



# **Telecom Regulatory Authority of India**

## **Recommendations**

**On**

**Allocation and Pricing for**

**2.3-2.4 GHz, 2.5-2.69 GHz & 3.3-3.6 GHz bands**

**New Delhi**

**11<sup>th</sup> July, 2008**

## **Preface**

The Authority had sent its recommendations to the Government on “**Allocation and pricing of spectrum for 3G and broadband wireless access services**” on 27<sup>th</sup> September, 2006. When the Authority gave its recommendations, the spectrum in the 2.3-2.4 GHz and 2.5-2.69 GHz bands was not available for allocation and therefore, the Authority had then recommended that allocation and pricing methodology of spectrum in these bands would be decided as and when these are made available.

The Government on 12<sup>th</sup> November 2007 issued guidelines on BWA services and identified 2.3-2.4 GHz, 2.5-2.69 GHz and 3.3-3.4 GHz bands for allocation for BWA. The guidelines also states that the Government will consider allocation of 3.4-3.6 GHz spectrum band after assessing its compatibility with satellite services. Though the Government has identified these bands for BWA services, however, the availability of spectrum for these services is still not clearly known. Due to uncertainty in the allocation of spectrum for BWA services, the roll out broadband services in the country has been delayed. Against a target of 20 millions broad band subscribers by 2010, we have achieved only 4.15 millions subscribers (as on May’08).

During the period of September, 2006 to October, 2007, there have been significant changes in the international scenario. The International Telecommunications Union-Radio (ITU-R) has identified 2.3-2.4 GHz band also as IMT (International Mobile Technology) band (spectrum in the band of 2.5-2.69 GHz band was already identified as IMT-2000 band). The use of 2.3-2.4 GHz and 2.5- 2.69 GHz band offers significant scope for innovation with the potential for induction of new technologies, services, applications and devices. With the availability of mobile services in this band, it provides an important opportunity for the introduction of next generation mobile technologies (BWA).

Keeping the above developments in mind, the Authority issued a consultation paper on 2<sup>nd</sup> May, 2008, for seeking comments of stakeholders on the limited issues like Eligibility for allocation, Maximum amount of the spectrum to each bidder, Pricing related to the spectrum bands (2.3.-2.4 GHz and 2.5-2.69 GHz,) and the need for revisiting of pricing of 3.3-3.6 GHz spectrum band in view of the technological advancement etc.

Based on technological advancement, and the availability of spectrum for allocation, the Authority has formulated its recommendations on this subject. These recommendations have been sent to DoT, a copy of which is also available on TRAI web site <[www.traigov.in](http://www.traigov.in)>.

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## CHAPTER 1

### INTRODUCTION

#### Background

- 1.1 As on May, 2008 the number of mobile phone in the country crossed 275 million, and with a monthly addition of more than 8 Million subscribers, the target of 500 million phones in the country by 2010 seems achievable. However, unlike mobile phones, the penetration of broadband in the country is still abysmally low. Against a target of 20 Million broadband subscribers by 2010, we have only 4.15 Million subscribers (as on May '08) and the current rate of growth is poor.
- 1.2 Recognizing the potential of ubiquitous broadband service in the growth of GDP of the country, improvement in the quality of the life of the masses through usage of applications like e-medicine, e-governance, e-education, entertainment etc. and recognizing the need for employing wireless technologies for faster and cost effective penetration of broadband in the country, the Authority had given its recommendations on '**Allocation and pricing of 3G and broadband wireless technology**' in September,2006. The salient recommendations are in **Annexure-I**.
- 1.3 Majority the above mentioned recommendations of the Authority are still under consideration of the DoT. However, in the interim period the following developments took place which prompted the Authority to issue the consultation paper on "**Allocation and Pricing of 2.3-2.4GHz, 2.5-2.69 GHz and 3.3-3.6 GHz band**" on 2<sup>nd</sup> May 2008.
- 1.4 In October-2007, the **International Telecommunication Union (ITU) Radio-communication Assembly in the World Radio Congress-07 (WRC-07)** decided to revise the ITU Recommendation M.1457 "Detailed specifications of the radio interfaces of IMT<sup>1</sup> and included the sixth new radio interface called OFDMA<sup>2</sup>TDD<sup>3</sup> WMAN<sup>4</sup>, into the IMT technology family with a view to make ways for the

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<sup>1</sup> IMT- International Mobile Telecommunication

<sup>2</sup> OFDMA - Orthogonal Frequency Division Multiple Access

<sup>3</sup> TDD- Time Division Duplex

<sup>4</sup> WMAN- Wireless Metro Area Network

deployment of a range of voice, data, and multimedia services to both stationary and mobile devices.

1.5 Accordingly WRC-07 has identified the following additional frequency bands for IMT applications :-

- 450-470 MHz
- 698-806 MHz
- 2.3-2.4 GHz
- 3.4-3.6 GHz

The use of the above frequency bands is subject to protection of existing assignments and Resolution No. 224 (Rev. WRC-07), 223(Rev. WRC-07).

1.6 Subsequently, the DoT also issued guidelines for BWA services on 12<sup>th</sup> November 2007 wherein it has identified the spectrum bands of 2.3-2.4 GHz, 2.5-2.69 GHz & 3.3-3.4 GHz for **BWA services**.

1.7 The Wireless Planning and Coordination wing (WPC) has also issued orders for the vacation of spectrum in the bands of 2.5-2.69 GHz and 2.3-2.4 GHz on 9<sup>th</sup> January, 2008.

1.8 The consultation paper issued on the subject “**Allocation and Pricing for 2.3-2.4 GHz, 2.5-2.69 GHz & 3.3-3.6 GHz bands**” covered following issues:-

- **In the 2.3-2.4 GHz and 2.5-2.69 GHz bands:-**
  - Eligibility for allocation
  - Maximum amount of the spectrum to each bidder
  - The size of the spectrum blocks for the bidding
  - Pricing
- **In 3.3.-3.6GHz band**, the need to revisit the reserve price for spectrum

1.9 Though the Authority gave it recommendations on spectrum for BWA services in September 2006, the availability of spectrum for wireless broadband is not known. The results of the efforts made by the WPC to get the required spectrum bands vacated/re-farmed from the incumbents are not available in the public domain. The Authority has time and again emphasized that in the times to come, the spectrum will become the most valuable and scarce resource as with the advent of new data centric applications, its demand will increase and there will be competitive users for the same

band of spectrum. Therefore, there is a need to have a transparent, predictable and efficient spectrum management system for allocation and pricing of the spectrum. Unlike a number of other countries, in India the introduction of 3G and mobile broadband services is delayed due to uncertainty in the spectrum allocation policies. Unless immediate action is taken for vacation of spectrum and its further allotment is done in a time bound manner with the clear-cut roadmap, little progress will be made in term of penetration of wireless broadband in the Country.

- 1.10 As the Authority was finalizing its suo-motu recommendations, DoT vide its letter No. L-14047/9/2005-NTG dated 1<sup>st</sup> July,2008 has requested the Authority for its considered recommendations/comments on certain modifications proposed in TRAI's recommendations of 27<sup>th</sup> September,2006 on 'Allocation and Pricing of Spectrum for 3G and Broadband Wireless Access services'. This reference has been made under the proviso- under section 11(1) of TRAI Act, 1997 amended time to time (Copy of the letter at **Annexure-II**). The Authority's response on this reference is being sent separately as required under the Act. It is enclosed as **Annexure-III**.

## Chapter-2

### Allocation & Pricing of spectrum

#### **Eligibility Criteria**

- 2.1 The Authority in its earlier recommendation on Allocation and Pricing of spectrum for 3G and BWA services dated 27<sup>th</sup> September 2006 had noted that *“in the current licensing regime Unified Access Service License (UASL) holders, Cellular Mobile Service Providers (CMSPs) and Internet Service Providers (ISPs) can offer broadband services. Therefore all these types of licenses could potentially qualify as BWA Operators”*. (Para 5.54)
- 2.2 Accordingly for spectrum allocation in 3.3-3.4 GHz and 3.4-3.6 GHz bands, the Authority had recommended that UASL, CMSPs and Category ‘A’ & ‘B’ ISPs shall be eligible for bidding for the spectrum. As the spectrum bands of 2.3-2.4 GHz and 2.5-2.69 GHz are also being considered for providing primarily BWA services, hence in line with its earlier recommendation, the **authority reiterates that for the spectrum bands of 2.3-2.4 GHz and 2.5-2.69 GHz also, the same category of licensees i.e. UASL, CMSPs and Category ‘A’ & ‘B’ ISPs should be eligible for participating in the auction for the spectrum.**

#### **3.3-3.6 GHz Spectrum band**

- 2.3 In view of interference issues with satellite services and non availability of spectrum in 3.4-3.6 GHz band, the Authority has decided to consider the above band (3.3-3.6 GHz) in two parts i.e. 3.3-3.4 GHz and 3.4-3.6 GHz.

#### **3.3- 3.4 GHz spectrum band**

- 2.4 Regarding this band, the Authority had earlier recommended that presently the assignments in the 3.3-3.4 GHz band are only for some specific cities. Having both city level and circle level operators will violate the level playing field. Therefore, in order to maintain the level playing field among all operators for BWA services, the

Authority recommended that *“the operator’s currently assigned spectrum in the 3.3 GHz band shall be given the option to migrate to circle level operations and the attendant 15 MHz of spectrum within the 3.3.-3.4 GHz band at a fixed acquisition fee as determined. The operators who do not choose to migrate to circle level will have to surrender their spectrum. The operators who choose to continue operation in this band will not be able to obtain spectrum in the 3.4-3.6 band. This option is important because some of the operators with spectrum assigned in the 3.3 GHz band might have made investments or even begun deployments in this band. It will be unfair to them to ask them to write- off these investments and hence, the Authority believes that they should have the option to continue with their plans in this band”*. (Para 5.63(1) of the recommendations dated September,2006)

- 2.5 However, as per the available information, the operators who were allocated spectrum in this band in different cities have not been yet given the option to migrate to circle level operation. As per the recent orders by WPC dated 9<sup>th</sup> January 2008, the operators/ wireless users who have spectrum in 2.5 GHz as well as 3.3GHz band have been asked to shift their operation from 2.5 GHz band to 3.3 GHz band immediately. The order does not provide that the operators shifting from 2.5 GHz band will be assigned any additional spectrum. It is also not linked with already allocated spectrum in 3.3 – 3.4 GHz band.
- 2.6 The Authority reiterates that **all the service providers having spectrum in 3.3-3.4 GHz band should be asked to immediately migrate to Circle level operation. Further as per WPC order the service providers having allocation in both 2.5 GHz and 3.3 GHz, bands should migrate to 3.3 GHz band immediately and vacate the 2.5 GHz band, if not already done till date.** DoT vide its letter dated 9<sup>th</sup> January,2008 to the concerned service providers has only asked for vacation of spectrum in 2.5GHz band and there is no reference to any compulsory allocation in lieu of this vacation. This is in line with the standard approach in such cases of vacation as no spectrum is identified in lieu as compensation.
- 2.7 As per the information available with the Authority, presently around 7-8 service providers have been assigned 2x7 MHz of spectrum in different cities in the 3.3 GHz band. Some of these service providers have also rolled out their services in some selected cities. As per WPC, 49+49 MHz of spectrum in this band has been already



assigned, however, Authority feels that after migration to circle level operation, there will be a number of circles where all the existing service providers shall not be present and therefore some spectrum will be available for other service providers wanting spectrum in this band. **The Authority recommends that :-**

- **The leftover spectrum in 3.3-3.4 MHz band after migration to circle level operation should be auctioned to other service providers in blocks of 2x7 MHz, so as to ensure level playing field with the existing service providers. Those service providers who already have 2x7MHz spectrum and are migrating to Circle level operation as required, shall not be eligible for participation in the auction.**
- **The service providers already having spectrum in the block of 2x7MHz in this band shall not be eligible to participate in the auction process. However, the existing service providers having spectrum less than 2x7MHz in this band will have the option either to continue with the existing spectrum OR participate in the auction process for 2x7 MHz block after submitting an undertaking to DoT that in case they are successful in the auction, then they will surrender the spectrum already held by them.**
- **The reserve price for this auction and the price to be paid by the existing service providers has been discussed separately. The mode of operation, i.e. FDD or TDD shall be left to the service providers. The Authority in its earlier recommendation has preferred the allocation of spectrum in the TDD mode. However, as some of the service providers have already started operation in this band using either TDD or FDD mode, hence the Authority do not want to specify any one mode in line with the policy of technology neutrality.**

#### **3.4-3.6 MHz band**

- 2.8 With reference to the above band, the Authority in its earlier recommendations had noted that *“The DoS has 300 MHz of spectrum from 3.4 to 3.7 GHz. The Authority firmly believes that 100 MHz in the 3.4-3.6 GHz band can be coordinated for broadband wireless deployments around the country to assist in the national*

*communication infrastructure growth.” (para 5.38)*

*“The Authority recommends 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.” (para 5.39)*

- 2.9 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.
- 2.10 In response to the consultation paper, a number of stake holders<sup>5</sup> particularly broadcast and satellites service operators 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, therefore it would be very difficult to vacate spectrum in this band and re-locate satellite services in some other bands.
- 2.11 The Office of the Telecommunications Authority (OFTA) in Hong Kong has issued a consultation paper (third) on Providing Radio Spectrum for Broadband Wireless Access Services.<sup>6</sup> In this paper the OFTA has noted “... ***that the deployment of BWA service in the 3.5 GHz band would cause interference to the FSS and the measures required for protecting FSS would make it difficult for wide and cost effective deployment of BWA systems in the 3.5 GHz band in Hong Kong. As a result, the TA considers that the proposed allocation in the 3.5 GHz band for BWA should be held in abeyance.***”
- 2.12 Considering the fact that there is presently no clarity on the use of this band in the country, the ‘**Authority has decided not to make any recommendation for 3.4-3.6GHz unless DoT assess the compatibility of satellite based services with**

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<sup>5</sup> DoS, CASBAA, Asianet, etc.

<sup>6</sup> [www.ofta.gov.hk/en/report-paper-guide/paper/consultation/20070511.pdf](http://www.ofta.gov.hk/en/report-paper-guide/paper/consultation/20070511.pdf)

**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, co-existence of both the services and also the feasibility of migration of satellite services to some other suitable band. Once DoT carryout the above study and reaches a conclusion that spectrum in the 3.4-3.6GHz band is possible to be refarmed then it should refer the matter to TRAI for recommending the allocation methodology.**

### **QUANTUM OF SPECTRUM TO BE ALLOCATED IN 2.3 and 2.5 GHz Bands**

- 2.13 The likely available spectrum in the 2.3 and 2.5 GHz bands will be about 80 MHz as detailed below:
- i. 2.3-2.4 GHz – 40 MHz
  - ii. 2.5-2.69 GHz – 40 MHz
- 2.14 In order to ensure optimal number of service providers having adequate spectrum in each service area, the Authority, had earlier recommended (dated 27<sup>th</sup> September, 2006) that the spectrum in 3.3-3.6 GHz band should be allocated to 13 service providers and quantum of spectrum to each service provider shall be 15MHz. While giving those recommendations, the Authority has envisaged that minimum 200 MHz of spectrum will be available immediately for allocation after co-ordination with Department of Space (DoS) and an additional 100 MHz of spectrum will be available for future allocation in 2.3-2.4 GHz band.
- 2.15 It is necessary that the quantum of spectrum allocated to the service providers is optimal to ensure its efficient utilization and also adequate so as to enable the service providers to be able to provide state of the art applications using the technology of their choice. However, in view of the limited availability of spectrum in these three bands specifically in 2.3 and 2.5 GHz bands, the maximum amount of spectrum to be allocated to a service provider is interlinked with the number of service providers in a service area.
- 2.16 Regarding the 2.3 and 2.5 GHz bands, as per available information apart from the available 80 MHz of spectrum, the likely availability in near future is uncertain. One

option with the Authority is to keep the same limit of 15 MHz of spectrum in these two bands also OR increase it. In response to the consultation paper, most of the stakeholders have suggested a minimum of 15-30 MHz of spectrum for allocation. Their contention is that with the march of technology, new applications are increasingly becoming available which require higher bandwidth. The Authority had deliberated at length on the issue and after studying the likely throughputs available with 15 and 20 MHz of spectrum and keeping in mind the fact that the available spectrum is limited and the need to have enough service providers so as to have fair competition, has decided that presently 15 MHz of spectrum should be the maximum spectrum (in 2.3 GHz and 2.5GHz combined) given to a service provider. The Authority believes that it will be sufficient to take care of most of the data applications available presently. **Therefore, the Authority recommends that a maximum of 15 MHz of spectrum (in 2.3 GHz and 2.5 GHz combined) should be allowed to each service provider in the bands of 2.3-2.4 GHz and 2.5-2.69 GHz. However, the spectrum shall be auctioned in blocks of 5 MHz each so that any service provider requiring lesser amount of spectrum than 15 MHz may not be at a disadvantage.** This would allow flexibility to the service providers to deploy cell configuration with one or more carriers of 5 MHz or one carrier of 10 MHz with frequency reuse of 1(one). With 80 MHz of available spectrum in these bands, this will enable that minimum 6 service providers are present in each service area for providing BWA services apart from 6-7 service providers who have spectrum in the 3.3 GHz band. This, the Authority believes, will provide fair competition and choice for the subscribers.

## **PRICING**

- 2.17 As noted in the consultation paper, the Authority in its earlier recommendation had adopted different allocation and pricing methodology for spectrum for BWA and 3G technologies because the spectrum band available at that time for the BWA technologies was only 3.3-3.6 GHz, which was considered to be more suitable for fixed and nomadic wireless access. Moreover at that time the mobile wireless access technologies were still in the nascent stage of development. Therefore the Authority believed that the spectrum in 3.3-3.6 GHz band can be better utilized to accelerate the growth of fixed broadband through encouragement of emerging wireless

technologies specially in the rural areas which was the need of the hour. Accordingly the Authority recommended reserve price in 3.3-3.6GHz band as below:-

<b>Circle (for 15MHz in Cr Rs)</b>	<b>Reserve Price (Cr Rs)</b>	<b>PBG</b>
<b>Metros &amp; A</b>	<b>10</b>	<b>5.0</b>
<b>B</b>	<b>5</b>	<b>2.5</b>
<b>C</b>	<b>2</b>	<b>1.0</b>

2.18 The Authority had given its recommendation on spectrum allocation for BWA, with the idea that immediate deployment of broadband wireless networks using the spectrum in the 3.3-3.6 GHz band will give the required fillip to the aim of reducing the digital divide. However, more than 20 months have passed since these recommendations were given and they are yet to be implemented. In the meantime, technological advancement and increased focus on the BWA technologies has resulted in increase in potential use of this band for various applications including triple play. This band has also been included in the mobile WiMAX certificate profiles for future testing (Band class 4 and 5)<sup>6</sup>. Therefore in future, both fixed and mobile broadband and other services will become available in the band.

2.19 In view of the foregoing, the Authority now do not feel any justification to treat 3.3-3.4GHz band differently from the 2.3 and 2.5 GHz band, as far as fixing a reserve price for the auction is concerned.

**Reserve Price (for 2.3-2.4GHz, 2.5-2.69GHz and 3.3-3.4GHz)**

2.20 For arriving at the reserve price for auction of spectrum in these three bands, one option with the Authority was to set it equal to that for 3G spectrum in view of the fact that these bands are highly versatile and offer significant potential for induction of new technologies, services, applications and devices. There is a strong possibility that in future, equipment for both 3G and BWA technology will be available in these bands. However, in view of the present usage of these bands, high cost of available equipment including the customer premises equipment and global acceptance in comparison to the 2.1 GHz band for 3G, the Authority decided to analyse the pricing

<sup>6</sup> Source “WiMAX Forum™ Mobile System Profile 4 Release 1.0 Approved Specification (Revision 1.2.2: 2006-11-17)”

trends for spectrum auctioned in these bands in other countries like Australia, Brazil and Sweden. The Authority also compared the 3G and BWA prices in the Asia region.

**Price of BWA spectrum**

Country	Price/Hz (US\$)	Price per Hz (Rs)	Price for 15MHz (Cr Rs)
Australia <sup>7</sup>	0.37	16.28	24.42
Brazil	0.33	14.52	21.78
Sweden	0.53	23.3	35

<sup>1</sup> US\$ = Rs. 44

- 2.21 Both Australia and Brazil are comparable to India in terms of size. Therefore looking at the average price of spectrum obtained in these two countries, an **average** of Rs. 25 Crores/15MHz as price for India can be taken. Unlike most of the countries, in India the license service area is equivalent to a state. Presently India is having 22 Licensed service areas with 8 number of Category Metro & ‘A’ Circles , 8 number of Category ‘B’ Circles and 6 number of Category ‘C’ Circles. The reserve price recommended for 3G by the Authority in its earlier recommendations was Rs 80,40 & 15 Cr for above category Metro & ‘A’ circles, ‘B’ and ‘C’ circles respectively i.e. in the ratio of 16:8:3. Using the same ratio and taking countrywise an average price of Rs. 25Crores/15 MHz, the approximate price for 15 MHz of spectrum for Metro, ‘A’ ‘B’ and ‘C’ service areas as defined above comes to Rs. 42 Crores, 21 crores and 8 crores.
- 2.22 For the Asia region, the average cost/Hz for the 3G and WiMAX spectrum is \$4.28 and \$1.69<sup>8</sup> i.e. the ratio between the two is around 2.5. In the earlier recommendations, the Authority has recommended a reserve price of Rs. 8 Crores, 4 Crores and 1.5 Crores per MHz for the 3G spectrum. Using the above ratio of 2.5, the comparable price for BWA spectrum comes to Rs. 48 crores, 24 crores and 9 crores for 15 MHz.
- 2.23 In view of the foregoing and taking into consideration the present dynamics of the market, a reserve price of 60, 30 and 10 Crores for the Category ‘A’ & Metro Circles , Category ‘B’ Circles and Category ‘C’ Circles seems justified. The Authority also wants to emphasize that the reserve prices are only to fix up a minimum bid price for the auction. The auction process will determine the final price. In its recommendations

<sup>7</sup> Recommendations on Allocation and pricing of spectrum for 3Gand BWA services- Annex T-TRAI

<sup>8</sup> Spectrum Analysis- The Critical factor in BWA/WiMAX versus 3G- Maravedis

dated 27<sup>th</sup> September, 2006 the Authority had recommended a performance bank guarantee amount equal to 50% of the reserve price. Accordingly the **Authority recommends that the reserve price and performance bank guarantee for spectrum in these bands (2.3-2.4GHz, 2.5-2.69GHz and 3.3-3.4GHz) for 15 MHz of spectrum shall be as below:**

<b>Circle</b>	<b>Reserve price (for 15MHz) (Cr Rs)</b>	<b>Performance Bank Guarantee (for 15MHz) (Cr Rs)</b>
<b>Metro &amp; Category A</b>	<b>60</b>	<b>30</b>
<b>Category B</b>	<b>30</b>	<b>15</b>
<b>Category C</b>	<b>10</b>	<b>5</b>

As mentioned earlier the DoT has also included the reserve price as a reference point in their letter No. L-14047/9/2005-NTG dated 1<sup>st</sup> July, 2008( Para 3). The Authority is of the view that the present recommendation on the reserve price is very much in line with that of DoT. A separate reply to the referred letter is being sent. However the Authority would like that the reserve price recommended for 15MHz should be so structured so that it takes into consideration the auctioning of spectrum in the blocks of 5MHz.

- 2.24 As earlier noted, in the 3.3 GHz band, there are already 6-7 service providers. These service providers are paying spectrum charges based on MCK formula. As per WPC unit of DoT, 49+49MHz spectrum has been allotted in 3.3-3.4MHz band. However, after migration to circle level, there will be a number of service areas where spectrum shall be available for auctioning to the new entrants. For these service areas, the spectrum will be auctioned. In order to keep level playing field, the existing service providers shall also have to pay the highest bid price obtained during auction in these service areas. However, in case of those service areas where auction of spectrum is not possible, as no spectrum is available in these service areas due to all spectrum already assigned, the service providers of these service areas shall have to pay the highest bid price obtained in the other service areas of that category. For example, if in Delhi service area, no auction takes place, then the highest bid obtained in Mumbai OR Category 'A' service area shall be applicable for Delhi. In case, any service provider does not agree to either migrate or pay this amount then the spectrum allocated to him should be taken back and auctioned to other eligible service providers.

- 2.25 One can argue that these service providers have already invested money in rolling out their network on the premise that they will have to pay a certain spectrum charge (based on MCK formula), and now changing the rules is not fair and justifiable. As per clause 11(1)(a)(viii) of the TRAI act, 1997 “*efficient management of available spectrum*” is one of the recommendatory function of the Authority. The Authority has been advocating since long that in future all spectrum except 800,900, and 1800MHz, which the Govt. has committed for 2G licenses, should be auctioned. However WPC has allocated spectrum in this band to a number of service providers without auction. The Authority’s initial view was to ask all these service providers to surrender the spectrum and then allocate it by auction. However, as it is WPC which has presented this fait accompli, **the Authority recommends that the existing service providers in this band (3.3-3.4GHz) shall also have to pay the same price as will be charged from the new entrants. For the Circles where no spectrum is available due to all spectrum already assigned, the service providers of that service area shall have to pay the highest bid price obtained in the other service areas of that category.**

## **ALLOCATION METHODOLOGY**

### **2.3-2.4GHz**

- 2.26 As per the data available with the Authority, a number of countries (Australia, New Zealand Thailand, Malaysia, Singapore, Indonesia, Laos, Vietnam and Hong Kong) have already allocated 2.3-2.4 GHz band for the BWA services.
- 2.27 In this band earlier a number of captive users like State Electricity Board, power utilities, Oil companies, the Railways etc. were using this band at different places in the country. In its earlier recommendations, the Authority had recommended vacation/ refarming of this 100 MHz band. On account of the vacation /refarming of the earlier users, about 40 MHz of spectrum is now available for allocation.
- 2.28 The Authority has already recommended the maximum quantum of spectrum with each service providers in a service area as 15 MHz (para 2.16) However, as spectrum in this band is being vacated from a large number of users, therefore, there is strong possibility that the available/vacated spectrum may not be contiguous.



2.29 In response to the consultation paper, most of the stake holders have suggested auctioning of the spectrum in this band in the block of 5 MHz. One of the stakeholder<sup>9</sup> has commented that as the most efficient channeling bandwidth is 10MHz therefore the blocks of spectrum in these bands may be allocated in 10MHz and not in 5MHz. However because of the reasons given below the Authority has decided to auction the spectrum in the blocks of 5 MHz each:-

- There are already certified profiles available for 5 and 10MHz channelization plan in above two bands. Therefore in order to allow both these profiles the Authority is enabling 10&15MHz spectrum in these two bands.
- Different carrier sizes enabling these profiles which might be approved by standardization agencies in due course. Therefore the telecom service providers can bid for spectrum in these bands in the block size of 5MHz for one, two or three blocks OR they can also bid for two contiguous blocks of 5MHz each to form 1(one) block of 10 MHz carrier.

Moreover, as the possibility of getting 5 MHz contiguous spectrum in the vacated / reforming spectrum is quite high and in view of the fact that in most of the countries the spectrum allotted is in TDD mode, therefore, in order to have harmonization with the international allocation and to enable international roaming requirements the **Authority recommends that the spectrum in 2.3-2.4 GHz band be allocated in TDD mode in the block of 5 MHz each with the maximum spectrum amount of 15 MHz to each service provider.**

The DoT in its letter of 1<sup>st</sup> July,2008 (Para2) has proposed that the auction should be for a block of 10MHz in the spectrum bands of 2.3-2.4GHz and 2.5-2.69GHz. Further they have pointed out that 5MHz is likely to be wasted in case 15MHz is auctioned. The comments of the Authority on this issue are also being sent separately. However, above reasoning is self evident and lucid.

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<sup>9</sup> WiMax Forum

**2.5-2.69 MHz**

2.30 As noted in the consultation paper, it is expected that at least 40 MHz of spectrum which has been earlier allocated to LMDS/MMDS (2.535-2.550 GHz) (2.630-2.655 GHz) shall be available for allocation. As this band has the capability for the introduction of next generation mobile technologies as well as for the provision of additional capacity for networks using 3G technologies, therefore, in the countries, where spectrum in this band has been allocated, the allocation has been done in a technology neutral manner, so that it can be used by both the technologies i.e. those using FDD mode or TDD mode. As quoted in the consultation paper from the document of Ofcom:-

*“There are two main types of likely uses for the 2.6 GHz band, reflecting technologies that are available or in advanced stages of development:*

- *paired use for FDD technologies which rely on paired blocks of frequencies separated by 120 MHz, one for network base station transmission (and user equipment reception), the other for user equipment transmission (and network base station reception). The two main FDD technologies relevant to 2.6 GHz are LTE and possibly UMTS and its evolutions such as HSPA;*
- *unpaired use for TDD technologies which rely on unpaired blocks in which network base stations and user equipment both receive and transmit at the same frequency, but in different timeslots. The main TDD technology relevant to 2.6 GHz is mobile WiMAX.”*



2.31 However, unlike other countries, where 190 MHz of spectrum is available for allocation, in India only 40 MHz of spectrum in two different blocks of 15 MHz (2535-2550) and 25 MHz (2630-2655) is available for allocation.

2.32 Though, the spectrum available is within the bands marked for FDD technologies, however, they cannot be used in FDD mode as it is not possible to allocate spectrum with 120 MHz of duplex separation in line with the international band plan. The other alternative is to allocate the spectrum for use of TDD based technology. However, in case some additional spectrum becomes available in future in this band

then it will not be possible to refarm the already allocated spectrum and use it for FDD technologies.

2.33 In view of the importance and value of this spectrum band(2.5-2.69GHz), the Authority recommends the following:

- (i) DoT/WPC should coordinate with Department of Space (DoS) and ascertain the feasibility of vacation of additional spectrum in this band in a time bound manner, say 45 days.**
- (ii) In case, there are possibilities of vacation of spectrum in this band and with the then vacated spectrum and the present 40 MHz spectrum, if WPC finds it feasible to harmonize with internationally accepted band plan then spectrum in this band may be allocated accordingly in both FDD and TDD modes.**
- (iii) In case, DoT/WPC comes to the conclusion that no additional spectrum can be made available by vacation / refarming, then the spectrum may be allocated in TDD mode with block of 5 MHz each subject to maximum limit 15 MHz spectrum (cumulative for 2.3-2.4GHz & 2.5-2.69GHz) per service provider.**

#### **MAXIMUM CUMULATIVE HOLDING OF SPECTRUM**

2.34 In order to ensure enough competition and level playing field in the market for providing broad band service and also to ensure that the spectrum is not hoarded by any service provider, **the Authority recommends that the cumulative holding of spectrum acquired in 2.3-2.4GHz and 2.5-2.69GHz band by a licensee shall not exceed 15 MHz of spectrum. As spectrum in 3.3-3.4GHz band has already been assigned and some of the service providers have rolled out their network therefore, the Authority has not considered this band while putting the cumulative holding limit.**

2.35 In order to ensure fair competition in the market and to discourage hoarding of spectrum by a single service provider under different licenses( a number of UASLs are

ISPs also), **the Authority recommends that a service provider/company shall not be allowed to bid under different licenses.**

### **AUCTION PROCEDURE**

2.36 **The Authority recommends simultaneous ascending e-Auction method for auction of spectrum in BWA bands. The auction will be done in the blocks of 5MHz each and any bidder can bid for one or two or three blocks (i.e. maximum up to 15MHz in block of 5MHz). However the bidder has to specify before the auction, the number of blocks he desires to bid for. After the conclusion of the auction process, the highest bid obtained for 5MHz block shall be declared and all successful bidders shall have to match the highest bid. In case any service provider desires to have contiguous block of 5MHz then he should be asked to pay highest bid price of 5 MHz block for the first 5 MHz block and 1.25times the highest bid price of 5MHz block for each contiguous 5 MHz block. The option to take contiguous block shall be given based on the ranking of the service providers in the auction process.**

2.37 The DoT has also proposed the auction process methodology in its letter No. L-14047/9/2005-NTG dated 1<sup>st</sup> July,2008 (para 4) . The Authority is of the view that the above recommended process is in line with the DoT's proposal. A separate reply to the referred letter is being sent.

### **Annual Spectrum Fee:-**

2.38 **The Authority reiterates its earlier recommendation of charging an additional step up annual spectrum fee of 1% of total AGR from the service providers providing BWA services.**

### **Rollout Obligations**

2.39 **The Authority reiterates its earlier recommendations on the rural rollout obligations so as to encourage faster penetration of broadband services in rural areas.**

### **Chapter-3 Summary of Recommendations**

- 3.1 For the spectrum bands of 2.3-2.4 GHz, 2.5-2.69 GHz and 3.3-3.4 GHz, UASL, CMSPs and Category 'A' & 'B' ISPs should be eligible for participating in the auction for the spectrum.**
- 3.2 All the service providers having spectrum in 3.3-3.4 GHz band should be asked to immediately migrate to Circle level operation. Further the service providers having allocation in both 2.5 GHz and 3.3 GHz, bands should migrate to 3.3 GHz band immediately and vacate the 2.5 GHz band, if not already done till date.**
- 3.3 The leftover spectrum in 3.3-3.4 MHz band after migration to circle level operation should be auctioned to other service providers in blocks of 2x7 MHz, so as to ensure level playing field with the existing service providers. Those service providers who already have 2x7MHz spectrum and are migrating to Circle level operation as required, shall not be eligible for participation in the auction.**
- 3.4 The service providers already having spectrum in the block of 2x7MHz in this band shall not be eligible to participate in the auction process. However, the existing service providers having less than 2x7MHz spectrum in this band will have the option either to continue with the existing spectrum OR participate in the auction process for 2x7 MHz spectrum after submitting an undertaking to DoT that in case they are successful in the auction, then they will surrender the spectrum already held by them.**
- 3.5 In the 3.3-3.4 GHz band, the mode of operation, i.e. FDD or TDD shall be left to the service provider. The Authority in its earlier recommendation has preferred the allocation of spectrum in the TDD mode. However, as some of the service providers have already started operation in this band using either TDD or FDD mode, hence the Authority do not want to specify any one mode in line with the policy of technology neutrality.**

- 3.6 **Authority has 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, co-existence of both the services and also the feasibility of migration of satellite services to some other suitable band. Once DoT carryout the above study and reaches a conclusion that spectrum in the 3.4-3.6GHz band is possible to be refarmed, then it should refer the matter to TRAI for recommending the allocation methodology.**
- 3.7 **A maximum of 15 MHz of spectrum (in 2.3 GHz and 2.5 GHz combined) should be allowed to each service provider in the bands of 2.3-2.4 GHz and 2.5-2.69 GHz. However, the spectrum shall be auctioned in blocks of 5 MHz each so that any service provider requiring lesser amount of spectrum than 15 MHz may not be at a disadvantage.**
- 3.8 **The reserve price and performance bank guarantee for 15 MHz of spectrum in the bands of 2.3-2.4GHz, 2.5-2.69GHz and 3.3-3.4GHz spectrum shall be as below:**

<b>Circle</b>	<b>Reserve price (for 15MHz) (Cr Rs)</b>	<b>Performance Bank Guarantee (for 15MHz) (Cr Rs)</b>
<b>Metro &amp; Category A</b>	<b>60</b>	<b>30</b>
<b>Category B</b>	<b>30</b>	<b>15</b>
<b>Category C</b>	<b>10</b>	<b>5</b>

- 3.9 **The existing service providers in the band 3.3-3.4GHz shall also have to pay the same price as will be charged from the new entrants. For the Circles where no spectrum is available due to all spectrum already assigned, the service providers of that service area shall have to pay the highest bid price obtained in the other service areas of that category.**
- 3.10 **The spectrum in 2.3-2.4 GHz band be allocated in TDD mode in the block of 5 MHz each with the maximum spectrum amount of 15 MHz to each service provider.**

- 3.11 For allocation of spectrum band in 2.5-2.69GHz band, the Authority recommends the following:
- **DoT/WPC should coordinate with Department of Space (DoS) and ascertain the feasibility of vacation of additional spectrum in this band in a time bound manner, say 45 days.**
  - **In case, there is possibilities of vacation of spectrum in this band and with the then vacated spectrum and the present 40 MHz spectrum, if WPC finds it feasible to harmonize with internationally accepted band plan then spectrum in this band may be allocated accordingly in both FDD and TDD modes.**
  - **In case, DoT/WPC comes to the conclusion that no additional spectrum can be made available by vacation / refarming, then the spectrum may be allocated in TDD mode with block of 5 MHz each subject to maximum limit 15 MHz spectrum (cumulative for 2.3-2.4GHz & 2.5-2.69GHz) per service provider.**
- 3.12 **The cumulative holding of spectrum acquired in 2.3-2.4GHz and 2.5-2.69GHz band by a licensee shall not exceed 15 MHz of spectrum. As spectrum in 3.3-3.4GHz band has already been assigned and some of the service providers have rolled out their network therefore, the Authority has not considered this band while putting the cumulative holding limit.**
- 3.13 **Simultaneous ascending e-Auction method may be used for auction of spectrum in BWA bands. The auction will be done in the blocks of 5MHz each and any bidder can bid for one or two or three blocks (i.e. maximum up to 15MHz in block of 5MHz). However the bidder has to specify before the auction, the number of blocks he desires to bid for. After the conclusion of the auction process, the highest bid obtained for 5MHz block shall be declared and all successful bidders shall have to match the highest bid. In case any service provider desires to have contiguous block of 5MHz then he should be asked to pay highest bid price of 5 MHz block for the first 5 MHz block and 1.25 times the highest bid price of 5MHz block for each contiguous 5 MHz block. The option**

**to take contiguous block shall be given based on the ranking of the service providers in the auction process.**

- 3.14 **The Authority reiterates its earlier recommendation of charging an additional step up annual spectrum fee of 1% of total AGR from the service providers providing BWA services.**
- 3.15 **The Authority reiterates its earlier recommendations on the rural rollout obligations so as to encourage faster penetration of broadband services in rural areas.**



**Annexure-I**

The Authority sent its recommendations on “Allocation and pricing of spectrum for 3G and broadband wireless access services” on 27<sup>th</sup> September, 2006 to the Government. The salient points in the recommendations were:-

**Allocation methodology and pricing for 3G spectrum**

1. With the current availability of 2 x 25 MHz of spectrum in the 2.1 GHz band, five operators should be accommodated in blocks of 2 x 5 MHz in this band in the first lot. Remaining operators should be allocated spectrum as and when it is available. Since the quantum of spectrum in the 800 MHz band is limited, the Authority recommended that this band be allocated among the UASL CDMA operators. DoT should also allocate 2 x 5 MHz in the 450 MHz band to one of the existing UASL CDMA operators based on the specified allocation process.
2. An UASL CDMA operator will have the option to seek 2 x 1.25 MHz in the 800 MHz band at a determined price. Additionally, it will have the option of taking spectrum in either the 2.1 GHz or 450 MHz bands. In case it opts for the 2.1 GHz band, the UASL CDMA operator will have to bid along with the other operators. In case it is among the successful bidder, he will have an option of either retaining 2 x 1.25 MHz in the 800 MHz and getting an additional 2 x 3.75 MHz in the 2.1 GHz band, or giving up the option on 2 x 1.25 MHz in the 800 MHz band and getting 2 x 5 MHz in the 2.1 GHz band.
3. In the 450 MHz band, if more than one operator opts for 2 x 5 MHz, the Authority recommended that a single stage bidding process be conducted. The reserve price for 2 x 5 MHz in the 450 MHz band will be half of the reserve price set for 2.1 GHz band for that service area.

**Spectrum pricing**

4. The Government should charge a spectrum acquisition fee from all operators wishing to provide services using the 800 MHz band and/or 450 MHz band. The allocation criteria followed for the identified carriers in 800 MHz should also be a spectrum

acquisition fee.

- 5 The Government may allocate spectrum blocks in the 2.1 GHz band using a simultaneous ascending auction system. If there are more operators interested in the 450 MHz or 800 MHz bands than the amount of available spectrum, then a one-stage bidding process should be organized to decide the winners.
- 6 Ascending auctions have a reserve price, a minimum price above which bidders must place their bids. The Authority recommended a specific reserve price for the 2.1 GHz and 450 MHz bands. For the 800 MHz band 3G carriers, the Authority recommended that the second-highest winning bid in the 2.1 GHz auction should be pro-rated to a per 2x1.25 MHz price.
- 7 **The reserve price for spectrum auctions in the 2.1 GHz band for 2 x 5 MHz blocks of spectrum should be:**

Circle	Reserve price (Cr Rs)
<b>Mumbai, Delhi, Category A</b>	<b>80.00</b>
<b>Chennai, Kolkatta, Category B</b>	<b>40.00</b>
<b>Category C</b>	<b>15.00</b>

- 8 DoT should have a one year moratorium on incremental annual spectrum fees for 3G spectrum from the time of spectrum assignment. After this one year, the DoT should charge operators an additional annual spectrum charge of 1 per cent of the operator's total adjusted gross revenue (AGR).
- 9 There are specific roll out obligations and conditions to be enforced for the 2.1 GHz and 450 MHz bands.

### **Spectrum for BWA technologies**

- 10 The Authority considered the following bands for BWA systems:
  - 700 MHz,
  - 2.3 - 2.4 GHz,
  - 2.5 - 2.69 GHz,
  - 3.3 - 3.4 GHz,
  - 3.4 - 3.6 GHz,

- 11 In order to ensure that sufficient spectrum is available for BWA systems, the Authority recommended that at least 200 MHz of spectrum should be made available for BWA to accommodate growth requirement until 2007, and an additional 100 MHz of spectrum should be coordinated by 2010.
- 12 Operators with current spectrum assignments in the 3.3-3.4 GHz band should be given the option to migrate to circle-wide operations by December 2006, and the DoT should then allocate this spectrum for BWA technologies.
- 13 The DoT should coordinate with Department of Space (DoS) to get 100 MHz for broadband wireless applications in the 3.4 - 3.6 GHz band immediately.
- 14 DoT should coordinate some part of 700 MHz spectrum for making it available for rural wireless networks in the near future. Also keeping in mind the suitability of 2.3-2.4 GHz band for BWA applications and the need for additional spectrum later, the Authority recommended that DoT should plan to vacate/re-farm this 100 MHz band from the existing users by end-2007 and allocate it for BWA services.
- 15 The Authority also recommended that the DoT should initiate the process to vacate portions of the 2.5 - 2.69 GHz band that might not be in use at this time, or which have marginal uses limited in nature. This spectrum should be earmarked for wireless telecommunications systems, and the Authority will recommend the precise allocation at a later stage depending on technological developments and market demand.
- 16 The Authority recommended allocation of the 200 MHz of spectrum in the 3.3-3.4 GHz and 3.4-3.6 GHz bands to 13 operators in contiguous blocks of 15 MHz each. The Authority will make recommendations about future allocations of spectrum in bands such as 2.3 GHz, 2.5 GHz, or 700 MHz, as and when these bands are made available.
- 17 Twelve blocks of BWA spectrum as identified should be allocated among UASLs, CMSPs, or Category A and B ISPs for circle level deployments. One block of spectrum should be allocated to Category A, B, and C ISP licenses in cities or SSAs with population less than one million. DoT may use a first-come first-serve allocation mechanism for this one block of spectrum if needed.

18 DoT should organize a one-stage sealed bid auction for every circle to allocate BWA spectrum for circle-wide licensees. Reserve prices have been specified.

19 The reserve price for 15 MHz of BWA spectrum in different circles will be as follows:

<b>Circle (for 15MHz in Cr Rs)</b>	<b>Reserve Price (Cr Rs)</b>	<b>PBG</b>
Metros & A	10	5.0
B	5	2.5
C	2	1.0

20 Specific roll out obligations and conditions for operators offering BWA services will be:-

<b>Time Line</b>	<b>Metro Circles</b>	<b>A,B &amp;C Circles</b>	<b>Local operator/ captive circles</b>
<b>2 Years</b>		<b>25% Rural SDCAs area Coverage</b>	
<b>5 years</b>	<b>90% area Coverage</b>	<b>50% Rural SDCAs area Coverage</b>	<b>90% area Coverage</b>

## Annexure-II

No.L-14047/9/2005-NTG  
Government of India  
Ministry of Communications & IT  
Department of Telecommunications

Sanchar Bhavan  
Ashoka Road, New Delhi 110 001  
Dated: 1<sup>st</sup> July 2008

To

The Secretary,  
Telecom Regulatory Authority of India,  
MTNL Bhavan, Jawahar Lal Nehru Marg,  
New Delhi 110002.

**Subject: TRAI Recommendation on BWA Services.**

Please refer to TRAI Recommendations of 27 September 2006 on 'Allocation and Pricing of Spectrum for 3G and Broadband Wireless Access Services'. The Government feels that the following modifications are necessary.

**1. Eligibility:**

TRAI has recommended (Para 5.57) that all existing UASLs, CMSPs, and Category 'A' and 'B' ISPs shall be eligible to bid.

**It is proposed that all the existing UASLs, CMSPs, and Category 'A' ISPs be eligible for participation in the auction as there are large numbers of UASL and category 'A' ISPs.**

**2. Amount of Spectrum to be Allocated:**

One of the recommendations (Para 5.53) was that spectrum in contiguous blocks of 15 MHz each in 3.3-3.4 GHz and 3.4-3.6 GHz bands be allocated.

✓ As per present estimate of availability of spectrum 4 blocks each of 10 MHz (TDD) in 2.5 GHz (2.5-2.69 GHz) and 2.3 GHz (2.3-2.4 GHz) are proposed to be allocated. As per inputs from WiMAX forum and other experts, spectrum for BWA services should be allocated in blocks of 10 MHz or multiples thereof. If a block of 15 MHz is allocated, 5 MHz is likely to be wasted.

A successful bidder can bid for an additional block of 10 MHz in future, subject to availability.

**3. Reserve Price and Performance Bank Guarantee:**

Y/TRAJ TRAI has recommended (Para 5.76) that reserve price and performance bank guarantee be as follows:

Circle	Reserve Price (Rs. Crore)	Performance Bank Guarantee
Metro & Category A	10	5
Category B	5	2.5
Category C	2	1

It is felt that the reserve price for BWA auction of each 10 MHz block for a period of 15 years should be 25% of the reserve price for 3G spectrum. Thus reserve price and PBG would be as follows:

Circle	Reserve Price (Rs. Crore)	Performance Bank Guarantee
Metro & Category A	40	20
Category B	20	10
Category C	7.5	3.75

**4. Auction Process:**

TRAI has recommended (Para 5.69) that DoT should organise one stage sealed bid auction for every circle to allocate BWA spectrum for circle-wide licensees.

In place of the above, it is proposed to have a controlled simultaneous e-auction similar to that in the case of 3G spectrum. Further here also when the number of bidders left is equal to the number of blocks of spectrum being auctioned, in any service area, the auction will end. All the bidders will have to match the bid of the highest bidder, H1. In case they do not match, then that block would be offered to the next highest bidder at the highest bid price, H1. If any block is left vacant, then the block would be re-auctioned. This would ensure that all successful bidders pay the same amount for the same BWA spectrum block.

**5. Grant of License:**

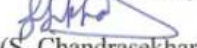
TRAI has recommended (Para 5.60) that BWA spectrum license should be for 5 years duration renewable upto 20 years.

Considering the fact that the validity of an ISP licence is for 15 years, it is proposed that the successful bidders shall get spectrum allotment for BWA services for period of 15 years duration. Further, if the period of the UAS or ISP license is expiring before 15 years its existing license shall be extended at a price. This price will be determine by multiplying the numbers of years of license extension required by the pro-rata entry fee of the license to be extended. This will ensure a level playing field so that existing UAS or ISP licensees can bid for BWA spectrum with the comfort that their licenses would be extended to a period to be co-terminus with the BWA spectrum allocation of 15 years.

6. TRAI is requested to kindly provide their considered recommendations/comments on the above proposed changes within 15 days, as per the proviso under section 11(1) of TRAI Act 1997, as amended in 2000 (reproduced below):

“Provided also that if the Central Government, having considered that recommendation of the Authority, comes to prima facie conclusion that such recommendation cannot be accepted or needs modification, it shall refer the recommendation back to the Authority for its reconsideration, and the Authority may, within 15 days from the date of receipt of such reference, forward to the Central Government its recommendation after considering the reference made by that Government. After receipt of further recommendation, if any, the Central Government shall take a final decision”

Yours faithfully,

  
(S. Chandrasekhar)

Deputy Secretary to the Government of India

## Annexure-III

D.O. No. 103-3/2008-MN

Dated 11<sup>th</sup> July, 2008

Dear Shri

The Telecom Regulatory Authority of India (TRAI) had submitted its recommendation to DoT on '**Allocation and pricing of spectrum for 3G and BWA services**' vide letter No. 101-36/2006-MN dated 27<sup>th</sup> September 2006. DoT vide its letter No. L-14047/9/2005-NTG dated 1<sup>st</sup> July, 2008 has proposed certain modifications in the above referred recommendations for **Broadband Wireless Access (BWA)** services and has requested TRAI for its considered views / comments on proposed changes within a fortnight as per the proviso under section 11(1) of TRAI Act 1997 as amended from time to time.

In the proposal, sent by DoT, some of the changes pertain to the spectrum bands of 2.3 GHz and 2.5 GHz for which the Authority had not given any recommendation earlier. It may be recalled that the Authority had sent a letter No.103-3/2008-MN, dated 25<sup>th</sup> March, 2008, informing DoT that in view of two significant developments i.e. identification of 2.3 GHz, 2.5 GHz bands and 3.4-3.6 GHz bands as IMT band by ITU, and recognition of these bands for BWA services by DoT, the Authority shall be holding consultation for allocation and pricing of these spectrum bands and will be sending its recommendations. The Authority issued the consultation paper on 2<sup>nd</sup> May, 2008 and held discussions with the stakeholders on 29<sup>th</sup> May, 2008. The Authority was in the process of finalizing its recommendation on "**Allocation and pricing for 2.3-2.4 GHz, 2.5-2.69 GHz & 3.3-3.6 GHz bands**" when the above stated letter of DoT dated 1<sup>st</sup> July '08 was received. Therefore, the Authority has decided to give its comments on the DoT's proposal relating to these bands also. However, the Authority would request DoT to refer to the recommendations on the subject matter, while evaluating our response to the DoT letter of 1<sup>st</sup> July 2008.

The recommendations of the Authority on the DoT letter are as below:-

### **1. Eligibility**

The DoT in its letter has proposed that '*all the existing UASLs, CMSPs and category 'A' ISPs be eligible for participation in the auction as there are large number of UASL and category 'A' ISPs*'. In this reference, it may be noted that as per the ISP licensing conditions the area of operation for category 'B' ISPs is circle level. The spectrum for BWA services is also proposed to be given on the circle basis. The Authority believes that by not allowing category

'B' ISPs for participation in the auction process, will be against the principle of equity and level playing field.

Secondly, the UASL/CMTS license is also circle service area wise and there are around 10 to 12 operators in each service area. The total number of category 'A' ISPs are 78. There are total 115 category 'B' ISPs. For Delhi their number is 25, Maharashtra 26, Gujarat 13, Andhra Pradesh 19 and in other circles they are less than 10. It is also observed that there is no category 'B' ISPs licensee in about 13 circles. Thus, if category 'B' ISPs are also included, then the increase in the number of bidders will be around 25 for Delhi and Maharashtra assuming that all category 'B' ISPs apply for BWA Services. If only UASL/CMTS and category 'A' ISPs are permitted the number of bidders will be around 90 assuming all such license holders decide to apply for BWA services. Thus, the increase is not significant in most of the circles except Delhi, Maharashtra and Andhra Pradesh. Therefore, in order to ensure level playing field it is desirable to permit category 'B' ISPs also to participate in the auction process for the service area for which they hold the valid license.

The Authority in its earlier recommendations on "Allocation and pricing of 3G and broadband wireless access services" dated 27<sup>th</sup> September 2006, had recommended UASLs, CMSPs and category 'A&B' ISPs be made eligible for BWA spectrum. **Therefore, the Authority reiterates its recommendation that for auction of the spectrum bands of 2.3 GHz, 2.5 GHz and 3.3 GHz, UASLs, CMSPs and category 'A' & 'B' ISPs should be eligible.**

## **2. Amount of spectrum to be allocated**

DoT in its letter dated 1<sup>st</sup> July, 2008, on para 2 has proposed that "*As per present estimate of availability of spectrum 4 blocks each of 10 MHz (TDD) in 2.5 GHz (2.5-2.69 GHz) and 2.3 GHz (2.3-2.4GHz) are proposed to be allocated. As per inputs from WiMAX forum and other experts, spectrum for BWA services should be allocated in blocks of 10 MHz or multiples thereof. If a block of 15 MHz is allocated, 5 MHz is likely to be wasted*

*A successful bidder can bid for an additional block of 10 MHz in future, subject to availability.*"

The Authority has deliberated at length on this issue and feels that as there are already certified profiles available for 5 and 10 MHz channelization plan in above two bands, therefore, in order to enable both these profiles, it is recommending allotment of spectrum in block of 5 MHz with flexibility to the service providers to take two or three blocks of 5 MHz i.e. maximum of 15 MHz spectrum in these two bands.



Secondly, as different carrier sizes enabling these profiles, might be approved by standardization agencies, in due course, therefore, the telecom service providers can bid for spectrum in these bands in the block size of 5MHz for one, two or three blocks OR they can also bid for two contiguous blocks of 5 MHz each to get 1 block of 10 MHz carrier.

Moreover, as the possibility of getting 5 MHz contiguous spectrum in the vacated / refarmed spectrum is quite high as compared to 10 MHz and in view of the fact that in most of the countries the spectrum allotted is in TDD mode in 2.3 to 2.4 GHz, therefore, in order to have harmonization with the international allocation and to ensure international roaming requirements the Authority recommends that the spectrum in 2.3-2.4 GHz band be allocated in TDD mode in the block of 5 MHz each with the maximum spectrum amount of 15 MHz to each service provider. Any eligible service provider can bid for maximum 3 blocks of 5 MHz each. This will not result in any wastage of any block of spectrum.

Further, DoT has proposed allocation of spectrum in 2.5 GHz band in TDD mode. Therefore, in this band also policy similar to 2.3 GHz band can be followed.

The Authority in its recommendation on “**Allocation and pricing for 2.3-2.4 GHz, 2.5-2.69 GHz & 3.3-3.6 GHz bands**” dated 11<sup>th</sup> July, 2008 has also in Para 2.29 cited the above reasons and has **recommended that a maximum spectrum amount of 15 MHz (not necessarily contiguous block) to each service provider shall be allocated. The bidding for the spectrum should be done in blocks of 5 MHz each.** The Authority had also recommended maximum amount of spectrum of 15 MHz in its earlier recommendation.

### **3. Reserved price and performance bank guarantee.**

DoT in its above referred letter has proposed that *“It is felt that reserve price for BWA auction of each 10 MHz block for a period of 15 years should be 25% of the reserve price for 3G spectrum. Thus, reserve price and PBG would be as follows:”*

Circle	Reserve price (Rs Crore)	Performance Bank Guarantee
<b>Metro &amp; Category A</b>	<b>40</b>	<b>20</b>
<b>Category B</b>	<b>20</b>	<b>10</b>
<b>Category C</b>	<b>7.5</b>	<b>3.75</b>

The Authority has collected data regarding price obtained in various countries for spectrum for BWA services and based on the analysis done, the Authority concurs with the reserved price and performance bank guarantee proposed by DoT. However, the Authority would like that the reserved price should be so structured so that it takes into consideration the auctioning of spectrum in the blocks of 5 MHz. As the blocks of the spectrum to be auctioned shall be finalized before the auction process itself, therefore, the number of contiguous blocks of spectrum shall be known. In case any service provider desires to have contiguous block of 5 MHz then he should be asked to pay highest bid price of 5 MHz block for first 5 MHz block and 1.25 times the highest bid price of 5 MHz block for each contiguous 5 MHz block. The option to take contiguous block shall be given based on the ranking of the service providers in the auction process

#### 4. Auction Process

DoT in its above referred letter has proposed that “... *it is proposed to have a controlled simultaneous e-auction similar to that in the case of 3G spectrum. Further here also when the number of bidders left is equal to the number of blocks of spectrum being auctioned, in any service area, the auction will end. All the bidders will have to match the bid of the highest bidder, H1. In case they do not match, then that block would be offered to the next highest bidder at the highest bid price, H1. If any block is left vacant, then the block would be re-auctioned. This would ensure that all successful bidders pay the same amount for the same BWA spectrum block.*”

The Authority agrees with DoT that the spectrum should be given through a controlled simultaneous ascending e-auction and all the successful bidders should be asked to match the highest bid i.e. H1. However, in case any service provider desires to have contiguous block of 5 MHz, then he should be asked to pay highest bid price of 5 MHz block for first 5 MHz spectrum and then 1.25 times the highest bid price of 5 MHz block for each contiguous 5 MHz block. The option to take contiguous block shall be given based on the ranking of the service providers in the auction process.

#### 5. Grant of License

DoT in its above referred letter has proposed that “... *Considering the fact that the validity of an ISP license is for 15 years, it is proposed that the successful bidders shall get spectrum allotment for BWA services for period of 15 years duration. Further, if the period of the UAS or ISP license is expiring before 15 years its existing license shall be extended at a price. This price will be determined by multiplying the numbers of years of license extension*

*required by the pro-rata entry fee of the license to be extended. This will ensure a level playing field so that existing UAS or ISP licensees can bid for BWA spectrum with the comfort that their licenses would be extended to a period to be co-terminus with the BWA spectrum allocation of 15 years.”*

In this reference, the relevant license conditions regarding the duration & extension of the license period is given in **Annexure**.

The Authority is of the view that the right to use the spectrum for providing a service is dependent on the service license conditions, therefore the validity of spectrum usage cannot exceed that of the service license. In case, the validity of usages of spectrum is later than the validity of license period the service provider cannot transfer the spectrum to any other service provider. The Authority is of the firm view that the renewal of license is a sacrosanct process and should be automatic subject to compliance of conditions of DoT unless extreme reasons of national security etc. warrant otherwise. The Government has the power to review the renewal fee at any time and therefore the Authority is of the opinion that in view of the foregoing, the licenses should be renewed/extended as per the laid down conditions in the respective licenses. The renewal of license should not be linked with auction of spectrum for 3G or BWA services. At present, the Government is thinking of auction of spectrum for 3G and BWA services while in future some more spectrum may have to be auctioned for any telecom services which would again necessitate extension of some licenses, if this practice is followed. Therefore, the Authority suggests that **“the licenses should be renewed / extended as per the laid down conditions in the respective licenses”**.

Yours sincerely,

**(Nripendra Misra)**

**Shri Siddhartha Behura,  
Secretary,  
Department of telecommunications,  
Sanchar Bhawan,  
New Delhi- 110 001**

**License conditions regarding the duration & extension of the license period**

**UASL License**

**3. Duration of Licence:**

*3.1 This LICENCE shall be valid for a period of 20 years from the effective date unless revoked earlier for the reason specified elsewhere in the document.*

**4. Extension of Licence:**

*4.1 The LICENSOR may extend, if deemed expedient, the period of LICENCE by 10 years at one time, upon request of the 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”.*

**ISP License**

**3. Duration of Licence:**

*3.1 This LICENCE shall be valid for a period of 15 years from the effective date unless revoked earlier.*

**4. Extension of Licence:**

*4.1 The Licensor may extend, if deemed expedient, the period of LICENCE by 5 years at one time, upon request of the LICENSEE, if made during 14th year of the Licence period on terms mutually agreed. The decision of the LICENSOR shall be final in regard to the grant of extension.”*