share regime because license fees for these licenses are charged on a per terminal basis. These are licenses for captive operations involving no revenue stream. A road-map for the migration of IP-I registration to the license regime will have to be made to implement the recommendations.

Permissible Deductions

4.3 For all categories of licenses, the following deductions only be permitted:

(a) Actual payments made to other operators for interconnect usage charges.
(b) Actual payments made to other operators on account of roaming charges.
(c) Service tax and sales tax actually paid to the government if these were included in the Gross Revenue.

P.K. Mittal
P.K. Mittal
DDG(AS-II) 31/8/09

A.K. Srivastava 31/8/09
A.K. Srivastava
DDG(AS-I))

Manish Sinha 31/08/09
Manish Sinha
DDG(LF)

J. S. Deepak 31/8/09
J. S. Deepak
JS (T)

Abbreviations

AGR	Adjusted Gross Revenue
BS	Basic Service
CCA	Controller of Communication Accounts
CMRTS	Captive Mobile Radio Trunk Service
CMTS	Cellular Mobile Telecommunication Service
DoT	Department of Telecommunications
EBITDA	Earnings Before Interest Tax Depreciation and Amortization
GMPCS	Global Mobile Personal Communication Service
ILD	International Long Distance
IP-I	Infrastructure Provider - I
IP-II	Infrastructure Provider - II
ISP	Internet Service Provider
ISP-IT	Internet Service Provider with Internet Telephony
IT	Internet Telephony
LF	License Fee
NLD	National Long Distance
PMRTS	Public Mobile Radio Trunk Service
TERM	Telecommunication Enforcement and Resource Management
TRAI	Telecom Regulatory Authority of India
UAS	Unified Access Service
UASL	Unified Access Service License
USO	Universal Service Obligation
VAS	Value Added Service
VSAT	Very Small Aperture Terminal

Annexure-V

Calculation of 1000 million subscribers by 2014

- Population of India in 2001(from census) :- 1028 mn
- Urban population in 2001 :- 28%(285 mn)
- Projected population in 2014(from census of India) :- ~1239 mn
- Projected urban population by 2021 :- 40%
- Projected urban population by 2014/15 :-37% (458.43 mn)
  (Assuming uniform growth rate)
- Projected rural population by 2014/15 :- 780.57 mn
- The mobile teledensity figures of the three years:

Year	Mobile Tele-density		
	Urban	**Rural**	**Total**
Jan'08	54.61	6.88	21.2
Jan'09	75.39	12.33	31.25
Jan'10	105.51	21.02	46.37

- Expected(Assumed) Urban mobile teledensity by 2014 :- 125
- Expected (Assumed)Rural mobile teledensity by 2014 :- 60
- Number of Urban mobile numbers by 2014 :- 572 mn
- Number of Rural mobile numbers by 2014 :-468 mn
- **Total number of mobiles by 2014** :-1040 mn

  (Rounded-off) :-**1000 million**

Annexure-VI

A Calculation of GSM Spectrum Requirement in Various services areas upto Specified Limits

S.No.	Circle	Available GSM Spectrum	No. of Operators	Operators with MHz						Additionally Required Spectrum for quantum upto (MHz)				Spectrum already allocated	Balance available spectrum	Future Maximum required spectrum	Balance Spectrum Required for Prescribed Limit
		A		12	10	8	6.2	4.4	Nil	4.4	6.2	8	10	B	C=A-B	D=A*8/10+ Additional spectrum already allocated	E=D-B-C
1	Delhi	57.2	12	1	2	1		3	5	22	36.4	50.8	68.8	53.6	3.6	122.4	65.2
2	Mumbai	74.8	11	1	3			7			12.6	25.2	39.2	72.4	2.4	112.4	37.6
3	Kolkata	78.4	10		2	1	1	6			10.8	23.4		60.4	18	84	5.6
4	Maharashtr	69.4	12		2	1	1	8			14.4	30.6		69.4	0	100	30.6
5	Gujarat	60.4	11		1	1	2	7			12.6	28.8		60.4	0	90	29.6
6	AP	83.6	12		2	1	1	8			14.4	30.6		69.4	14.2	100	16.4
7	Karnataka	79.2	12		2	1	1	8			14.4	30.6		69.4	9.8	100	20.8
8	Tamil Nadu	87	11		3	1		7			12.6	25.2		67	20	94	7
9	Kerala	89.2	11		1	1	2	7			12.6	28.8		61.2	28	90	0.8
10	Punjab	63.2	12			2	2	8			14.4	32.4		63.2	0	96	32.8
11	Haryana	63.8	12		1		3	8			14.4	34.2		63.8	0	98	34.2
12	UP - West	61.2	11		1	1	2	7			12.6	28.8		61.2	0	90	28.8
13	UP - East	62.4	11		1	2	1	7			12.6	27		62.4	0	90	27.6
14	Rajasthan	63.8	12			2	2	8			14.4	32.4		63.8	0	96	32.2
15	M.P.	93.6	11		1	2	1	7			12.6	27		63	30.6	90	-3.6
16	West Bengal	57.4	10			1	3	6			10.8	27		53	4.4	80	22.6
17	H.P.	57.6	11		1		2	8			14.4	32.4		57.6	0	90	32.4
18	Bihar	71.2	12		2	1		9			16.2	32.4		66.8	4.4	100	28.8
19	Orissa	77.4	11		1	1	1	8			14.4	30.6		59.4	18	90	12.6
20	Assam	59.4	10		1		3	6			10.8	27		55	4.4	82	22.6
21	North East	57.6	10		1		2	7			12.6	28.8		53.2	4.4	82	24.4
22	J&K	49.4	10			1	1	8			14.4	30.6		49.4	0	80	30.6

Note: In stray cases, Spectrum allocated varies slightly from the above tranches

B Calculation of CDMA Spectrum Requirement in Various services areas upto Specified Limits

S.No.	Circle	No. of Operators	Operators with MHz			Additionally Required Spectrum for quantum upto (MHz)				Spectrum already allocated	Balance available spectrum #	Future Maximum required spectrum	Balance Spectrum Required for Prescribed Limit
		A	2.5	3.75	5	2.5	3.75	5	6.25	B	C	D=A*5/6.25	E=D-B-C
1	Delhi	4	2	0	2	-	2.50	5.00	10.00	15.00	2.50	25.00	7.50
2	Mumbai	4	2	0	2	-	2.50	5.00	10.00	15.00	2.50	25.00	7.50
3	Kolkata	4	2	1	1	-	2.50	6.25		13.75	2.50	20.00	3.75
4	Maharashtra	4	2	0	2	-	2.50	5.00		15.00	1.25	20.00	3.75
5	Gujarat	4	2	2	0	-	2.50	7.50		12.50	5.00	20.00	2.50
6	AP	4	2	1	1	-	2.50	6.25		13.75	2.50	20.00	3.75
7	Karnataka	4	2	1	1	-	2.50	6.25		13.75	2.50	20.00	3.75
8	Tamil Nadu	4	3	0	1	-	3.75	7.50		12.50	5.00	20.00	2.50
9	Kerala	4	1	2	1	-	1.25	5.00		15.00	2.50	20.00	2.50
10	Punjab	5	3	2	0	-	3.75	10.00		15.00	1.25	25.00	8.75
11	Haryana	4	2	2	0	-	2.50	7.50		12.50	5.00	20.00	2.50
12	UP - West	4	2	1	1	-	2.50	6.25		13.75	3.75	20.00	2.50
13	UP - East	4	2	1	1	-	2.50	6.25		13.75	3.75	20.00	2.50
14	Rajasthan	4	1	2	1	-	1.25	5.00		15.00	0.00	20.00	5.00
15	M.P.	4	3	0	1	-	3.75	7.50		12.50	3.75	20.00	3.75
16	West Bengal	4	3	1	0	-	3.75	8.75		11.25	5.00	20.00	3.75
17	H.P.	4	4	0	0	-	5.00	10.00		10.00	7.50	20.00	2.50
18	Bihar	4	2	1	1	-	2.50	6.25		13.75	3.75	20.00	2.50
19	Orissa	4	3	1	0	-	3.75	8.75		11.25	6.25	20.00	2.50
20	Assam	4	4	0	0	-	5.00	10.00		10.00	7.50	20.00	2.50
21	North East	4	4	0	0	-	5.00	10.00		10.00	7.50	20.00	2.50
22	J&K	4	4	0	0	-	5.00	10.00		10.00	5.00	20.00	5.00

Note: In stray cases, Spectrum allocated varies slightly from the above tranches

 # As per the carrier plan only 14 carriers are available in 20 MHz band

List of Date of Allocation of Spectrum to Service providers

Service Area	Mobile Operator (with number)		Date of License	Total Spectrum Available (in MHz)		Total Spectrum Allocated (in MHz)		GSM					CDMA		
	GSM	CDMA		GSM	CDMA	GSM	CDMA	4.4 MHz on (Date)	6.2 MHz on (Date)	8 MHz on (Date)	10 MHz on (Date)	12.4 MHz on (Date)	2.5 MHz on (Date)	3.75 MHz on (Date)	5 MHz on (Date)
Delhi	**12**	**4**		**57.2**	**20**	**53.6**	**15.00**								
	Bharti		29.11.94			10		31.5.95 (900 MHz)	31.12.96 (900 MHz)	17.7.02 (900 MHz)	17.7.03				
	Vodafone		29.11.94			10		5.7.95 (900 MHz)	31.12.96 (900 MHz)	17.7.02 (900 MHz)	15.10.03				
	MTNL	MTNL	10.10.97			12.4	2.50	-	22.12.00 (900 MHz)	6.12.05		30.3.2007	02.06.00		
	Idea		5.10.01			8		-	22.10.02	6.12.05					
	Aircel Ltd		5.12.06			4.4		11.1.08							
	Etisalat DB		25.1.08			4.4		28.8.08							
	Videocon		25.1.08			Not									
	Loop		25.1.08			Not									
	Unitech		25.1.08			Not									
	Spice		25.1.08			Not									
	RCL	RCL	20.7.01			4.4	5.00	11.1.08					16.9.02	29.8.03	10.10.03
	Tata	Tata	31.8.01			Not	5.00						16.9.02	13.8.04	07.04.06
		Sistema Shyam	25.1.08				2.50						28.8.08		
Mumbai	**11**	**4**		**74.8**	**20**	**72.4**	**15**								
	Loop		29.11.94			10		27.6.95 (900 MHz)	12/1/1996 (900 MHz)	13.1.03 (900 MHz)	6.9.04				
	Vodafone		29.11.94			10		31.5.95 (900 MHz)	4.2.97 (900 MHz)	17.7.02 (900 MHz)	15.10.03				
	MTNL	MTNL	10.10.97			12.4	2.50	-	22.12.00 (900 MHz)	6.5.05		30.3.07	16.11.98		
	Bharti		28.9.01			9.2		-	11.3.02	21.4.04	20.01.06 (9.2 MHz)				
	Idea		5.12.06			4.4		11.1.08							
	Aircel Ltd		6.12.06			4.4		11.1.08							
	Etisalat DB		25.1.08			4.4		9.9.08							
	Videocon		25.1.08			4.4		9.9.08							
	Unitech		25.1.08			4.4		9.9.08							
	RCL	RCL	20.7.01			4.4	5.00	11.1.08					2.9.02	2.9.02	19.5.04
	Tata	Tata	30.9.97			4.4	5.00	9.9.08						3.9.98	
		Sistema Shyam	25.1.08				2.50						28.8.08		
Chennai	**3**	**1**				**16.6**	**2.5**								
	Aircel Cellular		29.11.94			8.6		29.11.95 (900 MHz)	1.3.00 (900 MHz)	20.1.06 (8 MHz) & 15.11.06 (8.6 MHz)					
	BSNL	BSNL	29.02.00			10	2.50	-	22.12.00 (900 MHz)	20.3.06	12.3.07		25.9.00		
	Vodafone		26.9.01			8		-	30.5.02	1.6.06					

List of Date of Allocation of Spectrum to Service providers

Service Area	Mobile Operator (with number)		Date of License	Total Spectrum Available (in MHz)		Total Spectrum Allocated (in MHz)		GSM					CDMA		
	GSM	CDMA		GSM	CDMA	GSM	CDMA	4.4 MHz on (Date)	6.2 MHz on (Date)	8 MHz on (Date)	10 MHz on (Date)	12.4 MHz on (Date)	2.5 MHz on (Date)	3.75 MHz on (Date)	5 MHz on (Date)
Kolkata	**10**	**4**		**78.4**	**20**	**60.4**	**13.75**								
	Bharti		29.11.94			8		29.11.95 (900 MHz)	28.12.99 (900 MHz)	22.1.05					
	Vodafone		29.11.94			9.8		29.11.95 (900 MHz)	28.1.97 (900 MHz)	30.6.04 (7.8 MHz) (900 MHz)	12.7.06 (9.8 MHz)				
	BSNL	BSNL	29.02.00			10	2.50	-	22.12.00 (900 MHz)		10.5.07		26.4.00		
	Reliance Telecom		27.9.01			6.2		-	11.3.02						
	Dishnet Wireless		14.12.06			4.4		5.4.07							
	Videocon		25.1.08			4.4		9.1.09							
	Unitech		25.1.08			4.4		9.1.09							
	Loop		25.1.08			4.4		9.1.09							
	Idea		25.1.08			4.4		9.1.09							
		RCL	20.7.01				5.00						31.12.02	16.12.03	23.1.04
	Tata	Tata	30.1.04			4.4	3.75	9.1.09					06.07.04	19.5.06	
		Sistema Shyam	25.1.08				2.50						29.5.08		
Maharashtra	**12**	**4**		**69.4**	**20**	**69.4**	**15**								
	Vodafone		19.12.95			6.2		19.12.95 (900 MHz)	28.12.99 (900 MHz)						
	Idea		12.12.95			9.8		12.12.95 (900 MHz)	9.8.00 (900 MHz)	31.12.03 (7.8 MHz) (900 MHz)	1.4.05 (9.8 MHz)				
	BSNL	BSNL	29.02.00			10	2.50	-	22.12.00 (900 MHz)	27.10.04	12.3.07		26.4.00		
	Bharti		28.9.01			8.2		-	1.4.02	14.11.08 (7.2 MHz) 9.3.09 (8.2 MHz)					
	Aircel		5.12.06			4.4		10.1.08							
	Videocon		25.1.08			4.4		10.9.08							
	Etisalat DB		25.1.08			4.4		10.9.08							
	Unitech		25.1.08			4.4		10.9.08							
	Spice		25.1.08			4.4		6.5.09							
	Loop		25.1.08			4.4		14.11.08							
	RCL	RCL	20.7.01			4.4	5.00	10.1.08					02.9.02	10.10.03	19.5.04
	Tata	Tata	30.9.97			4.4	5.00	14.11.08						18.11.97	
		Sistema Shyam	25.1.08				2.50						14.5.08		
Gujarat	**11**	**4**		**60.4**	**20**	**60.4**	**12.5**								
	Vodafone		19.12.95			9.8		19.12.95 (900 MHz)	6.3.00 (900 MHz)	31.12.03 (7.8 MHz) (900 MHz)	13.5.05 (9.8 MHz)				
	Idea		12.12.95			6.2		12.12.95 (900 MHz)	9.8.00 (900 MHz)						
	BSNL	BSNL	29.02.00			7.4	2.50		22.12.00 (900 MHz)	16.5.05 (7.4 MHz)			25.9.00		
	Bharti		28.9.01			6.2		-	1.4.02						
	Aircel		5.12.06			4.4		11.1.08							
	Videocon		25.1.08			4.4		25.9.08							
	Unitech		25.1.08			4.4		25.9.08							
	Etisalat DB		25.1.08			4.4		25.9.08							
	Loop		25.1.08			4.4		9.3.09							
	RCL	RCL	30.9.97			4.4	3.75	11.1.08					28.8.02	29.3.04	
	Tata	Tata	31.8.01			4.4	3.75	9.3.09					3.9.02	20.1.06	
		Sistema Shyam	25.1.08				2.50						29.5.08		

List of Date of Allocation of Spectrum to Service providers

Service Area	Mobile Operator (with number)		Date of License	Total Spectrum Available (in MHz)		Total Spectrum Allocated (in MHz)		GSM					CDMA		
	GSM	CDMA		GSM	CDMA	GSM	CDMA	4.4 MHz on (Date)	6.2 MHz on (Date)	8 MHz on (Date)	10 MHz on (Date)	12.4 MHz on (Date)	2.5 MHz on (Date)	3.75 MHz on (Date)	5 MHz on (Date)
Andhra Pradesh	**12**	**4**		**83.6**	**20**	**69.4**	**13.75**								
	Idea		19.12.95			8		19.12.95 (900 MHz)	27.12.00 (900 MHz)	20.9.04					
	Bharti		12.12.95			10		12.12.95 (900 MHz)	3.4.00 (900 MHz)	9.2.04 (7.8 MHz) (900 MHz)	27.5.08 (9.2 MHz) & 9.3.09 (10 MHz)				
	BSNL	BSNL	29.02.00			10	2.50	-	22.12.00 (900 MHz)	20.9.04	12.3.07		12.9.00		
	Vodafone		29.9.01			6.2		-	11.3.02						
	Aircel		5.12.06			4.4		10.1.08							
	Videocon		25.1.08			4.4		27.5.08							
	Unitech		25.1.08			4.4		27.5.08							
	Spice		25.1.08			4.4		27.5.08							
	Etisalat DB		25.1.08			4.4		27.5.08							
	Loop		25.1.08			4.4		27.5.08							
	RCL	RCL	20.7.01			4.4	5.00	10.1.08					11.9.02	6.12.03	16.1.04
	Tata	Tata	30.9.97			4.4	3.75*	27.5.08					06.1.98		
		Sistema Shyam	25.1.08				2.50						11.4.08		
Karnataka	**12**	**4**		**79.2**	**20**	**69.4**	**13.75**								
	Bharti		15.2.96			10		15.2.96 (900 MHz)	3.4.00 (900 MHz)	31.12.03 (7.8 MHz) (900 MHz)	3.12.04 (9.8 MHz) & 24.9.08 (10 MHz)				
	Spice		9.4.96			6.2		4.4.96 (900 MHz)	3.4.00 (900 MHz)						
	BSNL	BSNL	29.02.00			10	2.50	-	22.12.00 (900 MHz)	5.11.04	5.4.07		28.4.00		
	Vodafone		26.9.01			8		-	11.3.02	22.1.05					
	Aircel		5.12.06			4.4		10.1.08							
	Videocon		25.1.08			4.4		30.5.08							
	Unitech		25.1.08			4.4		30.5.08							
	Etisalat DB		25.1.08			4.4		30.5.08							
	Loop		25.1.08			4.4		30.5.08							
	Idea		25.1.08			4.4		30.5.08							
	RCL	RCL	20.7.01			4.4	5.00	10.1.08					20.8.02	5.12.03	16.1.04
	Tata	Tata	31.8.01			4.4	3.75	30.5.08					28.6.02	20.1.06	
		Sistema Shyam	25.1.08				2.50						14.5.08		

List of Date of Allocation of Spectrum to Service providers

Service Area	Mobile Operator (with number)		Date of License	Total Spectrum Available (in MHz)		Total Spectrum Allocated (in MHz)		GSM					CDMA		
	GSM	CDMA		GSM	CDMA	GSM	CDMA	4.4 MHz on (Date)	6.2 MHz on (Date)	8 MHz on (Date)	10 MHz on (Date)	12.4 MHz on (Date)	2.5 MHz on (Date)	3.75 MHz on (Date)	5 MHz on (Date)
Tamil Nadu	**3**	**1**				**27**	**2.5**								
	Vodafone		12.12.95			7.2		12.12.95	28.12.99 (900 MHz)	30.07.08 (7.2 MHz) (900 MHz)					
	Aircel		31.12.98			9.8		31.12.98 (900 MHz)	6.10.99 (900 MHz)	9.1.04 (7.8 MHz) (900 MHz)	3.12.04 (9.8 MHz)				
	BSNL	BSNL	29.02.00			10	2.50	-	22.12.00 (900 MHz)	20.9.04	12.3.07		25.9.00		
Tamil Nadu including Chennai	**8**	**3**		**87**	**20**	**40**	**10.00**								
	Bharti		29.11.94			9.2		29.11.95 (900 MHz)	29.1.98 (900 MHz)	20.1.06 (8 MHz) & 15.11.06 (8.6 MHz)	30.7.08 (9.2 MHz)				
	Idea		25.1.08			4.4		22.4.08							
	Videocon		25.1.08			4.4		22.4.08							
	Unitech		25.1.08			4.4		22.4.08							
	Etisalat DB		25.1.08			4.4		22.4.08							
	Loop		25.1.08			4.4		22.4.08							
	RCL	RCL	26.9.01			4.4	5.00	10.1.08					20.8.02	28.11.03	07.1.04
	Tata	Tata	31.8.01			4.4	2.50	22.4.08					28.6.02		
		Sistema Shyam	25.1.08				2.50						11.4.08		
Kerala	**11**	**4**		**89.2**	**20**	**61.2**	**15.00**								
	Idea		12.12.95			8		12.12.95 (900 MHz)	28.12.99 (900 MHz)	28.10.04					
	Vodafone		12.12.95			6.2		12.12.95 (900 MHz)	28.12.99 (900 MHz)						
	BSNL	BSNL	29.02.00			10	3.75	-	22.12.00 (900 MHz)	20.09.04	12.3.07		12.9.00	18.7.07	
	Bharti		28.9.01			6.2		-	11.3.02						
	Dishnet		14.12.06			4.4		10.1.08							
	Videocon		25.1.08			4.4		15.5.08							
	Unitech		25.1.08			4.4		15.5.08							
	Etisalat DB		25.1.08			4.4		15.5.08							
	Loop		25.1.08			4.4		15.5.08							
	RCL	RCL	20.7.01			4.4	5.00	10.1.08					27.12.02	15.9.04	9.6.06
	Tata	Tata	30.1.04			4.4	3.75	15.5.08					25.5.04	23.6.06	
		Sistema Shyam	25.1.08				2.50						14.5.08		

List of Date of Allocation of Spectrum to Service providers

Service Area	Mobile Operator (with number)		Date of License	Total Spectrum Available (in MHz)		Total Spectrum Allocated (in MHz)		GSM					CDMA		
	GSM	CDMA		GSM	CDMA	GSM	CDMA	4.4 MHz on (Date)	6.2 MHz on (Date)	8 MHz on (Date)	10 MHz on (Date)	12.4 MHz on (Date)	2.5 MHz on (Date)	3.75 MHz on (Date)	5 MHz on (Date)
Punjab	**12**	**5**		**63.2**	**20**	**63.2**	**15.00**								
	Spice		9.4.96			7.8		4.4.96 (900 MHz)	3.4.00 (900 MHz)	9.1.04 (7.8 MHz) (900 MHz)					
	Bharti		12.12.95			7.8		12.12.95 (900 MHz)	28.12.99 (900 MHz)	9.1.04 (7.8 MHz) (900 MHz)					
	BSNL	BSNL	29.02.00			6.2	2.50	-	22.12.00 (900 MHz)				24.1.01		
	Vodafone		5.10.01			6.2		3.4.02	28.1.04						
	Dishnet		14.12.06			4.4		11.1.08							
	Unitech		25.1.08			4.4		10.9.08							
	Etisalat DB		25.1.08			4.4		10.9.08							
	Idea		25.1.08			4.4		6.5.09							
	Loop		25.1.08			4.4		9.3.09							
	RCL	RCL	20.7.01			4.4	3.75	11.1.08					20.11.02	13.2.04	
	HFCL Infocom	HFCL Infocom	30.9.97			4.4	2.50	10.9.08					26.12.97		
	Tata	Tata	30.1.04			4.4	3.75	9.3.09					29.6.04	21.4.06	
		Sistema Shyam	25.1.08				2.50						25.7.08		
Haryana	**12**	**4**		**63.8**	**20**	**63.8**	**12.50**								
	Idea		12.12.95			6.2		12.12.95 (900 MHz)	28.12.99 (900 MHz)						
	Vodafone		12.12.95			6.2		28.12.95 (900 MHz)	2.1.01 (900 MHz)						
	BSNL	BSNL	29.02.00			10	2.50	-	22.12.00 (900 MHz)		12.7.07		25.9.00		
	Bharti		28.9.01			6.2		-	1.4.02						
	Dishnet		14.12.06			4.4		11.1.08							
	Etisalat DB		25.1.08			4.4		4.12.08							
	Videocon		25.1.08			4.4		4.12.08							
	Unitech		25.1.08			4.4		4.12.08							
	Loop		25.1.08			4.4		4.12.08							
	Spice		25.1.08			4.4		6.5.09							
	RCL	RCL	20.7.01			4.4	3.75	11.1.08					16.10.02	27.5.04	
	Tata	Tata	30.1.04			4.4	3.75	4.12.08					27.10.04	8.8.06	
		Sistema Shyam	25.1.08				2.50						11.4.08		
UP - West	**11**	**4**		**61.2**	**20**	**61.2**	**13.75**								
	Idea		12.12.95			8		12.12.95 (900 MHz)	28.12.99 (900 MHz)	28.1.06					
	Bharti		28.9.01			6.2		-	3.4.2002 (1800 MHz)						
	BSNL	BSNL	29.02.00			10	2.50	-	22.12.00 (900 MHz)	28.1.06	12.3.07		30.5.00		
	Vodafone		13.2.04			6.2		-	6.5.04 (900 MHz)						
	Aircel		14.12.06			4.4		11.1.08							
	Etisalat DB		25.1.08			4.4		25.9.08							
	Unitech		25.1.08			4.4		25.9.08							
	Videocon		25.1.08			4.4		25.9.08							
	Loop		25.1.08			4.4		26.12.08							
	RCL	RCL	20.7.01			4.4	5.00	11.1.08					22.1.03	28.2.05	8.8.06
	Tata	Tata	30.1.04			4.4	3.75	26.12.08					21.5.04	17.5.06	
		Sistema Shyam	25.1.08				2.50						11.4.08		

List of Date of Allocation of Spectrum to Service providers

Service Area	Mobile Operator (with number)		Date of License	Total Spectrum Available (in MHz)		Total Spectrum Allocated (in MHz)		GSM					CDMA		
	GSM	CDMA		GSM	CDMA	GSM	CDMA	4.4 MHz on (Date)	6.2 MHz on (Date)	8 MHz on (Date)	10 MHz on (Date)	12.4 MHz on (Date)	2.5 MHz on (Date)	3.75 MHz on (Date)	5 MHz on (Date)
UP - East	**11**	**4**		**62.4**	**20**	**62.4**	**13.75**								
	Vodafone		12.12.95			8.2		12.12.95 (900 MHz)	2.1.01 (900 MHz)	28.1.06 (8 MHz) & 21.1.09 (8.2 MHz)					
	BSNL	BSNL	29.02.00			10	2.50	-	22.12.00 (900 MHz)	28.1.06	12.3.07		26.4.00		
	Bharti		10.2.04			7.2		-	6.5.04 (900 MHz)	21.1.09 (7.2 MHz)					
	Idea		5.10.01			6.2		3.4.02	22.2.06						
	Dishnet		14.12.06			4.4		11.1.08							
	Videocon		25.1.08			4.4		10.9.08							
	Unitech		25.1.08			4.4		10.9.08							
	Loop		25.1.08			4.4		21.1.09							
	Etisalat DB		25.1.08			4.4		10.9.08							
	RCL	RCL	20.7.01			4.4	5.00	11.1.08					27.12.02	16.1.04	6.3.06
	Tata	Tata	30.1.04			4.4	3.75	21.1.09					5.5.04	23.6.06	
		Sistema Shyam	25.1.08				2.50						11.4.08		
Rajasthan	**12**	**4**		**63.8**	**20**	**63.8**	**15.00**								
	Vodafone		12.12.95			6.2		12.12.95	2.1.01						
	Hexacom(Bharti)		22.4.96			8.2		22.4.96 (900 MHz)	10.08.00 (900 MHz)	23.12.08 (8.2 MHz)					
	BSNL	BSNL	29.02.00			8	2.50	-	22.12.00 (900 MHz)	8.6.06			26.4.00		
	Idea		5.10.01			6.2		1.4.02 (900 MHz)	19.12.05 (900 MHz)						
	Dishnet		5.12.06			4.4		11.1.08							
	Videocon		25.1.08			4.4		23.12.08							
	Unitech		25.1.08			4.4		23.12.08							
	Etisalat DB		25.1.08			4.4		23.12.08							
	Loop		25.1.08			4.4		23.12.08							
	RCL	RCL	20.7.01			4.4	3.75	11.1.08					5.9.02	24.12.03	
	Sistema Shyam	Sistema Shyam	4.3.98			4.4	5.00	23.12.08						2.6.98	
	Tata	Tata	30.1.04			4.4	3.75	23.12.08					14.7.04	17.5.06	
Madhya Pradesh	**11**	**4**		**95.2**	**20**	**63**	**12.50**								
	Idea		12.12.95			8		12.12.95 (900 MHz)	9.9.02 (900 MHz)	2.11.06					
	Reliance Telecom		12.12.95			6.2		12.12.95 (900 MHz)	8.1.01 (900 MHz)						
	BSNL	BSNL	29.02.00			10	2.50	-	22.12.00 (900 MHz)		10.5.07		26.4.00		
	Bharti		28.9.01			8		-	1.4.02	8.1.07					
	Vodafone		20.3.07			4.4		11.2.08							
	Dishnet		14.12.06			4.4		11.1.08							
	Videocon		25.1.08			4.4		28.8.08							
	Unitech		25.1.08			4.4		28.8.08							
	Loop		25.1.08			4.4		28.8.08							
	Allianz		31.7.08			4.4		28.8.08							
		RCL	20.7.01				5.00						18.12.02	23.3.05	8.8.06
	Tata	Tata	12.2.04			4.4	2.50	28.8.08					29.6.04		
		Sistema Shyam	25.1.08				2.50						11.4.08		

List of Date of Allocation of Spectrum to Service providers

Service Area	Mobile Operator (with number)		Date of License	Total Spectrum Available (in MHz)		Total Spectrum Allocated (in MHz)		GSM					CDMA		
	GSM	CDMA		GSM	CDMA	GSM	CDMA	4.4 MHz on (Date)	6.2 MHz on (Date)	8 MHz on (Date)	10 MHz on (Date)	12.4 MHz on (Date)	2.5 MHz on (Date)	3.75 MHz on (Date)	5 MHz on (Date)
West Bengal	**10**	**4**		**57.4**	**20**	**53**	**11.25**								
	Reliance Telecom		12.12.95			6.2		12.12.95 (900 MHz)	20.2.04						
	BSNL	BSNL	29.02.00			8	2.50	-	22.12.00 (900 MHz)	12.3.07			26.4.00		
	Bharti		11.2.04			6.2		12.8.04 (900 MHz)	10.1.08						
	Vodafone		23.3.04			6.2		12.8.04 (900 MHz)	10.1.08						
	Dishnet Wireless		21.4.04			4.4		15.12.04							
	Videocon		25.1.08			4.4		9.1.09							
	Idea		25.1.08			4.4		9.1.09							
	Loop		25.1.08			4.4		9.1.09							
	Unitech		25.1.08			4.4		9.1.09							
		RCL	20.7.01				3.75						31.12.02	6.3.06	
	Tata	Tata	30.1.04			4.4	2.50	9.1.09					6.7.04		
		Sistema Shyam	25.1.08				2.50						11.4.08		
Himachal Pradesh	**11**	**4**		**57.6**	**20**	**57.6**	**10.00**								
	Bharti		12.12.95			6.2		12.12.95 (900 MHz)	19.9.03 (900 MHz)						
	Reliance Telecom		12.12.95			6.2		12.12.95 (900 MHz)	26.8.05 (900 MHz)						
	BSNL	BSNL	29.02.00			10	2.50	-	22.12.00 (900 MHz)		12.7.07		26.4.00		
	Idea		5.10.01			4.4		11.3.02							
	Dishnet Wireless		21.4.04			4.4		13.3.06							
	Vodafone		5.12.06			4.4		11.1.08							
	Videocon		25.1.08			4.4		4.12.08							
	S. Tel		25.1.08			4.4		4.12.08							
	Loop		25.1.08			4.4		4.12.08							
	Unitech		25.1.08			4.4		4.12.08							
		RCL	20.7.01				2.50						15.1.04		
	Tata	Tata	30.1.04			4.4	2.50	4.12.08					29.6.04		
		Sistema Shyam	25.1.08				2.50						11.4.08		
Bihar	**12**	**4**		**71.2**	**20**	**66.8**	**13.75**								
	Reliance Telecom		12.12.95			8		12.12.95 (900 MHz)	28.12.99 (900 MHz)	23.10.06					
	BSNL	BSNL	29.02.00			10	2.50		22.12.00 (900 MHz)	24.8.06	5.4.07		26.4.00		
	Bharti		10.2.04			9.2			6.5.04 (900 MHz)	9.6.06 (8 MHz) & 3.10.08 (8.2 MHz)	30.11.08 (9.2 MHz)				
	Dishnet Wireless		21.4.04			4.4		7.2.06							
	Vodafone		5.12.06			4.4		11.1.08							
	Idea		6.12.06			4.4		11.1.08							
	Videocon		25.1.08			4.4		3.10.08							
	Unitech		25.1.08			4.4		3.10.08							
	S Tel		25.1.08			4.4		3.10.08							
	Loop		25.1.08			4.4		3.10.08							
	Allianz		31.7.08			4.4		3.10.08							
		RCL	20.7.01				5.00						7.2.03	15.9.04	6.3.06
	Tata	Tata	30.1.04			4.4	3.75	3.10.08					5.5.04	17.5.06	
		Sistema Shyam	25.1.08				2.50						11.4.08		

List of Date of Allocation of Spectrum to Service providers

Service Area	Mobile Operator (with number)		Date of License	Total Spectrum Available (in MHz)		Total Spectrum Allocated (in MHz)		GSM					CDMA		
	GSM	CDMA		GSM	CDMA	GSM	CDMA	4.4 MHz on (Date)	6.2 MHz on (Date)	8 MHz on (Date)	10 MHz on (Date)	12.4 MHz on (Date)	2.5 MHz on (Date)	3.75 MHz on (Date)	5 MHz on (Date)
Orissa	**11**	**4**		**77.4**	**20**	**59.4**	**11.25**								
	Reliance Telecom		12.12.95			6.2		12.12.95 (900 MHz)	5.9.01 (900 MHz)						
	BSNL	BSNL	29.02.00			10	2.50		22.12.00 (900 MHz)		10.5.07		26.4.00		
	Bharti		10.2.04			8			6.5.04 (900 MHz)	16.9.06					
	Dishnet Wireless		21.4.04			4.4		24.12.04							
	Vodafone		5.12.06			4.4		11.1.08							
	Idea		25.1.08			4.4		24.4.08							
	Videocon		25.1.08			4.4		24.4.08							
	Loop		25.1.08			4.4		24.4.08							
	Unitech		25.1.08			4.4		24.4.08							
	S Tel		25.1.08			4.4		24.4.08							
		RCL	20.7.01				3.75						22.1.03	15.9.04	
	Tata	Tata	30.1.04			4.4	2.50	24.4.08					5.5.04		
		Sistema Shyam	25.1.08				2.50						29.5.08		
Assam	**10**	**4**		**59.4**	**20**	**55**	**10.00**								
	Reliance Telecom		12.12.95			6.2	2.50	12.12.95 (900 MHz)	6.10.03 (900 MHz)				21.4.08		
	BSNL	BSNL	29.02.00			10	2.50	-	28.4.03 (900 MHz)		24.5.07		26.4.00		
	Bharti		8.7.04			6.2		15.3.05 (1.8 MHz in 900 MHz)	10.11.06						
	Dishnet Wireless		21.4.04			6.2		22.7.04 (900 MHz)	1.12.06						
	Vodafone		5.12.06			4.4		11.1.08							
	Videocon		25.1.08			4.4		22.12.08							
	Idea		25.1.08			4.4		22.12.08							
	Unitech		25.1.08			4.4		22.12.08							
	Loop		25.1.08			4.4		22.12.08							
	S.Tel		25.1.08			4.4		22.12.08							
		Tata	25.1.08				2.50						4.4.08		
		Sistema Shyam	25.1.08				2.50						3.4.08		
North East	**10**	**4**		**57.6**	**20**	**53.2**	**10.00**								
	Reliance Telecom		12.12.95			6.2	2.50	12.12.95 (900 MHz)	20.1.06				21.4.08		
	Bharti		12.12.05			6.2		24.12.04 (900 MHz)	23.12.08						
	BSNL	BSNL	29.02.00			10	2.50		28.4.03 (900 MHz)		10.5.07		16.6.00		
	Dishnet Wireless		21.4.04			4.4		22.7.04 (900 MHz)							
	Vodafone		5.12.06			4.4		11.1.08							
	Videocon		25.1.08			4.4		23.12.08							
	Idea		25.1.08			4.4		23.12.08							
	Unitech		25.1.08			4.4		23.12.08							
	Loop		25.1.08			4.4		23.12.08							
	S. Tel		25.1.08			4.4		23.12.08							
		Tata	25.1.08				2.50						3.4.08		
		Sistema Shyam	25.1.08				2.50						3.4.08		

List of Date of Allocation of Spectrum to Service providers

Service Area	Mobile Operator (with number)		Date of License	Total Spectrum Available (in MHz)		Total Spectrum Allocated (in MHz)		GSM					CDMA		
	GSM	CDMA		GSM	CDMA	GSM	CDMA	4.4 MHz on (Date)	6.2 MHz on (Date)	8 MHz on (Date)	10 MHz on (Date)	12.4 MHz on (Date)	2.5 MHz on (Date)	3.75 MHz on (Date)	5 MHz on (Date)
Jammu & Kashmir	**10**	**4**		**49.4**	**20**	**49.4**	**10.00**								
	BSNL	BSNL	29.02.00			8	2.50		28.4.03 (900 MHz)	16.6.06 (900 MHz)			26.4.00		
	Bharti		10.2.04			6.2		22.6.04 (900 MHz)	28.6.06 (900 MHz)						
	Dishnet Wireless		21.4.04			4.4		1.9.04 (900 MHz)							
	Vodafone		5.12.06			4.4		11.1.08							
	Idea		25.1.08			4.4		24.12.08							
	Videocon		25.1.08			4.4		24.12.08							
	Unitech		25.1.08			4.4		24.12.08							
	Loop		25.1.08			4.4		24.12.08							
	S. Tel		25.1.08			4.4		24.12.08							
	RCL	RCL	6.9.04			4.4	2.50	11.1.08					27.9.05		
		Tata	25.1.08				2.50						3.4.08		
		Sistema Shyam	25.1.08				2.50						3.4.08		

Source: WPC/DoT Data & Service Providers various reports

Annexure-VIII

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

Annexure-IX

List of Service Providers who have been allocated 6.2 MHz directly

S.No.	Service Area	Name of Licensee	Spectrum Allocated (in MHz)	Date of Allocation
1	AP	BSNL	6.2	22.12.2000
2	Bihar	BSNL	6.2	22.12.2000
3	Chennai	BSNL	6.2	22.12.2000
4	Gujarat	BSNL	6.2	22.12.2000
5	Haryana	BSNL	6.2	22.12.2000
6	HP	BSNL	6.2	22.12.2000
7	Karnataka	BSNL	6.2	22.12.2000
8	Kerala	BSNL	6.2	22.12.2000
9	Kolkata	BSNL	6.2	22.12.2000
10	Maharashtra	BSNL	6.2	22.12.2000
11	MP	BSNL	6.2	22.12.2000
12	Orissa	BSNL	6.2	22.12.2000
13	Punjab	BSNL	6.2	22.12.2000
14	Rajasthan	BSNL	6.2	22.12.2000
15	TN	BSNL	6.2	22.12.2000
16	UP(E)	BSNL	6.2	22.12.2000
17	UP(W)	BSNL	6.2	22.12.2000
18	WB	BSNL	6.2	22.12.2000
19	Delhi	MTNL	6.2	22.12.2000
20	Mumbai	MTNL	6.2	22.12.2000
21	Kerala	Bharti	6.2	11.3.2002
22	Mumbai	Bharti	6.2	11.3.2002
23	TN	Bharti	6.2	11.3.2002
24	AP	Hutch	6.2	11.3.2002
25	Karnataka	Hutch	6.2	11.3.2002
26	Kolkata	Reliable Internet	6.2	11.3.2002
27	Gujarat	Bharti	6.2	1.4.2002
28	Haryana	Bharti	6.2	1.4.2002
29	Maharashtra	Bharti	6.2	1.4.2002
30	MP	Bharti	6.2	1.4.2002
31	UP(W)	Bharti	6.2	3.4.2002
32	Chennai	Hutch	6.2	30.5.2002
33	Delhi	Idea	6.2	22.10.2002
34	Assam	BSNL	6.2	28.4.2003
35	J&K	BSNL	6.2	28.4.2003
36	NE	BSNL	6.2	28.4.2003
37	Bihar	Bharti	6.2	6.5.2004
38	Orissa	Bharti	6.2	6.5.2004
39	UP(W)	Hutch	6.2	6.5.2004

Annexure-X

International practices on Licensing

Australia

There are two types of organisations that can provide telecommunications services to the public - carriers and carriage service providers (CSPs). Carriers are defined as persons or organisations who own a telecommunications network unit to supply carriage services to the public. Examples of a network unit include a length of telecommunications cable or a radio communications base station. CSPs are defined as those who use, but do not own, a telecommunications network to provide services to the public. Carriers are generally required to hold a carrier licence. Spectrum and numbers are allotted separately.

The charge imposed on an application for a carrier licence is due and payable when the application is made to ACMA. The amount of the application charge is $2,500, representing the charge determined by the ACMA in the *Telecommunications (Carrier Licence Application Charge) Determination 2007* made under section 9 of the *Telecommunications (Carrier Licence Charges) Act 1997*. An annual charge is also imposed on a carrier licence. The annual charge consists of a fixed component and a variable component that will be determined for each financial year. The fixed component (the minimum charge) will be specified in that year's Annual Carrier Licence Charge Determination. The variable component will be calculated on the basis of market share in accordance with the formula set out in section 20R of the *TCPSS Act*. This formula is also used in determining the amount of levy debit applicable to a participating carrier under the universal service regime. Each year ACMA makes a determination under subsection 14(1) of the *Telecommunications (Carrier Licence Charges) Act 1997* setting out the annual charge for each

licensed carrier. The annual charge is intended to provide a mechanism for recovery of costs associated with the regulation of the telecommunications industry by ACMA and the ACCC.[1]

European Union[2]

The European Parliament and the Council gave a set of five directives to its Member States so as to provide for a single Regulatory framework for all transmission network and services. The service specific licences in the new framework have been replaced by authorizations. The Member States are however, permitted to impose a set of conditions to the general authorizations.

With the exception of assigning radio frequencies and numbers, the EU has replaced individual licences with a general authorization to provide all electronic communications services and networks under a new regulatory framework for electronic communications.

The new regulatory framework for the electronic communications sector in the European Union entered into force in July 2003. The main objectives of the new rules are to promote competition in telecommunication markets, improve the functioning of the internal market and guarantee basic user rights. The new framework is also technology neutral and aims to be sufficiently flexible to deal with converging markets.

[1] Source: http://www.acma.gov.au/WEB/STANDARD/pc=PC_578

[2] ***Source:- Directive 2002/20 EC - dated 7th March 2002 and ITU trends 2004/05***

Through its Authorization Directive, the EU wants to create more consistent licensing throughout the member states. It is requiring the following:

• *A general authorization instead of individual licences*- All electronic communication services and networks will be covered under a general authorization regime, with individual rights-of-use being confined to the assignment of radio frequencies and numbers only.

• *A maximum set of conditions to be attached to general authorizations.* The Directive introduces a strict separation between:

(a) conditions under general law, applicable to all undertakings in all economic sectors;

(b) conditions under the general authorization applicable to all telecommunication services and networks; and

(c) conditions attached to rights of use for radio frequencies and numbers.

Penalties for non-compliance with conditions must be strictly proportional, and withdrawal of an authorization or a right of use may only be a last resort.

• *Simplified procedures for market entry* No information or individual licence is required as a prior condition for market entry. At most, member states may require notification and provision of a minimum set of identification data, but even this may not stand in the way of market entry. Systematic verification of compliance is limited to those conditions specifically identified in the Directive.

• *Reduced fee and charges and a limited range of divergence in charges within the EU* Charges imposed under a general authorization have to be based on administrative costs. The Directive provides transparency by requiring national regulatory authorities to publish annual overviews of costs and charges. Fee may be charged to ensure the optimal use of frequencies, numbers, or rights of way, but they must be objectively justified, transparent, non-discriminatory and proportionate.

The authorization rules lay down an administratively simple, light-touch. procedure allowing companies to enter markets quickly.

Japan[3]

Before 1 April 2004, telecommunication carriers in Japan were categorized into two types under the Telecommunications Business Law: "Type 1 telecommunications carriers", which offered services using their own facilities, and "Type 2 telecommunications carriers", which did not have their own facilities and which leased their lines.

Carriers were required to obtain permission to engage in a Type 1 business or were required to submit a registration or notification of their entry into the market to engage in a Type 2 business.

In light of heightened competition and the emergence of numerous substitute services - and also out of a desire to review the regulations for market entry and service provision - the Telecommunications Business

[3] Source: Regulator's (Ministry of Public Management, Home Affairs, Posts and Telecommunications) website and ITU trends in Telecom reform 2004/05

Law was completely reviewed in 2003 and the amended law came into force on 1 April 2004. The amendments:

• abolished the distinction between telecommunication circuit facilities of Type 1 and Type 2 carriers;

• abolished the permission system for market entry and withdrawal and introduced a registration and notification system in its place;

• abolished tariff regulation; and

• improved consumer protection rules, holding carriers more accountable for service provision and handling of complaints.

With regard to registration and notification, the amended Telecommunications Business Law states that:

• *Any person who intends to operate a telecommunications business by installing telecommunications circuit facilities on a scale exceeding the standards specified in the applicable Ministry of Internal Affairs and Communications (MIC) ordinance shall obtain registration from the Minister for Internal Affairs and Communications.*

• *Any person (except a person who has to obtain registration) who intends to operate a telecommunications business shall submit a notification to the Minister for Internal Affairs and Communications.*

To start a service utilizing some radio facilities, only the person who has obtained a radio licence is authorized to use spectrum. This authorization cannot be resold, transferred or used by any other than the person so authorized on the licence[4].

[4] http://www.soumu.go.jp/main_sosiki/joho_tsusin/eng/faqs.html

Any person who wishes to establish a radio station shall obtain a radio station licence from the Minister. Where a radio station is to be established for the purpose of operating a telecommunications business, the licensee concerned shall be a telecommunications carrier.[5]

Malaysia

Under the Communications and Multimedia Act 1998, there are four categories[6] of licensable activities:

Network Facilities Providers - who are the owners of facilities such as satellite earth stations, broadband fibre optic cables, telecommunications lines and exchanges, radiocommunications transmission equipment, mobile communications base stations, and broadcasting transmission towers and equipment. They are the fundamental building block of the convergence model upon which network, applications and content services are provided.

Network Services Providers - who provide the basic connectivity and bandwidth to support a variety of applications. Network services enable connectivity or transport between different networks. A network service provider is typically also the owner of the network facilities. However, a connectivity service may be provided by a person using network facilities owned by another.

Applications Service Providers - who provide particular functions such as voice services, data services, content-based services, electronic commerce and other transmission services. Applications services are essentially the functions or capabilities, which are delivered to end-users.

[5] http://www.soumu.go.jp/main_sosiki/joho_tsusin/eng/Resources/Manual/Entry-Manual/entry2k-eng.pdf

[6] http://www.skmm.gov.my/what_we_do/licensing/cma/framework.asp

Content Applications Service Providers - who are special subset of applications service providers including traditional broadcast services and newer services such as online publishing and information services.

Within the four categories listed, there are two types of licences provided for – Individual licence and Class licence. Individual licences are granted for activities where a high degree of regulatory control is required. Class Licences are annually renewable and are entered into Registers maintained by the Malaysian Communications and Multimedia Commission.

The MCMC advertise the availability of a Spectrum Assignment exercise in the public media (i.e. newspapers) and successful candidates are invited to apply for the spectrum.[7]

For an Individual Licence the applicable licence fee are as follows:

a) Application Fee - RM10,000.00 (non refundable)

b) Approval Fee - RM50,000.00

c) Annual Fee - 0.5% of Gross Annual Turnover or RM50,000 - whichever is higher

For registration under a Class Licence a fee of RM2,500.00 is

payable for a One-year registration[8].

Singapore[9]

[7] http://www.skmm.gov.my/what_we_do/spectrum/assign.asp

[8] http://www.skmm.gov.my/what_we_do/licensing/cma/faq.asp

[9] http://www.ida.gov.sg/Policies%20and%20Regulation/20060419203000.aspx and ITU

There are two types of licences providing telecommunications services in Singapore. These are Facility Based Operator (FBO) and Service Based Operator (SBO). FBOs are operators intending to deploy any form of telecommunication network, systems and facilities to offer telecommunication switching and/or telecommunication services to other licensed telecommunication operators, business, and/or consumers. SBOs are operators intending to lease telecommunication network elements such as transmission capacity, switching services, ducts and fibre from any FBO licensed by IDA to provide telecommunication services to third parties or resell the telecommunication services of FBO. Arising from scarcity of radio frequency spectrum, operators who intend to deploy wireless technology platforms are assigned spectrum and/or licensed as FBOs separately via a comparative selection exercise and/or an auction exercise.

Apart from spectrum-related licences, there is no limit on the number of licences that may be issued by the national regulatory Authority, the Infocomm Development Authority of Singapore (IDA).

In general, operators that install or operate any kind of network infrastructure require an FBO licence. This includes international and domestic wireless transmission or switching facilities; public cellular mobile networks; paging networks; public mobile data and trunked radio services; and local multipoint distribution services. Wireless services are licensed separately, pursuant to spectrum-management policies. Where spectrum scarcity is an issue, a comparative selection or auction process may be used to distribute spectrum licences.

Successful applicants for the FBO licence are required to pay the relevant licence fee as stipulated below[10]:

Licence	Licence Fee
• FBO designated as PTL	Initial Fee: None Annual Fee: 1% AGTO, subject to a minimum of S$250,000 per year Licence Duration: 20 years, renewable for a further period as IDA thinks fit
• Terrestrial telecommunication networks for telecommunication purposes	Initial Fee: None Annual Fee: 1% AGTO, subject to minimum of S$100,000 per year Licence Duration: 15 years, renewable for a further period as IDA thinks fit
• Public cellular mobile telephone services • Public mobile broadband multimedia services • Public fixed-wireless broadband multimedia services	Due to limited frequency spectrum, the licence fee and licence duration will be specified together with the approach to award the respective spectrum rights and licences, via a comparative selection exercise and/or an auction exercise.

10 http://www.ida.gov.sg/doc/Policies%20and%20Regulation/Policies_and_Regulation_Level3/licensing/FBOGuidelines.pdf

• Public radio paging services • Public mobile data services • Public trunked radio services	Initial Fee: None Annual Fee: 1% AGTO, subject to minimum of S$1,200 per year Licence Duration: 10 years, renewable for a further period as IDA thinks fit

Annexure-XI

Government of India
Ministry of Communications & IT
Department of Telecommunications
Sanchar Bhawan, 20-Ashoka Road, New Delhi-110001.
(Carrier Services Cell)

No. 10-51/2008-Cs-III Dated: 09-03-2009

To.

All IP-I Providers

Subject: Clarification regarding scope of IP-I providers.

It is to clarify that the scope of IP-I category providers, which is presently limited to passive infrastructure, has been enhanced to cover the active infrastructure if this active infrastructure is provided on behalf of the licensees, i.e., they can create active infrastructure limited to antenna, feeder cable, Node B, Radio Access Network(RAN) and transmission system only for/on behalf of UASL/CMSP licensees.

This issues with the approval of competent authority.

(S.T.Abbas)
Director(CS-III)

Annexure-XII

Projection and Comparative Statement of AGR & Uniform Licence Fee (With ISP & IP-I)																		
Category	AGR & L. Fee 2008-09			AGR & L. Fee 2009-10			AGR & L. Fee 2010-11			AGR & L. Fee 2011-12			AGR & L. Fee 2012-13			AGR & L. Fee 2013-14		
				Projected			Projected			Projected			Projected			Projected		
	LF Rate (%)	AGR	L Fee	AGR	LF Rate (%)	L Fee	AGR	LF Rate (%)	L Fee	AGR	% L. Fee	L Fee	AGR	% L. Fee	L Fee	AGR	% L. Fee	L Fee
		(Rs in Cr.)	(Rs in Cr.)	(Rs in Cr.)		(Rs in Cr.)	(Rs in Cr.)		(Rs in Cr.)	(Rs in Cr.)		(Rs in Cr.)	(Rs in Cr.)		(Rs in Cr.)	(Rs in Cr.)		(Rs in Cr.)
Metro	10%	18,645.30	1,864.53	18,645.30	10.00%	1864.53	18,831.75	10.0%	1883.18	19,020.07	9.0%	1,711.81	19,210.27	8.0%	1,536.82	19,210.27	6.0%	1,152.62
A	10%	38,027.11	3,802.71	38,027.11	10.00%	3802.71	38,407.38	9.00%	3456.66	38,791.45	8.0%	3,103.32	39,179.37	7.0%	2,742.56	39,571.16	6.0%	2,374.27
B	8%	27,890.85	2,231.27	27,989.69	8.00%	2239.17	28,269.58	7.00%	1978.87	28,552.28	6.0%	1,713.14	28,837.80	6.0%	1,730.27	29,126.18	6.0%	1,747.57
C	6%	9,396.26	563.78	9,998.08	6.00%	599.88	10,098.06	6.00%	605.88	10,199.04	6.0%	611.94	10,301.03	6.0%	618.06	10,404.04	6.0%	624.24
NLD	6%	11,369.17	682.15	13,643.00	6.00%	818.58	15,007.30	6.00%	900.44	16,508.03	6.0%	990.48	18,158.83	6.0%	1,089.53	19,974.72	6.0%	1,198.48
ILD	6%	4,350.33	261.02	4,785.37	6.00%	287.12	5,263.90	6.00%	315.83	5,790.29	6.0%	347.42	6,369.32	6.0%	382.16	7,006.26	6.0%	420.38
ISP-IT	6%	1,186.17	71.17	1,304.78	6.00%	78.29	1,435.26	6.00%	86.12	1,578.79	6.0%	94.73	1,736.67	6.0%	104.20	1,910.33	6.0%	114.62
ISP	0.0	5,610.00	-	6,171.00	0.00%	0.00	6,788.10	4.0%	271.52	7,466.91	5.0%	373.35	8,213.60	6.0%	492.82	9,034.96	6.0%	542.10
IP-I	0.0		-	19,344.00	0.00%	0.00	22,245.60	4.0%	889.82	25,582.44	5.0%	1,279.12	29,419.81	6.0%	1,765.19	33,832.78	6.0%	2,029.97
Total		1,16,475.18	9,476.62	1,39,908.33	0.52	9,690.29	1,46,346.94		10,388.33	1,53,489.31		10,225.30	1,61,426.70		10,461.60	1,70,070.70		10,204.24

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AGR & L. Fee 2010-11			AGR & L. Fee 2011-12			AGR & L. Fee 2012-13			AGR & L. Fee 2013-14			Revenue Impact due to License Fee				
Projected figures @existing rate			Projected figures @existing rate			Projected figures @existing rate			Projected figures @existing rate							
AGR	% L. Fee	L Fee	AGR	% L. Fee	L Fee	AGR	% L. Fee	L Fee	AGR	% L. Fee	L Fee	2010-11	2011-12	2012-13	2013-14	Total
(Rs in Cr.)		(Rs in Cr.)	(Rs in Cr.)		(Rs in Cr.)	(Rs in Cr.)		(Rs in Cr.)	(Rs in Cr.)		(Rs in Cr.)	(Rs in Cr.)	(Rs in Cr.)	(Rs in Cr.)	(Rs in Cr.)	(Rs in Cr.)
18,831.75	10.0%	1,883.18	19,020.07	10.0%	1,902.01	19,210.27	10.0%	1,921.03	19,210.27	10.0%	1,921.03	-	-190.20	-384.21	-768.41	**-1342.82**
38,407.38	10.0%	3,840.74	38,791.45	10.0%	3,879.15	39,179.37	10.0%	3,917.94	39,571.16	10.0%	3,957.12	-384.07	-775.83	-1,175.38	-1,582.85	**-3918.13**
28,269.58	8.0%	2,261.57	28,552.28	8.0%	2,284.18	28,837.80	8.0%	2,307.02	29,126.18	8.0%	2,330.09	-282.70	-571.05	-576.76	-582.52	**-2013.02**
10,098.06	6.0%	605.88	10,199.04	6.0%	611.94	10,301.03	6.0%	618.06	10,404.04	6.0%	624.24	-	-	-	-	**0.00**
15,007.30	6.0%	900.44	16,508.03	6.0%	990.48	18,158.83	6.0%	1,089.53	19,974.72	6.0%	1,198.48	-	-	-	-	**0.00**
5,263.90	6.0%	315.83	5,790.29	6.0%	347.42	6,369.32	6.0%	382.16	7,006.26	6.0%	420.38	-	-	-	-	**0.00**
1,435.26	6.0%	86.12	1,578.79	6.0%	94.73	1,736.67	6.0%	104.20	1,910.33	6.0%	114.62	-	-	-	-	**0.00**
6,788.10	0.0%	-	7,466.91	0.0%	-	8,213.60	0.0%	-	9,034.96	0.0%	-	271.52	373.35	492.82	542.10	**1679.78**
22,245.60	0.0%	-	25,582.44	0.0%	-	29,419.81	0.0%	-	33,832.78	0.0%	-	889.82	1,279.12	1,765.19	2,029.97	**5964.10**
1,46,346.94		9,893.75	1,53,489.31		10,109.90	1,61,426.70		10,339.94	1,70,070.70		10,565.96	**494.58**	**115.39**	**121.66**	**-361.72**	**369.92**

Annexure-XIII

Technology wise and service area wise Market share by subscribers who have been allocated spectrum in the last 24 months (As on Dec 2009)

Service Area	Service Provider		Period of getting spectrum	Market Share	
	GSM	CDMA		GSM	CDMA
Delhi	Aircel		24 months	4.38	
	RCL		24 months	9.97	
	Etisalat		16 months	0.00	
		Sistema	16 months		1.88
Mumbai	Idea		24 months	7.11	
	RCL		24 months	9.25	
	Aircel		24 months	3.77	
	Tata		16 months	6.91	
	Etisalat		16 months	0.00	
	Videocon		16 months	0.00	
	Unitech		16 months	0.00	
		Sistema	16 months		0.07
Kolkata	Idea		12 months	1.83	
	Tata		12 months	4.81	
	Unitech		12 months	0.00	
	Videocon		12 months	0.00	
	Loop		12 months	0.00	
		Sistema	19 months		6.86
A circles					
Maharashtra	Aircel		24 months	0.44	
	RCL		24 months	8.75	
	Tata		14 months	5.85	
	Videocon		16 months	0.00	
	Etisalat		16 months	0.00	
	Unitech		16 months	0.00	
	Spice		8 months	0.00	
	Loop		14 months	0.00	
		Sistema	20 months		0.00
Gujarat	RCL		24 months	7.58	
	Aircel		24 months	0.00	
	Videocon		15 months	0.00	
	Unitech		15 months	0.00	
	Etisalat		15 months	0.00	
	Loop		10 months	0.00	

Service Area	Service Provider		Period of getting spectrum	Market Share	
	GSM	CDMA		GSM	CDMA
	Tata		10 months	0.00	
		Sistema	19 months		0.00
AP	Aircel		24 months	2.25	
	RCL		24 months	5.36	
	Tata		19 months	11.22	
	Unitech		19 months	0.97	
	Videocon		19 months	0.00	
	Spice		19 months	0.00	
	Etisalat		19 months	0.00	
	Loop		19 months	0.00	
		Sistema	21 months		0.00
Karnataka	Aircel		24 months	2.25	
	RCL		24 months	5.36	
	Tata		19 months	11.22	
	Unitech		19 months	0.97	
	Videocon		19 months	0.00	
	Etisalat		19 months	0.00	
	Loop		19 months	0.00	
	Idea		19 months	0.00	
		Sistema	20 months		1.90
TN including Chennai	RCL		24 months	3.50	
	Idea		20 months	1.41	
	Tata		20 months	6.57	
	Unitech		20 months	0.47	
	Videocon		20 months	0.00	
	Etisalat		20 months	0.00	
	Loop		20 months	0.00	
		Sistema	21 months		6.42
B Circles					
Kerala	Aircel		24 months	3.65	
	RCL		24 months	3.84	
	Tata		20 months	7.09	
	Unitech		20 months	0.50	
	Videocon		20 months	0.00	
	Etisalat		20 months	0.00	
	Loop		20 months	0.00	
		Sistema	20 months		3.84
Punjab	RCL		24 months	7.72	
	Tata		16 months	2.34	

Service Area	Service Provider		Period of getting spectrum	Market Share	
	GSM	CDMA		GSM	CDMA
	Aircel		24 months	0.00	
	Etisalat		16 months	0.00	
	Unitech		16 months	0.00	
	Idea		8 months	0.00	
	HFCL		16 months	0.00	
	Loop		10 months	0.00	
		Sistema	17 months		0.00
Haryana	RCL		24 months	9.71	
	Tata		13 months	6.77	
	Aircel		24 months	0.00	
	Etisalat		13 months	0.00	
	Videocon		13 months	0.00	
	Unitech		13 months	0.00	
	Loop		13 months	0.00	
	Spice		8 months	0.00	
		Sistema	21 months		0.01
UP -West	Aircel		24 months	2.99	
	RCL		24 months	10.90	
	Tata		12 months	1.30	
	Unitech		15 months	0.72	
	Etisalat		15 months	0.00	
	Videocon		15 months	0.00	
	Loop		15 months	0.00	
		Sistema	21 months		0.00
UP -East	Aircel		24 months	2.13	
	RCL		24 months	8.97	
	Tata		11 months	1.01	
	Unitech		16 months	0.55	
	Videocon		16 months	0.00	
	Loop		11 months	0.00	
	Etisalat		16 months	0.00	
		Sistema	21 months		0.00
Rajasthan	RCL		24 months	7.94	
	Aircel		24 months	0.00	
	Videocon		12 months	0.00	
	Unitech		12 months	0.00	
	Etisalat		12 months	0.00	
	Loop		12 months	0.00	
	Sistema		12 months	0.00	

Service Area	Service Provider		Period of getting spectrum	Market Share	
	GSM	CDMA		GSM	CDMA
	Tata		12 months	0.00	
MP	Vodafone		23 months	5.99	
	Tata		16 months	7.13	
	Aircel		24 months	0.00	
	Videocon		16 months	0.00	
	Unitech		24 months	0.00	
	Loop		24 months	0.00	
	Allinanz		24 months	0.00	
		Sistema	21 months		0.00
West Bengal	Tata		12 months	0.42	
	Idea		12 months	1.71	
	Videocon		12 months	0.00	
	Loop		12 months	0.00	
	Unitech		12 months	0.00	
		Sistema	21 months		12.52
C circles					
HP	Vodafone		24 months	3.80	
	S Tel		13 months	0.42	
	Videocon		13 months	0.00	
	Loop		13 months	0.00	
	Unitech		13 months	0.00	
	Tata		13 months	0.00	
		Sistema	21 months	0.00	
Bihar	Vodafone		24 months	9.74	
	Idea		24 months	10.13	
	Tata		15 months	1.93	
	S Tel		15 months	0.22	
	Unitech		15 months	0.50	
	Videocon		15 months	0.00	
	Loop		15 months	0.00	
	Allinanz		15 months	0.00	
		Sistema	21 months		3.83
Orissa	Vodafone		24 months	7.33	
	Idea		20 months	4.08	
	Tata		20 months	8.31	
	S Tel		20 months	0.60	
	Unitech		20 months	0.39	
	Videocon		20 months	0.00	
	Loop		20 months	0.00	

Service Area	Service Provider		Period of getting spectrum	Market Share	
	GSM	CDMA		GSM	CDMA
		Sistema	19 months		0.00
Assam	Vodafone		24 months	8.12	
	Idea		12 months	0.56	
	Videocon		12 months	0.00	
	Unitech		12 months	0.00	
	Loop		12 months	0.00	
	S Tel		12 months	0.00	
		RTL	20 months		0.00
		Tata	21 months		41.25
		Sistema	21 months		0.00
North East	Vodafone		24 months	8.73	
	Idea		12 months	0.07	
	Videocon		12 months	0.00	
	Unitech		12 months	0.00	
	Loop		12 months	0.00	
	S Tel		12 months	0.00	
		RTL	20 months		0.00
		Tata	21 months		32.26
		Sistema	21 months		0.00
Jammu & Kashmir	Vodafone		24 months	3.30	
	RCL		24 months	8.89	
	Idea		12 months	0.25	
	Videocon		12 months	0.00	
	Unitech		12 months	0.00	
	Loop		12 months	0.00	
	S Tel		12 months	0.00	
		Tata	21 months		54.67
		Sistema	21 months		0.00

Annexure-XIV

Rollout Obligations in Various Countries

S.No	Country	2G / 3G Licences	Roll-out Obligations Criteria
Asia Pacific Countries			
1	Pakistan	2G Licence	The new cellular Licences issued in 2006 requires the licensees to provide: **1.** Coverage within 70% Tehsil headquarters in 4 years. **2.** Coverage has to be minimum 10% of Tehsil headquarters 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 licensed 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. Roll-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:		Nearly all European Member States included Roll-out/Coverage conditions in the licence contract. This is valid for 2G and 3G licences. **They are generally related to population coverage** (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 **obligations in European countries is to reach 25 – 50% population coverage within 2-3 years from the date of the licence**. In Europe the majority of the Member States have 25-30% pop coverage written in the licences.	
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 licensed 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.

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 (% 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 June 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. Individual 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 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.
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.

Roll out obligations in some countries[11]

[11] Source: COAI

Annexure-XV

Villages covered by Mobile Operators

Rural Mobile Coverage Operator wise																					
Operators	Number of inhabited villages covered service area wise as on 31-12-08																			Total	%age of Covered
	Delhi	AP	Assam	Bihar	Guj	Har	HP	J&K	KTK	Kerala	MP	MH	NE	Orissa	PB	Raj	TN	UP	WB		
BSNL /MTNL	158	17779	15083	17640	6656	3682	14916	1729	14491	1345	26937	17150	514	19642	9751	23198	9854	63199	21771	285495	53
Airtel	146	12769	12135	41882	11510	6155	6629	3325	13994	567	31643	15309	1455	26002	11214	26313	13105	67752	32986	334891	62
Idea / Spice	96	11548	NA	25984	10386	5867	3788	NA	2457	1299	32038	20417	NA	NA	9918	5621	NA	5570	NA	134989	25
TATA	158	12617	7317	13731	*0*	6519	334	1621	6845	1179	21152	29952	843	43361	11763	21539	6606	6974	29792	222303	41
Vodafone	158	8418	1147	11527	14985	6660	4840	NA	34	1125	1705	28075	198	3303	7870	31161	14339	37237	35439	208221	38
RCL / RTL	150	15849	NA	48869	15321	5823	16050	0	23169	1341	42346	27580	NA	28666	11949	27647	12353	5894	33536	316543	58
Aircel	NA	NA	9473	5243	NA	NA	2823	2974	NA	NA	NA	NA	1190	6476	NA	NA	7777	NA	6565	42521	8
HFCL	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	12301	NA	NA	NA	NA	12301	2
Total Villages as per Census of India 2001	158	26613	25124	68369	18159	6764	17495	6417	27481	1372	71861	41442	14803	47529	12301	39752	15492	113703	38896	593731	
Uncovered Villages	0	4176	4166	4447	841	7	357	1440	1510	1	12319	937	11874	1685	0	2141	138	5958	329	52326	
% Uncovered Villages	0	16	17	7	5	0	2	22	5	0	17	2	80	4	0	5	1	5	1	9	
Total Villages covered by at least one operator	158	22437	20958	63922	17318	6757	17138	4977	25971	1371	59542	40505	2929	45844	12301	37611	15354	107745	38567	541405	
% Villages covered by at least one operator	100	84	83	93	95	100	98	78	95	100	83	98	20	96	100	95	99	95	99	91	
Covered by only 1		2822	6463	10781	1731	19	1822	1835	6387	7	15124	4559	2072	11328	49	3806	354	29232	987	**16.74**	
Covered by 2	2	3713	6941	17073	2432	67	5851	1842	8389	12	14765	7470	590	9248	122	6359	1034	48424	2213	**23.00**	
Covered by 3	5	4530	5533	17573	4034	234	4660	1070	7070	67	13546	8538	232	9793	259	9984	2795	24091	6279	**20.26**	
Covered by 4	66	4537	1894	11102	5444	970	2717	230	2476	258	10499	9263	34	10067	720	10330	4589	4419	12871	**15.58**	
Covered by 5	85	4016	127	5278	3677	2821	1531		1113	570	5119	7732	1	4469	1095	5646	4621	919	12983	**10.41**	
Covered by 6		2819		1908		2646	546		528	457	489	2943		939	1587	1486	1961	660	3234	**3.74**	
Covered by 7				207			11		8						3909					**0.70**	
Covered by 8															4560					**0.77**	

Annexure-XVI

International Practices on Renewal of Licenses

Australia

As per ACMA's "Five year spectrum outlook 2009-2013" of March 2009, a significant issue for the government over the next five years will be the expiry of spectrum licences. Some of these licences are high value and government decisions will have significant implications for industry. ACMA received substantial commentary from industry in responses to the Outlook and the spectrum management principles regarding expiring spectrum licences, spectrum certainty and licence tenure; and ACMA's approaches towards the renewal or otherwise of these licences. These comments are being considered in detail as part of a separate project dealing with expiring spectrum licences.

Denmark

In Denmark, mobile licence other than for the provision of 3G services have a duration of 10 years and are automatically renewed for another 10 years unless revoked by the regulator (NITA) one year before the expiry of the term.

France

Regulator ART launched a public consultation in July 2003 to initiate the renewal process for two GSM licences scheduled to expire in 2006.

The Regulator levied fee of $30.63 million a year plus one percent tax on sales for renewal. Annual tax rate matched with that levied on the new 3G licensees and was same for all the operators seeking renewal. Renewal applied for 15 years from March 2006. Roll out imposed were imposed for renewal. The operators were also required to meet new licence obligations, such as:

- improving services for customers with disabilities;
- protecting the environment;

- increasing protections against handset theft;
- increasing network coverage from 90 per cent to 99 percent in mainland France;
- implementing interpersonal mail service;
- limiting SIM-lock features.

In the French code, because spectrum is part of the public domain, the Authority has total discretion to refuse a renewal, and spectrum-related refusals do not allow for the right to compensation

Hong Kong

Existing Licences for Second Generation Mobile Services had expiry dates ranging from July 2005 to September 2006. Since August 2003, the Telecommunications Authority (TA) had initiated a public consultation on the licensing of mobile services on expiry of existing 2G licences.

TA decided to designate the frequency bands 890MHz – 915MHz, 935MHz – 960MHz, 1710.5MHz – 1780.1MHz and 1805.5MHz – 1875.1MHz, which will be assigned to the GSM and PCS licensees who exercise the "right of first refusal" and obtain mobile carrier licences, to be subject to the payment of SUF. As to the level of SUF, the TA recommended to set the SUF for 2G spectrum as follows:-

a) For the first 5 years upon the issue of a Mobile Carrier Licence, SUF is recommended to be set at HK$ 145,000 per MHz of frequency then assigned to the licensee per year;

b) From the sixth licence year onwards to the expiry of the licence, SUF is recommended to be set at 5% royalty over the annual network turnover

of the licensee, subject to a minimum fee of HK$ 1,450,000 per MHz of the frequency then assigned to the licensee per year. The new Mobile Carrier Licence will have a period of validity of 15 year. Based on the existing frequency allocation, the annual SUF for the first 5 years would be HK$ 3.4 million for a PCS licensee and HK$ 2.4 million for a GSM licensee. From the sixth year onwards, the annual SUF would be based on 5% of network turnover, subject to the minimum fee of HK$ 34 million for a PCS licensee and HK$ 24 million for a GSM licensee.

The "right of first refusal" was not granted to the existing CDMA and TDMA licensees.

Pakistan[12]

In Pakistan (in April 2004), Norway's Telenor and Space Telecom won two GSM licences. The company's winning bids of $291 secures a 15-year licence, renewable on application. At the same time, however, existing operators were also required to pay the same licence fee on renewal of their licences: both Paktel and Orascom (existing operators) agreed to pay $291 million for licence renewal for 15 years.

UK

The UK's Department for Business, Innovation and Skills (BIS) has announced the launch of a consultation on the findings and recommendations of the Independent Spectrum Broker (ISB) with a view to issuing directives to regulator Ofcom for the best use of the country's radio spectrum. A number of proposals are to be considered, including plans to remove the licence durations for both 2G and 3G services; 2G licences will be clarified as being indefinite, although will be subject to revocation at five years' notice for spectrum

[12] http://pta.gov.pk and ITU trends 2004/05

management reasons, while 3G licences will be made indefinite with an initial term that will expire on 31 December 2021.

USA

The United States has adopted a "high renewal expectancy" standard for renewal of domestic public cellular radio telecommunications services. If the licensee meets certain standards in terms of using the spectrum for their intended purposes and complying with the rules and policies, they can file for renewal expectancy. The rationale behind such a regime is to guarantee a degree of regulatory discretion to allow the regulator to review the terms and conditions of the licence, to reflect new technological developments in the general licensing policy, and to review the targets set in the original licence.

Annexure-XVII

Traffic calculation for GSM

For finding out the optimum traffic to be carried by one BTS, certain assumptions have been made to calculate this traffic. These assumptions are:

- 5/15 Reuse pattern is used for all the calculations
- 2 carriers for In Building solutions for 6.2 MHz and above
- Synthesized Frequency Hopping 1:1 is used
- One time slot for BCCH (Broadcast Control Channel) and two for SDCCH (Standalone Dedicated Control Channel) for all combinations
- 2 /3/4/4 time slots for GPRS in 4.4/6.2/8/10 MHz respectively
- Loading Factor for BTS is taken as 70 %
- 30% gain is assumed by using AMR (Adaptive Multi Rate) technologies. During the consultation process, though most of the service providers agreed that most of the handsets manufactured since last few years are AMR enabled and the percentage of such handsets in the network today is around 85%, however on the issue of capacity gain which can be achieved through AMR-HR, they had different views. In view of some of the service providers, the maximum capacity gain, which can be achieved without compromising the quality of service is 20%, while in view of other service providers, capacity gain upto 40% is achievable. Therefore in these calculations, a figure of 30% has been taken.

Based on these assumptions, the maximum traffic per BTS for different spectrum allotted is as below:

- For 4.4 MHz – 17.22 Erlang
- For 6.2 MHz – 39.34 Erlang
- For 8.0 MHz – 61.28 Erlang
- For 10.0 MHz – 96.95 Erlang

The detailed calculations are in the next page.

Calculation Sheet for Traffic Capacity

1	Spectrum allotted (MHz)			4.40			6.20			8.00			10.00
2	Reuse Pattern	5.00	by	15.00	5.00	by	15.00	5.00	by	15.00	5.00	by	15.00
3	No of Carriers			22.00			31.00			40.00			50.00
4	Reserved for BCCH			15.00			15.00			15.00			15.00
5	Reserved for In Building solutions			1.00			2.00			2.00			2.00
6	Carriers left for voice Traffic			6.00			14.00			23.00			33.00
7	Possible BTS configuration with one BCCH carrier in each sector	2.00	2.00	2.00	4.00	3.00	3.00	5.00	5.00	4.00	7.00	6.00	6.00
8	Traffic channels in all three sectors (8 time slots per carrier)	16.00	16.00	16.00	32.00	24.00	24.00	40.00	40.00	32.00	56.00	48.00	48.00
9	Time slots for BCCH/ SDCCH/ GPRS (2/3/4 GPRS slots for 4.4./6.2/8 & 10 MHz)	5.00	5.00	5.00	6.00	6.00	6.00	7.00	7.00	7.00	7.00	7.00	7.00
10	time slots left for traffic	11.00	11.00	11.00	26.00	18.00	18.00	33.00	33.00	25.00	49.00	41.00	41.00
11	Gain by using AMR (30 %)	3.00	3.00	3.00	7.00	5.00	5.00	9.00	9.00	7.00	14.00	12.00	12.00
12	Time slots in all three sectors after taking AMR gain	14.00	14.00	14.00	33.00	23.00	23.00	42.00	42.00	32.00	63.00	53.00	53.00
13	Traffic in erlangs (As per Erlang table with 2% GOS)	8.20	8.20	8.20	24.60	15.80	15.80	32.84	32.80	21.90	52.50	43.00	43.00
14	Total traffic per BTS in erlangs without taking loading factor			24.60			56.20			87.54			138.50
15	Total traffic per BTS in erlangs with 70 % loading			17.22			39.34			61.28			96.95

Mobile Subscriber Density which can be served with 4.4 MHz						
Inter Site Distance (in metre)	**Sq KM Per BTS**	**BTSs per Sq KM**	**Traffic per BTS**	**Subs per BTS**	**Subs per Sq Km**	**Total no. of subs. Which can be served (35% highest market share)**
500	0.22	4.62	17.20	430	1985	5670
1000	0.87	1.15	17.20	430	496	1418
1500	1.95	0.51	17.20	430	221	630
2000	3.47	0.29	17.20	430	124	354
2500	5.42	0.18	17.20	430	79	227
3000	7.80	0.13	17.20	430	55	158
3500	10.62	0.09	17.20	430	41	116
Mobile Subscriber Density which can be served with 6.2 MHz						
Inter Site Distance (in metre)	**Sq KM Per BTS**	**BTSs per Sq KM**	**Traffic per BTS**	**Subs per BTS**	**Subs per Sq Km**	**Total no. of subs. Which can be served (35% highest market share)**
300	0.08	12.82	39.30	983	12596	35989
400	0.14	7.21	39.30	983	7085	20244
500	0.22	4.62	39.30	983	4535	12956
600	0.31	3.21	39.30	983	3149	8997
700	0.42	2.35	39.30	983	2314	6610
800	0.55	1.80	39.30	983	1771	5061
1000	0.87	1.15	39.30	983	1134	3239
Mobile Subscriber Density which can be served with 8 MHz						
Inter Site Distance (in metre)	**Sq KM Per BTS**	**BTSs per Sq KM**	**Traffic per BTS**	**Subs per BTS**	**Subs per Sq Km**	**Total no. of subs. Which can be served (35% highest market share)**
300	0.08	12.82	61.30	1533	19647	56136
400	0.14	7.21	61.30	1533	11052	31576
500	0.22	4.62	61.30	1533	7073	20209
600	0.31	3.21	61.30	1533	4912	14034
700	0.42	2.35	61.30	1533	3609	10311
800	0.55	1.80	61.30	1533	2763	7894
900	0.70	1.42	61.30	1533	2183	6237
1000	0.87	1.15	61.30	1533	1768	5052
Mobile Subscriber Density which can be served with 10 MHz						
Inter Site Distance (in metre)	**Sq KM Per BTS**	**BTSs per Sq KM**	**Traffic per BTS**	**Subs per BTS**	**Subs per Sq Km**	**Total no. of subs. Which can be served (35% highest market share)**
300	0.08	12.82	97.00	2425	31090	88828
400	0.14	7.21	97.00	2425	17488	49966
500	0.22	4.62	97.00	2425	11192	31978
600	0.31	3.21	97.00	2425	7772	22207
700	0.42	2.35	97.00	2425	5710	16315
800	0.55	1.80	97.00	2425	4372	12491
900	0.70	1.42	97.00	2425	3454	9870
1000	0.87	1.15	97.00	2425	2798	7995

Annexure-XVIII

Traffic calculation for CDMA

For finding out the optimum traffic to be carried by one BTS, certain assumptions have been made to calculate this traffic. These assumptions are:

- Traffic carrying capacity of one carrier of 1.25 MHz is taken as 26 Erlangs.
- Loading Factor for BTS is taken as 70 %
- Inter-site BTS distance has been taken as 700 metres for all the configurations.

Based on these assumptions, the maximum traffic per BTS for different spectrum allotted is as below:

- For 2.5 MHz – 109.2 Erlang
- For 3.75 MHz – 163.8 Erlang
- For 5 MHz – 218.4 Erlang
- For 6.25 MHz – 273 Erlang

The detailed calculations are in the next page.

Mobile Subscriber Density which can be served with 2.5 MHz CDMA spectrum								
Inter Site Distance (in metre)	Sq KM Per BTS	BTSs per Sq KM	Traffic per BTS	Capacity for 3 sector	Total Capacity with 70% loading	Subs per BTS	Subs per Sq Km	Total no. of subs. Which can be served (25% market share)
700	0.42	2.35	52.00	156.00	109.20	2730	6429	25714
1000	0.87	1.15	52.00	156.00	109.20	2730	3150	12600
1200	1.25	0.80	52.00	156.00	109.20	2730	2188	8750
1500	1.95	0.51	52.00	156.00	109.20	2730	1400	5600
2000	3.47	0.29	52.00	156.00	109.20	2730	788	3150
2500	5.42	0.18	52.00	156.00	109.20	2730	504	2016
3000	7.80	0.13	52.00	156.00	109.20	2730	350	1400
3500	10.62	0.09	52.00	156.00	109.20	2730	257	1029

Mobile Subscriber Density which can be served with 3.75 MHz CDMA spectrum								
Inter Site Distance (in metre)	Sq KM Per BTS	BTSs per Sq KM	Traffic per BTS	Capacity for 3 sector	Total Capacity with 70% loading	Subs per BTS	Subs per Sq Km	Total no. of subs. Which can be served (25%market share)
700	0.42	2.35	78.00	234.00	163.80	4095	9643	38571
1000	0.87	1.15	78.00	234.00	163.80	4095	4725	18900
1200	1.25	0.80	78.00	234.00	163.80	4095	3281	13125
1500	1.95	0.51	78.00	234.00	163.80	4095	2100	8400
2000	3.47	0.29	78.00	234.00	163.80	4095	1181	4725
2500	5.42	0.18	78.00	234.00	163.80	4095	756	3024
3000	7.80	0.13	78.00	234.00	163.80	4095	525	2100
3500	10.62	0.09	78.00	234.00	163.80	4095	386	1543

Mobile Subscriber Density which can be served with 5 MHz CDMA spectrum								
Inter Site Distance (in metre)	Sq KM Per BTS	BTSs per Sq KM	Traffic per BTS	Capacity for 3 sector	Total Capacity with 70% loading	Subs per BTS	Subs per Sq Km	Total no. of subs. Which can be served (25% market share)
700	0.42	2.35	104.00	312.00	218.40	5460	12857	51429
1000	0.87	1.15	104.00	312.00	218.40	5460	6300	25200
1200	1.25	0.80	104.00	312.00	218.40	5460	4375	17500
1500	1.95	0.51	104.00	312.00	218.40	5460	2800	11200
2000	3.47	0.29	104.00	312.00	218.40	5460	1575	6300
2500	5.42	0.18	104.00	312.00	218.40	5460	1008	4032
3000	7.80	0.13	104.00	312.00	218.40	5460	700	2800
3500	10.62	0.09	104.00	312.00	218.40	5460	514	2057

Mobile Subscriber Density which can be served with 6.25 MHz CDMA spectrum								
Inter Site Distance (in metre)	Sq KM Per BTS	BTSs per Sq KM	Traffic per BTS	Capacity for 3 sector	Total Capacity with 70% loading	Subs per BTS	Subs per Sq Km	Total no. of subs. Which can be served (25% market share)
700	0.42	2.35	130.00	390.00	273.00	6825	16071	64286
1000	0.87	1.15	130.00	390.00	273.00	6825	7875	31500
1200	1.25	0.80	130.00	390.00	273.00	6825	5469	21875
1500	1.95	0.51	130.00	390.00	273.00	6825	3500	14000
2000	3.47	0.29	130.00	390.00	273.00	6825	1969	7875
2500	5.42	0.18	130.00	390.00	273.00	6825	1260	5040
3000	7.80	0.13	130.00	390.00	273.00	6825	875	3500
3500	10.62	0.09	130.00	390.00	273.00	6825	643	2571

Annexure-XIX

100 Most Populous Districts in India

Sr No	District	State/ UT	Population 2001	Population Density 2001	Rate of Growth for 2009	Population 2009	Population Density 2009
1	North East	Delhi *	1,763,712	29,395	3.15	2,208,167	36,803
2	Central	Delhi *	644,005	25,760	3.15	806,294	32,252
3	Kolkata	West Bengal	4,580,544	24,760	1.18	5,012,947	27,097
4	Chennai	Tamil Nadu	4,216,268	24,231	0.84	4,499,601	25,859
5	East	Delhi *	1,448,770	22,637	3.15	1,813,860	28,342
6	Mumbai	Maharashtra	3,326,837	21,190	1.64	3,763,318	23,970
7	Mumbai (Suburban)	Maharashtra	8,587,561	19,255	1.64	9,714,249	21,781
8	Hyderabad	Andhra Pradesh	3,686,460	16,988	1.15	4,025,614	18,551
9	West	Delhi *	2,119,641	16,431	3.15	2,653,791	20,572
10	North	Delhi *	779,788	12,996	3.15	976,295	16,271
11	South	Delhi *	2,258,367	9,033	3.15	2,827,475	11,309
12	Chandigarh	Chandigarh	900,914	7,903	5.56	1,301,641	11,418
13	North West	Delhi *	2,847,395	6,471	3.15	3,564,939	8,102
14	New Delhi	Delhi *	171,806	4,909	3.15	215,101	6,146
15	South West	Delhi *	1,749,492	4,165	3.15	2,190,364	5,215
16	Mahe	Pondicherry *	36,823	4,091	3.75	47,870	5,318
17	Bangalore	Karnataka	6,523,110	2,979	1.25	7,175,421	3,277

18	Hawra	West Bengal	4,274,010	2,913	1.18	4,677,477	3,188
19	Pondicherry	Pondicherry *	735,004	2,534	3.75	955,505	3,294
20	North Twenty Four Parganas	West Bengal	8,930,295	2,181	1.18	9,773,315	2,387
21	Varanasi	Uttar Pradesh	3,147,927	1,995	2.08	3,671,742	2,327
22	Lakshadweep	Lakshadweep	60,595	1,894	4.17	80,809	2,526
23	Ghaziabad	Uttar Pradesh	3,289,540	1,682	2.08	3,836,919	1,962
24	Hugli	West Bengal	5,040,047	1,601	1.18	5,515,827	1,752
25	Daman	Daman & Diu *	113,949	1,583	0.00	113,949	1,583
26	Yanam	Pondicherry *	31,362	1,568	3.75	40,771	2,038
27	Alappuzha	Kerala	2,105,349	1,489	0.90	2,256,934	1,596
28	Thiruvananthapuram	Kerala	3,234,707	1,476	0.90	3,467,606	1,582
29	Patna	Bihar	4,709,851	1,471	1.81	5,391,837	1,684
30	Lucknow	Uttar Pradesh	3,681,416	1,456	2.08	4,294,004	1,698
31	Darbhanga	Bihar	3,285,473	1,442	1.81	3,761,209	1,651
32	Sant Ravidas Nagar	Uttar Pradesh	1,352,056	1,409	2.08	1,577,038	1,643
33	Kanpur Nagar	Uttar Pradesh	4,137,489	1,366	2.08	4,825,967	1,593
34	Vaishali	Bihar	2,712,389	1,332	1.81	3,105,143	1,525
35	Saran	Bihar	3,251,474	1,231	1.81	3,722,287	1,409
36	Kozhikode	Kerala	2,878,498	1,228	0.90	3,085,750	1,316
37	Begusarai	Bihar	2,342,989	1,222	1.81	2,682,254	1,399

38	Siwan	Bihar	2,708,840	1,221	1.81	3,101,080	1,398
39	Sitamarhi	Bihar	2,669,887	1,214	1.81	3,056,487	1,390
40	Meerut	Uttar Pradesh	3,001,636	1,190	2.08	3,501,108	1,388
41	Muzaffarpur	Bihar	3,743,836	1,180	1.81	4,285,943	1,351
42	Samastipur	Bihar	3,413,413	1,175	1.81	3,907,675	1,345
43	Nadia	West Bengal	4,603,756	1,172	1.18	5,038,351	1,283
44	Dhanbad	Jharkhand	2,394,434	1,167	1.76	2,731,570	1,331
45	Sheohar	Bihar	514,288	1,161	1.81	588,757	1,329
46	Gorakhpur	Uttar Pradesh	3,784,720	1,140	2.08	4,414,497	1,330
47	Diu	Daman & Diu *	44,110	1,103	0.00	44,110	1,103
48	Murshidabad	West Bengal	5,863,717	1,101	1.18	6,417,252	1,205
49	Mau	Uttar Pradesh	1,849,294	1,080	2.08	2,157,017	1,260
50	Deoria	Uttar Pradesh	2,730,376	1,077	2.08	3,184,711	1,256
51	Karaikal	Pondicherry *	170,640	1,060	3.75	221,832	1,378
52	Gopalganj	Bihar	2,149,343	1,057	1.81	2,460,568	1,210
53	Ernakulam	Kerala	3,098,378	1,050	0.90	3,321,461	1,126
54	Shravasti	Uttar Pradesh	1,175,428	1,044	2.08	1,371,019	1,218
55	Kollam	Kerala	2,584,118	1,037	0.90	2,770,174	1,112
56	Moradabad	Uttar Pradesh	3,749,630	1,028	2.08	4,373,568	1,199
57	Malappuram	Kerala	3,629,640	1,022	0.90	3,890,974	1,096

58	Madhubani	Bihar	3,570,651	1,020	1.81	4,087,681	1,168
59	Faridabad	Haryana	2,193,276	1,020	2.07	2,556,483	1,189
60	Nalanda	Bihar	2,368,327	1,006	1.81	2,711,261	1,152
61	Kushinagar	Uttar Pradesh	2,891,933	994	2.08	3,373,151	1,159
62	Kanniyakumari	Tamil Nadu	1,669,763	992	0.84	1,781,971	1,059
63	Purba Champaran	Bihar	3,933,636	991	1.81	4,503,226	1,134
64	Sant Kabir Nagar	Uttar Pradesh	1,424,500	988	2.08	1,661,537	1,152
65	Barddhaman	West Bengal	6,919,698	985	1.18	7,572,917	1,078
66	Thrissur	Kerala	2,975,440	981	0.90	3,189,672	1,052
67	Jaunpur	Uttar Pradesh	3,911,305	969	2.08	4,562,146	1,130
68	Jehanabad	Bihar	1,511,406	963	1.81	1,730,258	1,102
69	Bhagalpur	Bihar	2,430,331	946	1.81	2,782,243	1,083
70	Gautam Buddha Nagar	Uttar Pradesh	1,191,263	939	2.08	1,389,489	1,095
71	Azamgarh	Uttar Pradesh	3,950,808	938	2.08	4,608,222	1,094
72	Ballia	Uttar Pradesh	2,752,412	923	2.08	3,210,413	1,077
73	Allahabad	Uttar Pradesh	4,941,510	911	2.08	5,763,777	1,063
74	Ghazipur	Uttar Pradesh	3,049,337	903	2.08	3,556,747	1,053
75	Bhojpur	Bihar	2,233,415	903	1.81	2,556,813	1,034
76	Agra	Uttar Pradesh	3,611,301	897	2.08	4,212,221	1,046
77	Saharsa	Bihar	1,506,418	885	1.81	1,724,547	1,013

78	Muzaffarnagar	Uttar Pradesh	3,541,952	884	2.08	4,131,333	1,031
79	Kottayam	Kerala	1,952,901	884	0.90	2,093,510	948
80	Maldah	West Bengal	3,290,160	881	1.18	3,600,751	964
81	Bareilly	Uttar Pradesh	3,598,701	873	2.08	4,197,525	1,018
82	Firozabad	Uttar Pradesh	2,045,737	866	2.08	2,386,148	1,010
83	Buxar	Bihar	1,403,462	864	1.81	1,606,683	989
84	Khagaria	Bihar	1,276,677	859	1.81	1,461,540	983
85	Ambedkar Nagar	Uttar Pradesh	2,025,373	854	2.08	2,362,395	996
86	Madhepura	Bihar	1,524,596	853	1.81	1,745,358	977
87	Thane	Maharashtra	8,128,833	850	1.64	9,195,336	962
88	Imphal West	Manipur	439,532	847	1.14	479,617	924
89	Baghpat	Uttar Pradesh	1,164,388	838	2.08	1,358,142	977
90	Kannur	Kerala	2,412,365	813	0.90	2,586,055	872
91	Rampur	Uttar Pradesh	1,922,450	812	2.08	2,242,346	947
92	Ludhiana	Punjab	3,030,352	804	1.39	3,367,327	893
93	Thiruvallur	Tamil Nadu	2,738,866	800	0.84	2,922,918	854
94	Munger	Bihar	1,135,499	800	1.81	1,299,919	916
95	Aligarh	Uttar Pradesh	2,990,388	798	2.08	3,487,989	931
96	Purnia	Bihar	2,540,788	787	1.81	2,908,694	901
97	Bulandshahar	Uttar Pradesh	2,923,290	786	2.08	3,409,725	917

98	Katihar	Bihar	2,389,533	782	1.81	2,735,537	895
99	Uttar Dinajpur	West Bengal	2,441,824	778	1.18	2,672,332	851
100	Saharanpur	Uttar Pradesh	2,848,152	772	2.08	3,322,084	900

Annexure-XX

QoS of various service providers

	Mobile Operator		Jun-06					Sep-09					
	GSM	**CDMA**	**Sub Base**	**Spectrum**	**Call Set-up Success Rate (within licensees own network)**	**Call Drop Rate**	**Connections with good voice quality**	**Sub Base**	**Spectrum**	**Call Set-up Success Rate (within licensees own network)**	**Call Drop Rate**	**Connections with good voice quality**	**% Growth**
					>95%	**<3%**	**>95%**			**>95%**	**<3%**	**>95**	
Delhi	Bharti		2208832	10	98.95	1.12	97.08	5415988	10	98.89	1.03	95.39	145
	Vodafone		1955027	10	98.81	1.07	97.79	4466895	10	99.42	0.78	98.16	**128**
	MTNL		1037768	8	95.25	1.79	95.43	2003954	12.	96.07	1.20	97.50	93
	Idea		936550	8	99.98	0.53	98.42	2369760	8	99.08	0.72	98.32	153
	Aircel							546606	4.4	98.47	0.84	98.11	
	RCL							1266857	4.4				
		MTNL	65145	2.5				142057	2.5				118
		RCL	1835207	5	99.43	0.58	99.08	3498853	5	99.35	0.75	99.40	91
		Tata	1555790	5	98.02	0.65	96.60	5130788	5	98.68	0.45	98.83	**230**
			9594319					**24841758**					159
Mumba	Loop		1297278	10	99.41	1.40	99.16	2495087	10	99.99	1.56	96.98	**92**
	Vodafone		2121565	10	99.59	1.86	95.60	4756222	10	98.33	1.22	97.89	124
	MTNL		**1131893**	**8**	**96.21**	**1.32**	**96.04**	**2365548**	**12**	**96.3**	1.96	96.68	**109**
	Bharti		1387727	9.2	97.00	1.09	96.00	2859089	9.2	97.84	0.99	97.50	**106**
	Idea							1162478	4.4	99.15	0.89	97.80	
	Aircel							411820	4.4	97.29	0.86	98.19	

	Mobile Operator		Jun-06					Sep-09					
	GSM	**CDMA**	**Sub Base**	**Spectrum**	**Call Set-up Success Rate (within licensees own network)**	**Call Drop Rate**	**Connections with good voice quality**	**Sub Base**	**Spectrum**	**Call Set-up Success Rate (within licensees own network)**	**Call Drop Rate**	**Connections with good voice quality**	**% Growth**
					>95%	**<3%**	**>95%**			**>95%**	**<3%**	**>95**	
	RCL							1249272	4.4				
		MTNL	73323	2.5				168582	2.5				130
		RCL	1824909	5	99.44	0.80	99.36	3825643	5	99.65	0.84	97.92	**110**
		Tata	908642	5	98.19	0.34	95.14	3169591	5	98.40	0.83	98.92	**249**
			8745337					**22463332**					157
Chenna	Aircel		787969	8	99.00	0.65	96.20	Included in	8.6	97.29	2.21	96.91	
	Bharti		784114	8	99.39	0.60	96.20	TN		98.23	1.08	98.12	
	BSNL		583507	8	98.00	0.84	100.00		10	98.67	1.27	99.67	
	Vodafone		494213	8	99.40	1.13	98.40		8	99.53	0.65	98.87	
		BSNL	32302	2.5					2.5				
		RCL	576918	5	99.53	0.49	99.90			99.59	0.69	99.00	
		Tata	258426	5	99.93	0.54	96.33		3.7	98.24	0.39	99.20	
			3517449										
Kolkata	Bharti		679851	8	97.22	1.62	98.09	2688753	8	98.99	0.87	96.97	**295**
	Vodafone		1063392	7.8	99.66	0.74	96.65	3219323	9.8	98.96	0.71	98.16	203
	BSNL		491397	6.2	97.92	0.64	98.69	1666543	10	97.33	1.88	98.67	239
	Reliance		146613	6.2	99.00	1.00	98.44	1229125	6.2	98.32	1.11	96.77	738
	Dishnet							678444	4.4	98.24	1.30	98.22	
		BSNL	29408	2.5				40252	2.5				37
		RCL	**885618**	**5**	**99.41**	**0.63**	**98.30**	**2033301**	**5**	**99.4**	0.81	98.85	130
		Sistema						178228	2.5	66.31	0.33	66.32	

	Mobile Operator		Jun-06					Sep-09					
	GSM	**CDMA**	**Sub Base**	**Spectrum**	**Call Set-up Success Rate (within licensees own network)**	**Call Drop Rate**	**Connections with good voice quality**	**Sub Base**	**Spectrum**	**Call Set-up Success Rate (within licensees own network)**	**Call Drop Rate**	**Connections with good voice quality**	**% Growth**
					>95%	**<3%**	**>95%**			**>95%**	**<3%**	**>95**	
		Tata	602207	3.7	97.11	0.82	96.17	1591032	3.7	98.85	0.43	98.90	**164**
			3898486					**13325001**					242
			25755591					**60630091**					135
MH	Vodafone		847433	6.2	98.23	1.20	99.86	5889390	6.2	97.59	0.95	97.17	595
	Idea		2028583	9.8	98.68	1.44	98.04	8278063	9.8	98.23	1.47	97.19	308
	BSNL		1169872	8	**98.74**	**1.50**	**98.00**	3837883	10	97.33	1.89	96.33	228
	Bharti		1567429	6.2	98.14	1.01	97.20	6261008	8.2	97.30	1.47	93.83	299
	Aircel							55118	4.4				
	RCL							1928060	4.4				
		BSNL	227172	2.5				426453	2.5				88
		RCL	1637045	5	99.44	0.85	99.08	3782291	5	99.42	0.76	99.01	131
		Tata	**959455**	**5**	**97.85**	**0.61**	**96.24**	**5865809**	**3.**	**98.7**	0.78	99.07	511
			8436989					**36324075**					331
GUJ	Vodafone		2689158	9.8	98.03	1.25	98.40	9001337	9.8	99.32	0.70	98.23	**235**
	Idea		1216252	6.2	98.67	1.48	97.82	4445774	6.2	99.43	1.30	96.37	**266**
	BSNL		901310	7.4	99.50	1.03	98.00	2623437	7.4	96.73	1.49	96.67	191
	Bharti		1001380	6.2	98.52	1.01	98.15	4769501	6.2	98.36	1.60	97.74	376
	RCL							1457266	4.4				
		BSNL	115282	2.5				252746	2.5				119
		RCL	1170967	3.7	99.47	0.76	99.16	3358493	3.7	99.48	0.63	99.84	**187**
		Tata	640665	3.7	98.59	0.44	98.05	1567031	3.7	98.75	0.46	98.96	**145**

	Mobile Operator		Jun-06					Sep-09					
	GSM	**CDMA**	**Sub Base**	**Spectrum**	**Call Set-up Success Rate (within licensees own network)**	**Call Drop Rate**	**Connections with good voice quality**	**Sub Base**	**Spectrum**	**Call Set-up Success Rate (within licensees own network)**	**Call Drop Rate**	**Connections with good voice quality**	**% Growth**
					>95%	**<3%**	**>95%**			**>95%**	**<3%**	**>95**	
			7735014					**27475585**					255
AP	Idea		1088295	8	99.98	0.53	98.42	5608871	8	99.92	0.73	96.35	415
	Bharti		2145533	7.8	98.16	0.90	99.77	10982799	10	96.74	1.44	95.31	412
	BSNL		1250829	8	98.50	1.52	99.00	3815465	10	96.05	1.59	98.00	205
	Vodafone		978890	6.2	99.64	1.32	98.00	4826493	6.2	99.07	0.79	98.23	393
	Aircel							513316	4.4	98.64	0.45	98.36	
	RCL							1222563	4.4				
		BSNL	128134	2.5				261179	2.5				104
		RCL	1994678	5	99.49	0.70	99.86	4825214	5	99.44	0.77	99.54	142
		Tata	1089877	3.7	98.14	0.47	96.04	5070148	3.7	98.90	0.43	98.51	**365**
			8676236					**37126048**					328
KTK	Bharti		2551835	10	99.11	1.16	98.86	11085474	10	96.29	1.82	94.54	334
	Spice		487153	6.2	98.16	1.53	98.93	1926743	6.2	98.11	1.39	97.43	296
	BSNL		1341547	8	97.60	1.00	97.60	2746593	10	98.67	1.41	97.77	105
	Vodafone		1238953	8	98.38	1.61	98.49	4295557	8	99.03	0.98	98.28	**247**
	Aircel							370363	4.4	98.35	0.46	98.29	
	RCL							1250733	4.4				
		BSNL	138706	2.5				429290	3.7				209
		RCL	1267231	5	99.53	0.57	99.57	3546137	5	99.43	0.75	99.46	180
		Tata	747742	3.7	97.14	1.16	97.59	3216844	3.7	98.97	0.79	98.62	**330**
			7773167					**28867734**					271

	Mobile Operator		Jun-06					Sep-09					
	GSM	**CDMA**	**Sub Base**	**Spectrum**	**Call Set-up Success Rate (within licensees own network)**	**Call Drop Rate**	**Connections with good voice quality**	**Sub Base**	**Spectrum**	**Call Set-up Success Rate (within licensees own network)**	**Call Drop Rate**	**Connections with good voice quality**	**% Growth**
					>95%	**<3%**	**>95%**			**>95%**	**<3%**	**>95**	
TN	Vodafone		584631	6.2	99.52	0.79	99.95	7870247	7.2	98.46	1.02	96.90	1246
	Aircel		1925920	9.8	98.12	1.47	96.12	12450215	9.8	95.56	1.15	96.64	546
	BSNL		**1600018**	**8**	**95.66**	**1.12**	**96.25**	**4862024**	**8**	**98.0**	1.00	99.00	**204**
	Bharti		1198194	6.2	99.29	0.92	95.40	9944161	9.2	96.64	1.10	96.14	730
	Idea							530681	4.4	98.76	0.72	98.85	
	RCL							1139802	4.4				
		BSNL	248915	2.5				448557	2.5				80
		RCL	1103732	5	99.44	0.83	99.93	4993075	5	99.51	0.76	98.04	**352**
		Sistema						316100	2.5	66.50	0.48	64.55	
		Tata	368762	2.5	99.15	0.78	97.69	2894598	2.5	98.44	0.50	98.47	685
			7030172					**45449460**					546
								175242902					
Kerala	Idea		904116	8	99.66	0.77	98.50	4900290	8	99.78	1.14	96.47	**442**
	Vodafone		538043	6.2	95.94	1.52	98.47	3729586	6.2	99.10	0.76	97.59	**593**
	BSNL		**1614107**	**8**	**99.08**	**1.04**	**95.20**	**3069674**	**8**	**98.0**	1.33	97.37	90
	Bharti		664417	6.2	99.42	1.66	98.64	2970022	6.2	98.62	1.14	98.19	347
	Dishnet							338578	4.4	97.83	1.20	98.00	
	RCL							477936	4.4				
		BSNL	298150	2.5				567525	3.7				90
		RCL	1091308	5	99.49	0.82	99.83	2477918	5	99.56	0.78	98.97	**127**
		Sistema						99772	2.5	66.51	0.29	65.90	

	Mobile Operator		Jun-06					Sep-09					
	GSM	CDMA	Sub Base	Spectrum	Call Set-up Success Rate (within licensees own network)	Call Drop Rate	Connections with good voice quality	Sub Base	Spectrum	Call Set-up Success Rate (within licensees own network)	Call Drop Rate	Connections with good voice quality	% Growth
					>95%	<3%	>95%			>95%	<3%	>95	
		Tata	337888	3.7	99.93	0.54	97.67	1484966	3.7	98.93	0.56	99.31	339
			5448029					**20116267**					269
Punjab	Spice		1567474	7.8	96.44	1.42	97.00	2769615	7.8	98.86	0.79	97.96	**77**
	Bharti		2020316	7.8	99.15	1.64	98.70	4188114	7.8	98.07	1.45	97.47	107
	BSNL		383133	6.2	99.60	1.50	100.00	3200347	6.2	97.67	1.40	98.00	735
	Vodafone		742400	6.2	99.31	1.50	98.87	2560849	6.2	98.74	1.10	98.25	245
	RCL							724240	4.4				
		BSNL	97507	2.5				92668	2.5				-5
		RCL	700063	3.7	99.58	1.37	99.71	1276571	3.7	98.33	0.87	99.61	82
		HFCL	154138	2.5	97.63	0.68	98.86	379654	2.5	99.05	0.95	96.90	**146**
		Tata	413939	3.7	99.86	0.68	96.99	1532311	3.7	98.51	0.57	96.97	270
			6078970					**16724369**					175
Haryan	Idea		402684	6.2	99.97	0.68	99.44	1815160	6.2	99.87	1.23	96.63	351
	Vodafone		389920	6.2	99.95	1.69	97.11	2444667	6.2	99.54	1.02	97.39	527
	BSNL		490514	6.2	97.30	2.60	100.00	2134650	10	96.10	1.99	95.77	335
	Bharti		474082	6.2	99.33	1.33	98.14	1353890	6.2	97.91	1.46	96.78	186
	RCL							744319	4.4				
		BSNL	77736	2.5				103256	2.5				33
		RCL	327991	3.7	99.58	0.96	99.84	1333233	3.7	99.12	1.16	97.29	306
		Tata	329546	3.7	99.87	0.85	97.81	1490471	3.7	98.70	0.28	98.77	352
			2492473					**11419646**					358

	Mobile Operator		Jun-06					Sep-09					
	GSM	**CDMA**	**Sub Base**	**Spectrum**	**Call Set-up Success Rate (within licensees own network)**	**Call Drop Rate**	**Connections with good voice quality**	**Sub Base**	**Spectrum**	**Call Set-up Success Rate (within licensees own network)**	**Call Drop Rate**	**Connections with good voice quality**	**% Growth**
					>95%	**<3%**	**>95%**			**>95%**	**<3%**	**>95**	
UP-W	Idea		1072081	8	98.83	1.24	97.74	4882350	8	99.82	1.25	99.30	**355**
	Bharti		643736	6.2	96.38	1.58	95.88	3005020	6.2	96.87	1.17	95.73	**367**
	BSNL		988169	8	99.00	2.90	98.00	2705866	10	98.41	1.50	97.50	174
	Vodafone		806768	6.2	99.89	1.97	95.80	5107985	6.2	97.82	1.35	95.64	533
	Dishnet							283090	4.4	97.22	0.97	96.39	
	RCL							1583169	4.4				
		BSNL	109490	2.5				262502	2.5				140
		RCL	1001437	5	99.42	0.83	98.86	3402319	5	99.23	1.04	99.48	240
		Tata	421977	3.7	97.93	1.15	96.50	2419298	3.7	99.29	0.74	99.99	**473**
			5043658					**23651599**					369
UP-E	Vodafone		1744897	8	95.35	2.03	96.23	8176771	8	97.26	1.71	95.51	**369**
	BSNL		1674060	6.2	98.00	2.20	97.00	6487121	10	97.00	1.53	96.67	288
	Bharti		869006	6.2	96.13	1.58	98.29	7218194	7.2	95.38	2.05	91.34	731
	Idea		1201	6.2				2640235	6.2	99.75	0.95	96.61	21973
	Dishnet							295875	4.4	97.83	0.86	95.87	
	RCL							1934832	4.4				
		BSNL	164685	2.5				407962	2.5				148
		RCL	1382576	5	99.39	0.97	97.81	4548037	5	99.08	0.94	98.88	229
		Tata	382762	3.7	97.62	0.88	99.20	1672887	3.7	98.54	0.66	99.14	**337**
			6219187					**33381914**					437
Raj	Vodafone		728430	6.2	96.49	2.69	96.93	6180390	6.2	99.40	1.13	96.67	**748**

	Mobile Operator		Jun-06					Sep-09					
	GSM	**CDMA**	**Sub Base**	**Spectrum**	**Call Set-up Success Rate (within licensees own network)**	**Call Drop Rate**	**Connections with good voice quality**	**Sub Base**	**Spectrum**	**Call Set-up Success Rate (within licensees own network)**	**Call Drop Rate**	**Connections with good voice quality**	**% Growth**
					>95%	**<3%**	**>95%**			**>95%**	**<3%**	**>95**	
	Bharti		1052431	6.2	97.42	1.48	95.57	8646002	8.2	96.12	1.69	93.18	722
	BSNL		1265949	8	96.50	2.90	97.50	3213113	8	98.00	1.97	97.57	**154**
	Idea		316	6.2	98.27	1.21	99.10	1811360	6.2				57311
	RCL							1478972	4.4				
		BSNL	218199	2.5				327618	2.5				50
		RCL	925546	3.7	99.44	0.93	99.67	2310366	3.7	98.88	0.88	98.88	150
		Shyam	64089	2.5				2765214	5	65.75	0.63	66.62	4215
		Tata	405809	3.7	97.73	0.87	97.72	1009394	3.7	98.28	0.82	98.57	**149**
			4660769					**27742429**					495
MP	Idea		886882	6.2	98.27	1.21	99.10	5902960	8	98.08	1.73	95.39	566
	Reliance		584177	6.2	100.00	1.70	96.50	3309166	6.2	98.39	0.96	96.55	466
	BSNL		599168	6.2	99.50	1.30	98.00	2720481	10	97.18	1.70	98.89	354
	Bharti		606682	6.2	98.78	1.01	96.12	5572236	8	98.34	1.44	95.90	818
	Vodafone							783929	4.4	96.74	2.37	97.45	
		BSNL	287589	2.5				677699	2.5				136
		RCL	1014637	5	99.32	0.97	99.77	3891960	5	99.29	0.73	98.58	284
		Tata	302058	2.5	99.95	0.77	98.48	2065308	2.5	98.04	0.83	96.79	584
			4281193					**24923739**					482
WB&A	Reliance		371578	6.2	99.00	2.20	99.10	1988118	6.2	98.90	1.59	96.87	435
	BSNL		802143	6.2	97.95	2.36	97.66	1993936	8	97.00	1.57	96.13	149
	Bharti		366233	6.2	97.70	1.73	100.00	4379200	6.2	96.28	1.59	96.87	1096

	Mobile Operator		Jun-06					Sep-09					
	GSM	**CDMA**	**Sub Base**	**Spectrum**	**Call Set-up Success Rate (within licensees own network)**	**Call Drop Rate**	**Connections with good voice quality**	**Sub Base**	**Spectrum**	**Call Set-up Success Rate (within licensees own network)**	**Call Drop Rate**	**Connections with good voice quality**	**% Growth**
					>95%	**<3%**	**>95%**			**>95%**	**<3%**	**>95**	
	Vodafone		620638	6.2	99.14	1.86	98.12	5966755	6.2				861
	Dishnet		75494	4.4	99.42	0.72	99.70	1592744	4.4	94.85	2.70	94.01	2010
		BSNL	95402	2.5				133779	2.5				40
		RCL	432355	3.7	99.39	1.25	97.94	1800031	3.7	99.14	1.21	97.91	316
		Sistema						270381	2.5	66.42	0.26	6.67	
		Tata	207838	2.5	99.17	1.23	97.52	1090104	2.5				424
			2971681					**19215048**					547
			37195960					**177175011**					376
HP	Bharti		390817	6.2	99.07	1.50	96.00	1164278	6.2	98.30	1.14	97.66	198
	Reliance		69917	6.2	99.00	2.40	98.90	763780	6.2	98.49	0.83	95.98	992
	BSNL		240845	6.2	97.50	1.90	97.50	1030188	10	95.56	1.87	95.00	328
	Idea		115	4.4				176102	4.4	99.80	1.86	96.99	15303
	Dishnet			4.4				234804	4.4	98.35	2.11	95.65	
	Vodafone							88506	4.4	98.89	1.73	97.44	
		BSNL	45020	2.5				85668	2.5				90
		RCL	32458	2.5	99.56	0.58	99.43	317166	2.5	99.41	1.02	98.13	877
		Tata	42448	2.5	98.38	0.75	97.58	146928	2.5	98.82	0.77	98.28	**246**
			821620					**4007420**					388
Bihar	Reliance		553612	6.2	97.00	1.70	95.60	3315723	8	98.47	0.99	96.36	499
	BSNL		1016050	6.2	98.10	2.20	97.00	2937415	10	98.17	1.57	98.33	189
	Bharti		1207869	8	98.14	1.94	96.87	9328172	9.2	93.91	1.79	96.27	672

	Mobile Operator		Jun-06					Sep-09					
	GSM	**CDMA**	**Sub Base**	**Spectrum**	**Call Set-up Success Rate (within licensees own network)**	**Call Drop Rate**	**Connections with good voice quality**	**Sub Base**	**Spectrum**	**Call Set-up Success Rate (within licensees own network)**	**Call Drop Rate**	**Connections with good voice quality**	**% Growth**
					>95%	**<3%**	**>95%**			**>95%**	**<3%**	**>95**	
	Dishnet		0	4.4				2310852	4.4				
	Vodafone							1886121	4.4	95.74	1.97	95.97	
	Idea							1958679	4.4	99.58	1.40	95.74	
		BSNL	178919	2.5				353119	2.5				97
		RCL	739011	5	99.35	0.70	99.17	3155998	5	98.64	1.13	96.89	327
		Sistema						86691	2.5	66.47	0.73	65.39	
		Tata	260660	3.7	96.72	0.76	95.57	2102126	3.7	98.64	0.85	98.20	**706**
			3956121					**27434896**					593
Orissa	Reliance		250789	6.2	99.00	1.70	98.80	1608352	6.2	98.60	1.00	96.03	541
	BSNL		576363	6.2	95.96	1.64	97.33	1776291	10	97.83	1.39	98.33	208
	Bharti		557430	8	98.53	0.99	97.70	3703479	8	97.39	1.64	97.87	564
	Dishnet		89717	4.4	99.56	0.85	99.70	1102424	4.4	97.45	1.81	95.40	1129
	Vodafone							702385	4.4	98.78	1.97	96.77	
	Idea							275281	4.4	98.88	1.16	96.57	
		BSNL	92131	2.5				196183	2.5				113
		RCL	261627	3.7	99.61	0.73	99.46	807577	3.7	99.62	0.90	99.17	**209**
		Tata	119106	2.5	97.67	0.93	97.77	1306137	2.5	98.34	0.42	98.70	**997**
			1947163					**11478109**					489
Assam	Reliance		237718	6.2	96.00	1.00	96.10	1480694	6.2	97.04	0.85	96.00	**523**
	BSNL		427895	6.2	98.00	2.40	96.00	942057	10	97.77	2.74	96.67	120
	Bharti		292981	6.2	95.85	1.46	95.62	1931357	6.2	95.76	2.01	90.76	559

	Mobile Operator		Jun-06					Sep-09					
	GSM	**CDMA**	**Sub Base**	**Spectrum**	**Call Set-up Success Rate (within licensees own network)**	**Call Drop Rate**	**Connections with good voice quality**	**Sub Base**	**Spectrum**	**Call Set-up Success Rate (within licensees own network)**	**Call Drop Rate**	**Connections with good voice quality**	**% Growth**
					>95%	**<3%**	**>95%**			**>95%**	**<3%**	**>95**	
	Dishnet		168411	4.4	99.32	0.57	99.75	2078925	6.2	88.72	3.82	90.44	1134
	Vodafone							405641	4.4	96.08	1.88	97.43	
		BSNL	58681	2.5				105903	2.5				80
		Tata						71156	2.5	99.27	0.40	98.99	
			1185686					**7015733**					492
NE	Reliance		102367	6.2	98.00	2.50	97.70	471717	6.2	97.48	0.82	96.00	361
	Bharti		73558	4.4	98.91	0.82	95.62	1141794	6.2	88.41	2.96	87.38	1452
	BSNL		287089	6.2	95.20	2.40	96.00	756782	10	96.00	2.33	97.33	164
	Dishnet		124220	4.4	98.76	0.61	99.00	1310819	4.4	75.90	4.94	91.74	955
	Vodafone							313479	4.4	96.37	1.70	96.60	
		BSNL	34629	2.5				115806	2.5				234
		Tata						45005	2.5	99.27	0.77	98.74	
			621863					**4155402**					568
J&K	BSNL		593116	8	99.00	1.80	98.80	883790	8	96.93	1.95	97.27	49
	Bharti		328126	6.2	99.10	1.70	97.00	1902885	6.2	97.40	1.57	96.27	480
	Dishnet		27086	4.4	99.42	0.78	99.90	1154640	4.4	90.09	3.69	92.77	4163
	Vodafone							173518	4.4	98.60	1.25	98.13	
	RCL							308011	4.4				
		BSNL	40251	2.5				64777	2.5				61
		RCL	244	2.5				773	2.5				217
		Tata						95739	2.5	99.13	0.87	99.22	

	Mobile Operator		Jun-06					Sep-09					
	GSM	CDMA	Sub Base	Spectrum	Call Set-up Success Rate (within licensees own network)	Call Drop Rate	Connections with good voice quality	Sub Base	Spectrum	Call Set-up Success Rate (within licensees own network)	Call Drop Rate	Connections with good voice quality	% Growth
					>95%	<3%	>95%			>95%	<3%	>95	
			988823					4584133					364
			9521276					58675693					516
			112124405					471723697					321

Source:- PMR Received from service providers and DoT Data

Annexure-XXI

Government of India
Ministry of Communications
Department of Communications
WPC Wing

No. L-14041/06/2000-NTG Dated: 01.02.2002

ORDER

Subject:- Allocation of additional Cellular Radio Frequency Spectrum to the Cellular Mobile Telephone Service (CMTS) Providers.

In order to meet the requirements of growth of subscribers, it has been decided to assign additional spectrum upto 1.8 MHz + 1.8 MHz to the CMTS operators. Any operator may apply for allotment of additional spectrum after reaching a customer base of 4 Lakh or more under a license in a service area, after which the process of allotment would be initiated; however, actual assignment of the spectrum would be made, subject to availability and coordination on case to case basis, after a customer base of 5 Lakh or more has been reached in the service area. This additional assignment will be beyond already allocated spectrum of 6.2 MHz + 6.2 MHz. The additional spectrum of 1.8 MHz + 1.8 MHz would be assigned in 1800 MHz Band.

2. The cellular licensees are to pay spectrum charge with effect from 1.8.99 on revenue share basis at the rate of 2% of Adjusted Gross Revenue (AGR) for spectrum upto 4.4 MHz + 4.4 MHz and 3% of AGR for spectrum upto 6.2 MHz + 6.2 MHz.

3. Further, for this additional spectrum of 1.8 MHz + 1.8 MHz, If assigned for any one or more places in a Service Area, beyond 6.2 MHz + 6.2 Mhz, an additional charge of 1% of AGR will be levied. Thus, the total spectrum charge to be paid by such operators would be 4% of AGR from the Service in the respective Service Area. This spectrum charge of 4% of AGR would also cover allocation of further spectrum, which may become possible to allocate in future subject to availability, to add up to a total spectrum allocation not exceeding (10 MHz + 10 MHz) per operator in a Service Area. Such additional allocation could be considered only after a suitable subscriber base, as may be prescribed, is reached.

4. This order is issued in partial modification to the order of even number dated 22nd September 2001; other terms and conditions of the said order shall remain unchanged.

(R.K. Srivastava)
Engineer

Copy to:

1. All concerned.
2. Cellular Operators Associations of India (COAI)
3. Cellular Service Providers

Annexure-XXII

Capex saved in case of upgradation of network from 6.2 MHz to 8 MHz and 8 MHz to 10 MHz.

1	**Quantum of Spectrum**	6.2	8	10
2	**As per Annexure XVII -Total traffic per BTS in erlangs with 70 % loading**	39.3	61.3	97.0
3	**Weighted Traffic per BTS**	37.1	47.0	63.2
4	**Maximum Subscribers prescribed in Lakh**	15.0	20.0	30.0
5	**Total Traffic @ 40 mE**	60000	80000	120000
6	**Total No. of BTSs**	1616	1702	1899
7	**Total Revenue @ 166 as ARPU (in Crores)**	298.8	398.4	597.6

CAPEX required if 6.2 MHz is not upgraded to 8 MHz :			**CAPEX required if 8 MHz is not upgraded to 10 MHz :**	
Total BTS Required	2155		Total BTS Required	2553
Present BTSs	1616		Present BTSs	1702
Additional BTSs Required	539		Additional BTSs Required	851
CAPEX for these additional BTSs @ 0.3 Cr	162		CAPEX for these additional BTSs @ 0.3 Cr	255

CAPEX required if 6.2 MHz is upgraded to 8 MHz :			**CAPEX required if 8 MHz is upgraded to 10 MHz :**	
Total BTS Required	1702		Total BTS Required	1899
Present BTSs	1616		Present BTSs	1702
Additional BTSs Required	86		Additional BTSs Required	196
CAPEX for these additional BTSs @ 0.3 Cr	26		CAPEX for these additional BTSs @ 0.3 Cr	59
Additional Charges as spectrum fee (1% on 20 lakh) (in Cr)	4		Additional Charges as spectrum fee (1% on 30 lakh) (in Cr)	6
Total Additional Expenditure (in Cr)	30		Total Additional Expenditure(in Cr)	65
Increase in expenditure if 6.2 MHz is not upgraded to 8.0 MHz vs upgraded to 8.0 MHz (in Cr)	132		Increase in expenditure if 8.0 MHz is not upgraded to 10 MHz vs upgraded to 10 MHz (in Cr)	190
Cost per MHz (6.2 to 8.0 Mhz) in Cr	**73.217**		**Cost per MHz (8.0 to 10.0 Mhz) in cr**	**95.2**
Ratio between Cost per MHz (8.0 to 10.0 Mhz) and Cost per MHz (6.2 to 8.0 Mhz)			**1.300**	

Annexure-XXIII

No.20-100/2007-AS-I
Government of India
Ministry of Communications and Information Technology
Department of Telecommunications
Sanchar Bhawan, 20, Ashok Road, New Delhi.

22nd April, 2008

Subject: Guidelines for intra service area Merger of Cellular Mobile Telephone Service (CMTS)/ Unified Access Services (UAS) Licences

The intra service area Merger of CMTS / UAS Licences shall be permitted as per the guidelines mentioned below for proper conduct of Telegraphs and Telecommunication services, thereby serving the public interest in general and consumer interest in particular: -

1. Prior approval of the Department of Telecommunications shall be necessary for merger of the licence.
2. Merger of licences shall be restricted to the same service area.
3. Merger of licence(s) shall be permitted in the following category of licences:

   (i) Cellular Mobile Telephone Service (CMTS) Licence with Cellular Mobile Telephone Service (CMTS) Licence;
   (ii) Unified Access Services Licence (UASL) with Unified Access Services Licence (UASL);
   (iii) Cellular Mobile Telephone Service (CMTS) Licence with Unified Access Services Licence (UASL);

   Merged licences in all the categories above shall be in UASL category only.

4. The relevant service market be defined as wire line and wireless services. Wireless service market shall include fixed wireless as well.
5. Exchange Data Records (EDR) shall be used in the calculation of wireline subscribers and specifically Visitor Location Register (VLR) data, in the calculation of wireless subscribers for the purpose of computing market share based on subscriber base.

6. 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.

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

8. The market share of merged entity in the relevant market shall not be greater than 40% either in terms of subscriber base separately for wireless as well as wireline subscriber base or in terms of Adjusted Gross Revenue.

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

10. Consequent upon the Merger of licences in a service area, the post merger licensee entity shall be entitled to the total amount of spectrum held by the merging entities, subject to the condition that after merger, licensee shall meet, within a period of 3 months from date of approval of merger by the Licensor, the prevailing spectrum allocation criterion separately for GSM & CDMA technologies, as in case of any other UAS/CMTS licensee(s).

In case of failure to meet the spectrum allocation criterion in the above mentioned period of 3 months, post merger Licensee shall surrender the excess spectrum, if any, failing which it may be treated as violation of terms & conditions of the licence agreement and action accordingly shall be taken. In addition, after the expiry of above mentioned period of 3 months, the applicable rate of spectrum charge shall be doubled every 3 months in case of excess spectrum held by post merger licensee.

Further, the spectrum transfer charge, as may be specified by the Government, shall be payable within the prescribed period.

11. On merger, spectrum enhancement charge shall also be charged as applicable in case of any other UAS/CMTS licensee.

12. Discretion to choose the band to surrender the spectrum beyond the ceiling will be of the new entity.

13. 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 licencees before issue of the permission for merger of licences.

14. In case consequent to merger of licences in a service area, the licensee becomes a "Significant Market Power" (SMP) post merger, then the extant rules & regulations applicable to SMPs would also apply to the merged entity.

15. 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.

    However, in case of holding of spectrum for various technologies by the entity subsequent to M&A, spectrum charges & license fee etc. or any other criterion being followed by the licensor shall be applicable as in case of any other UAS/CMTS licensee.

16. For regulating acquisitions of equity stake of one access services licensee Company/ legal person/promoter company in the enterprise of another access services licensee in the same license area, present guidelines on Substantial Equity shall continue i.e.

    "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."

17. Any permission for merger shall be accorded only after completion of 3 years from the effective date of the licences.

18. The duration of licence of the merged entity in the respective service area will be equal to the remaining duration of the Licence of the two merging licencees whichever is less on the date of merger.

    For example, if licence of company `A' is merging with Licence of company `B', and the remaining duration of licence of 'A' or `B' whichever is less will be applicable for the merged entity in the respective service area.

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

20. 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.

21. These guidelines are issued in supersession of earlier guidelines issued vide Office Memo No.20-232/2004-BS-III dated 21st February, 2004.

(R.K.Gupta)
Assistant Director General (AS-I)
For and on behalf of the President of India
Ph. 23036574

Abbreviation

S.No.	Abbreviation	Expansion
1.	AGR	Adjusted Gross Revenue
2.	AMR	Adaptive Multiple-Rate
3.	AUSPI	Association of Unified Telecom Service Providers of India
4.	BSS	Broadcast Satellite Service
5.	BTS	Base Transceiver Station
6.	BWA	Broadband Wireless Access
7.	CAGR	Cumulative Aggregate Growth Rate
8.	CBD	Central Business District
9.	CDMA	Code Division Multiple Access
10.	CMTS	Cellular Mobile Telephone System
11.	COAI	Cellular Operator Association of India
12.	DECT	Digital Enhanced Cordless Telecommunications
13.	DoS	Department of Space
14.	DSL	Digital Subscriber Line
15.	EDGE	Enhanced Data Rate for GSM Evolution
16.	EDR	Exchange Data Records
17.	EV DO	Evolution Data Only
18.	FBO	Facility Based Operator
19.	FDD	Frequency Division Duplex
20.	FSS	Fixed Satellite Service
21.	FWA	Fixed Wireless Access
22.	GDP	Gross Domestic Product
23.	GMPCS	Global Mobile Personal Communications by Satellite
24.	GPRS	General Packet Radio Service
25.	GR	Gross Revenue

Abbreviation

S.No.	Abbreviation	Expansion
26.	GSM	Global System for Mobile Communication
27.	HHI	Herfindahl-Hirschman Index
28.	HLR	Home Location Register
29.	ILD	International Long Distance
30.	IMT	International Mobile Telecommunications
31.	IP	Internet Protocol
32.	IP-I	Infrastructure Provider -I
33.	IPLC	International Private Leased Circuit.
34.	ISP	Internet Service Provider
35.	ITU	International Telecommunication Union
36.	LMDS	Local multipoint distribution system
37.	LSA	License Service Area
38.	LTE	Long Term Evaluation
39.	M&A	Merger and Acquisition
40.	MIMO	Multiple Input Multiple Output
41.	MMDS	Multichannel Multipoint Distribution Service
42.	MSS	Mobile Satellite Service
43.	MVNOs	Mobile Virtual Network Operators
44.	NFAP	National Frequency Allocation Plan
45.	NTP 1994	National Telecom Policy 1994
46.	PCS	Personal Communication Service
47.	PMRTS	Public Mobile Radio Trunk Service
48.	QOS	Quality of Service
49.	RAN	Radio Access Network
50.	PPP	Purchase Power Parity
51.	RF	Radio Frequency

Abbreviation

S.No.	Abbreviation	Expansion
52.	SAIC	Single Antenna Interference Cancellation
53.	SBO	Service Based Operator
54.	SFH	Synthesised Frequency Hopping
55.	SLC	Subscriber Linked Criteria
56.	SMP	Significant Market Power
57.	TDD	Time Division Duplex
58.	TDMA	Time Division Multiple Access
59.	TDSAT	Telecom Dispute Settlement Appellate Tribunal
60.	TEC	Telecom Engineering Centre
61.	UHF	Ultra High Frequency
62.	UMTS	Universal Mobile Telecommunication System
63.	USO	Universal Service Obligation
64.	VAS	Value-added services
65.	VLR	Visitor Location Register
66.	VSAT	Very Small Aperture Terminal
67.	WCDMA	Wideband Code Division Multiple Access
68.	WiFi	Wireless Fidelity
69.	WiMax	Worldwide Interoperability for Microwave Access
70.	WPC	Wireless Planning & Coordination Wing
71.	WARC	World Administrative Radio Conference
72.	WLL	Wireless in Local Loop
73.	WRC	World Radio Conference