



**Telecom Regulatory Authority of India**



**Consultation Paper**

**on**

**Allocation and Pricing of Microwave Access (MWA) and  
Microwave Backbone (MWB) RF carriers**

**28<sup>th</sup> March, 2014**

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**Written Comments on the Consultation Paper are invited from the stakeholders by 21<sup>st</sup> April, 2014 and counter-comments by 28<sup>th</sup> April 2014. Comments and counter-comments will be posted on TRAI's website [www.trai.gov.in](http://www.trai.gov.in). The comments and counter-comments may be sent, preferably in electronic form, to Shri Sanjeev Banzal, Advisor (Networks, Spectrum and Licensing), TRAI on the Email Id [advmn@trai.gov.in](mailto:advmn@trai.gov.in)**

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## **CHAPTER I: INTRODUCTION**

### **MICROWAVE IN MOBILE ACCESS AND BACKBONE NETWORK**

- 1.1 Microwave transmission refers to the technology of transmitting information using radio waves. Microwave technology is widely deployed in mobile communications to provide point-to-point (PTP) Radio Frequency (R.F.) links in mobile backhaul as well as in the backbone network. Mobile backhaul is that portion of the network infrastructure that provides interconnectivity between the access and core networks. The backbone network is used to interconnect different nodes situated at different geographical locations.
- 1.2 For PTP links, microwave frequencies are generally assigned in blocks of 2x28 MHz, known as microwave carriers. There are two types of microwave carriers viz. Microwave Access (MWA) Carriers and Microwave Backbone (MWB) Carriers.
- 1.3 Microwave carriers in the frequency bands of 10 GHz and beyond are used for backhauling the traffic in the access networks and are named as Microwave Access (MWA) Carriers. These systems are basically short-haul systems used to carry traffic through a relatively smaller distance in the mobile networks. Microwave systems are also used in the backbone networks of the cellular network to carry long distance traffic. Normally carriers in the frequency bands below 10 GHz are used for backbone network to provide connectivity in the LSAs and are called Microwave Backbone (MWB) Carriers.
- 1.4 All voice and data signals - conversations, SMSs, video downloads - travel through the backhaul network. It is an essential component of mobile networks and is used to transmit data between cell sites and network backbones or even between cell sites. The requirement of mobile backhaul capacity is anticipated to grow significantly due to the increasing use of newer multimedia and other data centric applications



being provided through the deployment of third and fourth generation wireless mobile systems.

1.5 From the implementation point of view, the backhaul architecture can be divided into two parts:

- Cell access part of backhaul (pre-aggregation segment) providing last mile backhaul connectivity to BTS from aggregation point, and;
- The aggregation which aggregates traffic from different access parts and backhauls it to BSC/RNC/AGW<sup>1</sup>.

1.6 The cell access part of the backhaul typically aggregates traffic from a number of BTSs sites and feeds it into the aggregating network. Depending on operator's strategy and availability at the site, one or a combination of various available physical link technologies (microwave, copper and fiber) can be used in this part. Each type of backhaul link has got certain advantages and disadvantages. However, among the various options, microwave usually is the cheapest option when none of the option is pre-existing at a cell site. Today, Microwave is the dominating backhaul technology in majority of cell sites. Aggregation part of the backhaul network mainly relies on OFC considering its higher bandwidth requirement. However, microwave can also be used in places of lesser bandwidth requirements.

1.7 To provide backhaul connectivity in pre-aggregation segment, copper pairs can also be used by deploying xDSL<sup>2</sup> technologies. However, links provided on copper suffer from its limited capacity support and inability to scale in a cost efficient manner. The use of copper is limited to support few Mbps of data upto few kilometres using xDSL technologies

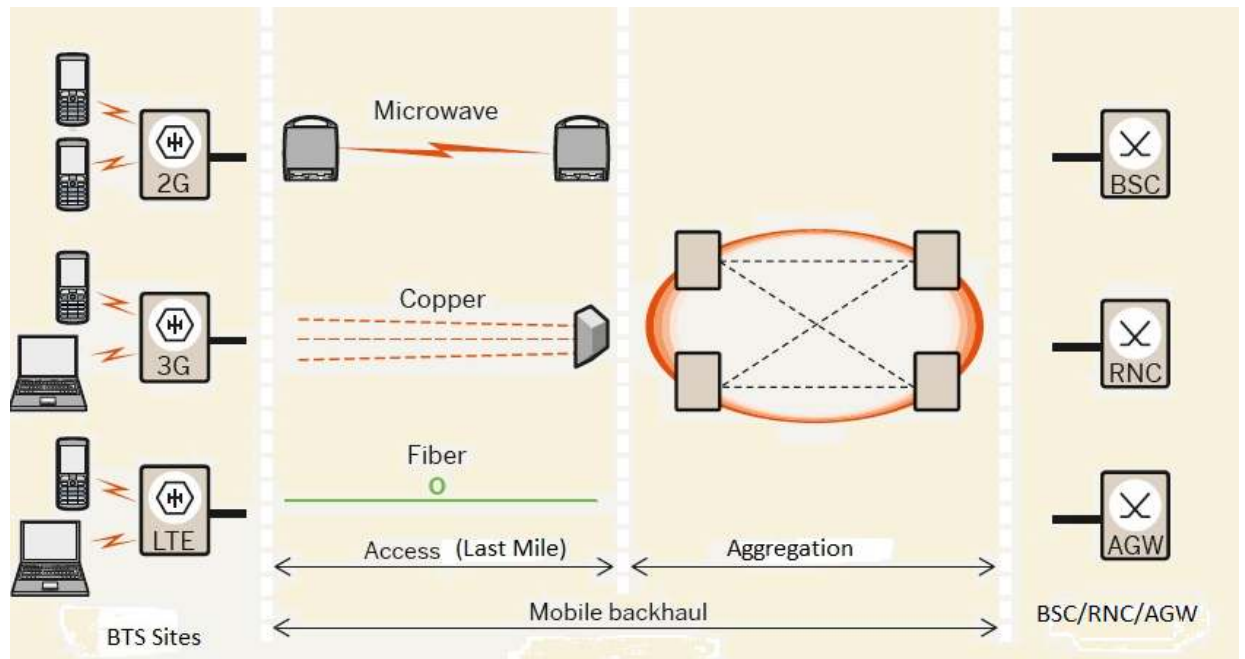
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<sup>1</sup> BSC-Base Station Controller, RNC-Radio Network Controller, AGW-Access Gateway

<sup>2</sup> The acronym DSL stands for digital subscriber line. DSL is a digital broadband transmission technology that involves sending digital information over a subscriber's telephone line, also referred to as the local loop. The applications of DSL involve the transport of high-speed data, voice and recently video, to residential and business subscribers. X denotes different variants of DSL technology.

but it is not very useful for technologies like 3G or LTE which require higher data capacity.

**Fig. 1.1**  
**Mobile Backhaul**



- 1.8 Over a period of time, optical fibre has evolved as the most practical wired solution for backhaul as well as backbone network, considering its extra-ordinary capacity. Owing to its almost limitless capacity and scalability, it is the right choice for high-capacity routes where logistics are manageable, capacity need is high, and the potential revenue gain offsets the expense. Over the period of time, its share in the mobile backhaul network is likely to go up owing to the expected growth in the data traffic and the increasing requirement of backhaul for the new technologies such as LTE, LTE-Advanced etc. The flip side of fibre deployment is that it is costly and requires time for deployment. Pulling Fiber to every cell site is practically not feasible due to cost and logistical challenges.
- 1.9 In view of the foregoing, microwave is the most widely used medium for the backhaul connectivity. It is also used in the backbone network, particularly in those areas where laying fibre is not a feasible option

due to difficult terrain, time constraint or economical viability. Though microwave does not have the matching capacity of fiber, it can cater to the bandwidth requirements in the pre-aggregation segments. Because it is a cheaper, scalable and highly reliable option and can be deployed quickly, its use as a cost-effective alternative to traditional copper circuits and fiber optic links has been increasing. Microwave backhaul is suitable for any terrain. In certain rural and remote locations, microwave is the only practical high-capacity backhaul solution available. Reducing inter-site distances have also helped in MW links becoming so popular.

- 1.10 Today, wireless or microwave connections currently account for over 50% of mobile backhaul access connections for macro cell sites worldwide<sup>3</sup>. As per one estimate, nearly 80 per cent of cell sites in India have a microwave-based backhaul link. Moving forward, it is expected to play an increasingly important role in providing backhaul connectivity where fiber or copper-based access is either not available or economically unviable to deploy.

#### **REFERENCE RECEIVED FROM THE DOT**

- 1.11 Presently, the assignment of Microwave Access & Backbone (MWA/MWB) carriers to the TSPs is done administratively based on the demand and justification given by them and subject to the availability of spectrum spots. The charging of Microwave Access & Backbone (MWA/MWB) carriers is regulated as per the AGR based annual spectrum usage charges notified in the DoT's orders No. J-14025/20(11)/06-NT dated 03.11.2006 **(Annexure-1.1)**, its amendments dated 10.11.2008 **(Annexure-1.2)** and 19.02.2009 **(Annexure-1.3)**. However, these orders were set aside by a Hon'ble TDSAT judgment dated 22.04.2012 and are now sub-judice in view of a Civil appeal no. D29714 of 2010 by the Government before Hon'ble Supreme Court against the TDSAT judgment. As an interim

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<sup>3</sup> Infonetics Research, Macrocell Mobile Backhaul Equipment and Services, 2012

arrangement, the DoT has issued guidelines in respect of allotment of MWA carriers for BWA services through its order no. L-14035/19/2010-BWA dated 16<sup>th</sup> March 2012 **(Annexure 1.4)**.

1.12 Through its letter dated 26<sup>th</sup> November 2012 **(Annexure 1.5)**, the DoT has sought TRAI's recommendations, under clause 11 (1) (a) of TRAI Act 1997 as amended, on the following issues:

- a. Methodology for Allocation & Pricing of Microwave Access & Backbone (MWA / MWB) carriers for new service providers and the existing service providers for initial and additional allocations of MW Access and MW backbone carriers.
- b. Criteria for withdrawal of excess allocation of MWA & MWB carriers from existing service providers.
- c. Annual spectrum usages charges & criteria for pricing for different bands of MWA & MWB carriers including any upfront charges, along with date of applicability.

1.13 In view of the reference received from the DoT, this Consultation Paper (CP) is being brought out to seek the views of the stakeholders on the various related issues. Chapter-II of the CP discusses requirement of MWA carriers while Chapter -III deals with the assignment and the pricing of MWA and MWB carriers. The issues for consultation have been enlisted in the Chapter-IV. The methodology followed for the assignment and charging of MW carriers by some countries has been annexed at Annexure 3.1 and 3.2.

## **CHAPTER II: REQUIREMENT OF MICROWAVE BACKHAUL ACCESS CARRIERS**

### **WHY HIGH-CAPACITY BACKHAUL IS REQUIRED?**

- 2.1 The mobile world is rapidly evolving with the proliferation of new mobile devices and applications. Increasing penetration of web-enabled devices such as smart-phones, tablets etc, which generate significantly higher traffic across the mobile networks, are driving the adoption of new access technologies. Trend in India is no different from other countries. Increase in the mobile data usage during 2013-14 (first three quarters) across all categories of the LSAs is pretty evident from the Table below.

**Table 2.1**  
**Data Usage in India (in TB)**

<b>Service Area</b>	<b>Total Data Usage in December 2013</b>	<b>Total Data Usage in April 2013</b>	<b>Change in Total data usage</b>
Metro/Cat 'A'	31179	28020	11%
Cat 'B'	16153	11987	35%
Cat 'C'	5019	3797	32%
<b>Total</b>	<b>52351</b>	<b>43804</b>	<b>20%</b>

### **Evolution of Mobile Access Technologies**

- 2.2 With the changing requirements and increasing users' data demand, the access technology has evolved over a period of time. It has resulted in better use of spectrum in terms of improved spectral efficiencies and more capacity as shown in the Table 2.2. However, the higher data carrying capacity of access technologies can be effective in providing mobile broadband services to the customers only if these are complemented by an equally supportive and capable backhauls. For example, most industry estimates suggest that for LTE deployments, operators will require peak capacities of 50-100Mbit/s per cell site. The transition to all-IP technologies such as LTE means that the backhaul network will need to cater to an increasing volume of packet data over

time, whilst at the same time being able to handle legacy circuit-switched traffic. Therefore, choice of access technology has direct bearing on the backhaul requirement. Tentative requirement of backhaul capacity for different technologies is given in Table 2.3.

**Table 2.2**  
**Various 3GPP releases from Rel99/4 onwards**

	<b>WCDMA</b>	<b>HSPA</b>	<b>HSPA+</b>	<b>LTE</b>	<b>LTE Advanced</b>
Max downlink speed	384 kbps	14 Mbps	28 Mbps	300Mbps	1Gbps
Max uplink speed	128 kbps	5.7 Mbps	11 Mbps	75 Mbps	500 Mbps
3GPP releases	Rel 99/4	Rel 5/6	Rel 7	Rel 8	Rel 10
Approx years of initial roll out	2003/4	2005/6 HSDPA 2007/8 HSUPA	2008/9	2009/ 10	In development stage
Access methodology	CDMA	CDMA	CDMA	OFDMA / SC-FDMA	OFDMA / SC-FDMA

**Table-2.3**  
**Backhaul Requirement for different Access Technologies<sup>4</sup>**

<b>Access Technology</b>	<b>Backhaul Capacity per BTS</b>
2G	Typically 2 Mbps to 4 Mbps required. Very large urban BTSs could require up to 12 Mbps.
3G	HSPA will require 12 Mbps – 30 Mbps for typical macro-base station deployments.
LTE	LTE macro-base stations will require between 30 Mbps – 120 Mbps, with very large urban base stations potentially requiring up to 240 Mbps backhaul capacity.

2.3 For 2G and 3G technologies, average base station capacity is 2-30 Mbps, which can be catered by the traditional TDM based Microwave (MW) systems (PDH/SDH)<sup>5</sup>. But the capacity required for deployment of 4G technologies exceeds its capability. According to the ITU, IMT mobile networks are defined as providing at least 100 Mbps peak capacity for high mobility applications, and 1 Gbps for stationary applications. This massive jump in performance definitions from 3G to 4G is one of the key drivers for enhanced backhaul capacity needs, and is the main

<sup>4</sup> OFCOM:Future Options for Efficient Backhaul, 23<sup>rd</sup> January 2007

<sup>5</sup> PDH (Plesiochronous Digital Hierarchy) and SDH (Synchronous Digital Hierarchy) are standards for data transmission.

reason for the transition to Fiber or higher-capacity wireless backhaul solutions. It is expected that cell site backhaul will inevitably grow to hundreds of megabits per second per cell site, and gigabits per second in the aggregation networks.

### **Deployment of cells in large number particularly small cells**

- 2.4 Mini & Micro cells have recently emerged as a more cost-effective way for Telecom Service Providers (TSPs) to improve the coverage and capacity of their mobile services. The cells will no longer limit to tower cells, but there will be more and more smaller cells which are likely to be deployed in the network to deliver more capacity and coverage into the mobile network. However, the backhaul should also have the requisite scalability to cater to the large number of cells and also the capacity.

### **ASSESSMENT OF REQUIREMENT OF MICROWAVE CARRIERS**

- 2.5 As discussed above, unprecedented data growth facilitated by enhanced capabilities and availability of cheaper handsets, newer access technologies and increasing number of cells (macro/small/femto etc) has resulted in the requirement of more capacity in the mobile microwave backhaul networks. The amount of OFC laid and numbers of OFC POPs (Points-of-Presence) present in TSP's network are the obvious factors that affect the number of microwave carriers for backhaul. Microwave backhaul carrier requirement also depends on the type of radio technology used by the TSP in backhaul network and the possible interference between nearby sites. These are discussed in the subsequent section.

### **Radio technologies in backhaul network**

- 2.6 The capacity of legacy TDM-based microwave backhaul systems is limited. With technological developments, today's microwave technologies provide impressive capacity. Various modulation technologies along with different antenna array and polarization

techniques are used to increase the spectral efficiency and, thus, the capacity of the system. Some of the major technologies are discussed in successive paras.

- 2.7 **Higher order Modulation:** Higher order Quadrature Amplitude Modulation (QAM) is the most widespread digital modulation method in use today for high-capacity terrestrial microwave links; QAM employs a combination of amplitude and phase modulation. As the order of modulation goes up, more number of bits can be transferred through the same symbol rate i.e. transmission rate of information is increased as shown in Table 2.4. However, as a trade-off, higher modulation technique requires better signal-to-noise ratio (SNR) to maintain an acceptable Bit-Error-Rate (BER) level.

**Table 2.4**

<b>Modulation Scheme</b>	<b>Capacity of 28 MHz Carrier</b>
QPSK (Quadrature Phase Shift Keying)	50 Mbps
64-QAM	150 Mbps
256-QAM	200 Mbps
1024 QAM	250 Mbps

- 2.8 **Multiple-Input Multiple-Output (MIMO):** Multiple-antenna technique significantly increases the data throughput and link range without additional bandwidth or increased transmit power. It achieves this goal by spreading the same total transmit power over multiple antennas to achieve an array gain that improves the spectral efficiency (more bits per second per hertz of bandwidth) and/or to achieve a diversity gain that improves the link reliability (reduced fading).
- 2.9 **Cross-Polarization Interference Cancellation:** Cross-polarization interference cancellation (XPIC) allows assignment of the same frequency to both the vertical and horizontal polarization on a path. Therefore, twice the bandwidth becomes available using the same set of



frequencies. For example, if a block of eight frequencies were available for a 6 GHz lower band path, sixteen frequencies may be assigned each way on the same path (eight per polarization) using equipment with XPIC capability.

2.10 Above discussed techniques result in improvement in the spectral efficiency. Spectral Efficiency using different levels of modulation and carrier multiplexing technique is given in Table below:

**Table 2.5**

<b>Level of Modulation</b>	<b>XPIC</b>	<b>MIMO</b>	<b>Spectral Efficiency (bps/Hz)</b>
64 QAM	No	No	5.4
256 QAM	No	No	7.2
1024 QAM	No	No	9
1024 QAM	Yes	No	18
1024 QAM	Yes	2x2 MIMO	36

## **Interference**

2.11 In addition to the capacity of the RF links, interference is another crucially important factor which affects the requirement of backhaul microwave access carriers. By using the techniques such as higher order multiplexing, MIMO, XPIC etc, discussed in the preceding paras, although MW link capacity can be increased, but it poses more stringent requirement on the interference tolerance limit. If the interference increases, the link will be forced to switch to lower order modulation and thereby reducing the link bandwidth. In order to contain the interference, additional carriers may be required to ensure that same frequency carriers are allotted to sites which are sufficiently far off from each other.

2.12 As the number of nodes connected to a hub site<sup>6</sup> increases, and if they are using the same frequencies, then it increases the chances of interference between different RF links. This becomes more critical in a

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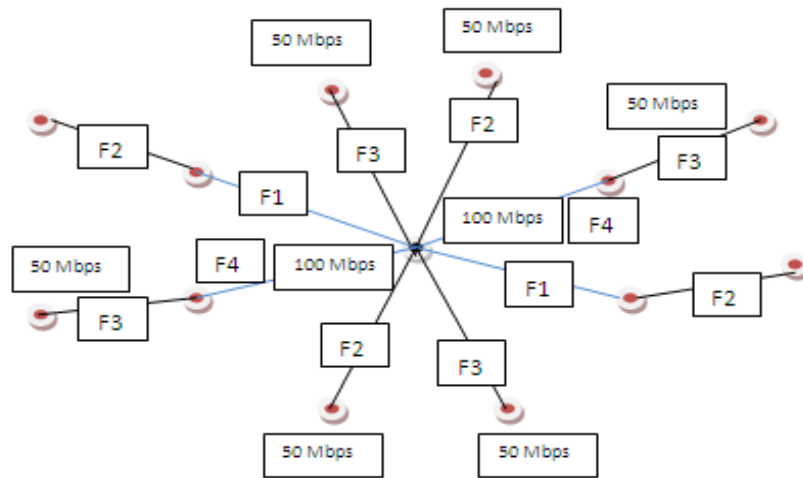
<sup>6</sup> Generally, traffic from BTS/RNC sites having MW connectivity is brought to another BTS/RNC site having OFC connectivity, which is known as hub site.

urban/dense urban setting where the intra-BTSs distances is significantly lower as compared to relatively sparsely populated area. It also depends upon the actual network topology deployed by a TSP.

2.13 Choice of topology is one of the important factors in the determination of requirement of microwave access carriers. It depends upon a number of factors such as site locations, inter-site distances, services being offered, traffic requirement at each site, spectrum availability etc. Each topology has its unique characteristics with respect to the redundancy of the links, capacity requirement of each link and tolerance to frequency interference. In the combination of star-chain topology, the capacity requirement of common links is more, as it caters to more than one site. Similarly, in a ring structure, the total available capacity of ring gets distributes to the each node and can limit the number of nodes that can be in connected in a single ring structure.

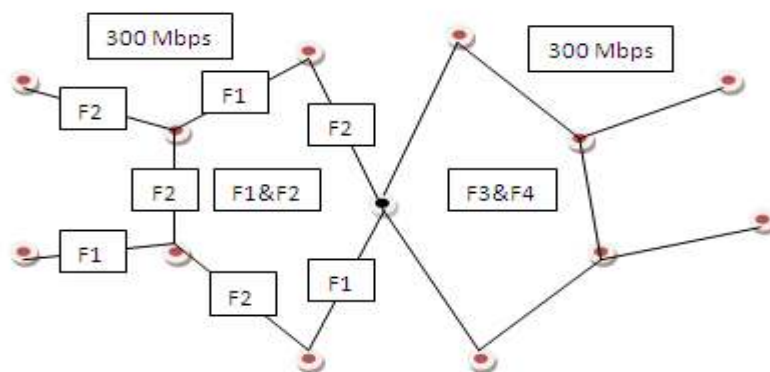
2.14 For illustration purpose, 12 numbers of sites have been shown connected thorough two different network topologies. It has been assumed that the requirement of each node is 50 Mbps and four microwave carriers are available with the TSP. In the star-chain combination (**Fig. 2.1**), the capacity requirements of some of the RF links are 100 Mbps. It can be observed that the number of nodes that can be connected in the star-chain topology is not constrained by the capacity of the MW link, but as the number of MW links towards the common nodes increase, the distance between the MW links will get reduced, thereby making interference a crucial factor in determining the number of MW links which can be connected in this topology to a common node.

**Figure 2.1**  
**Combination of Star-Chain network**



2.15 Another topology is ring-tree combination (**Fig 2.2**), in which the capacity requirements of each MW link in the ring is 300 Mbps, although there is less cluttering of MW links at a particular node. Therefore, the number of nodes that can be connected in this fashion is more likely to be constrained by the MW link capacity. When the number of such rings connected to the hub site increases, then, of course, interference mitigation will also be required.

**Figure 2.2**  
**Combination of Ring-tree network**



## **REQUIREMENT OF NUMBER OF MICROWAVE ACCESS CARRIERS FOR A TSP**

- 2.16 As discussed above, the requirement of backhaul depends upon many factors including the choice of topology adopted and technology deployed by a TSP, number of nodes to be connected to a hub site, number of OFC PoPs and to some extent on the network topology adopted by the TSP. In India, there are following category of access service providers viz. (a) TSPs deploying only 2G technologies; (b) TSPs providing services using both 2G and 3G technologies; (c) TSPs deploying BWA technologies alone; and (d) TSPs providing 2G, 3G and BWA technologies. These TSPs may be deploying their nodes in different topologies based on their network planning and number of BTSs and the number of subscribers being served by them will be varying. Therefore, their requirement of backhaul capacities would differ.
- 2.17 Requirement of bandwidth for a 2G BTS is typically only 2-4 Mbps. However, some BTSs in dense urban area may require higher capacity. If a TSP forms a ring of 15-20 sites, one microwave carrier may be sufficient from the capacity angle only. However, actual requirement of carriers may be more, considering the fact that interference needs to be controlled. If a TSP is deploying both 2G and 3G technologies, backhaul requirement at each site could be around 14 Mbps to 21 Mbps for 3G in addition to 2-4 Mbps for 2G services. If the TSP forms a ring of 10-12 sites, it may require 2 microwave access carriers. In this case also, additional backhaul carriers may be required by the TSP, due to necessity to contain the interference between the nearby sites. If a TSP provides BWA services, the backhaul requirement at each site may be 100-150 Mbps. In that case, even for a ring of 4-6 nodes, TSP may require 3-4 microwave access carriers from capacity perspective alone.
- 2.18 In December 2010, a committee was constituted by the DoT under the chairmanship of DDG (Radio), TEC, to determine the actual requirement of microwave access carriers for different services. The

report of the committee is part of the DoT's reference. The committee recommended that microwave access carriers (each of 28 MHz paired bandwidth) may be allocated as per the following Table:

**Table 2.6**

<b>Service</b>	<b>Metro &amp; A circle</b>	<b>B circle</b>	<b>C circle</b>	<b>Remarks</b>
2G	3-4	2-3	2	
3G	One additional RF pair in each category compared to 2G			
BWA	4-6	3-4	3	This is requirement for a standalone BWA operator as well as for an operator having 2G & 3G services in a service area.

2.19 On 16<sup>th</sup> March 2012, the DoT issued guidelines for allocation of Microwave Access RF carriers for BWA services as an interim measure (annexed as part of DoT's reference). As per these guidelines, a total of 4 MW Access carriers in Metros & 'A' circles and 3 in 'B&C' circles respectively may be allotted to the new BWA operators as well as existing 2G/3G operators offering BWA services (including their present assignment of MW Access carriers) on their request. Allotment will be considered in the frequency bands as per channelling plan provisioned in the National Frequency Allocation Plan -2011 amended from time to time, subject to availability and execution of legally vetted frequency agreement. Additional MW Access spectrum beyond 4 MW Access Carriers in Metros & A circles and 3 in B circles may be considered by the Government after formulation of necessary criteria.

2.20 As far as assignment of MW backbone carriers is concerned, there are no defined limits on the number of MWB carriers that can be assigned to a TSP. The assignment of MWB carriers is considered on the basis of full justification of the requirements and availability of the spectrum, on case-to-case and link-to-link basis.

2.21 In view of the foregoing discussion on the assessment of the number of MW carriers for mobile network, following issues needs deliberation: -

**Q1. How many total Microwave Access and Backbone (MWA/MWB) carriers should be assigned to a TSP deploying:**

- a. 2G technology only.**
- b. 3G technology only.**
- c. BWA technology only.**
- d. Both 2G and 3G technologies.**
- e. 2G and BWA technologies.**
- f. 2G, 3G and BWA technologies.**

**Please give rationale & justification for your answer.**

**Q2. How many MWA/MWB carriers need to be assigned to TSPs in case of 2G, 3G and BWA at the start of their services[ i.e. at beginning of rolling of services] Please justify your answer.**

2.22 In the preceding section, requirement of number of MWA and MWB carriers for the deployment in 2G, 3G and BWA networks has been discussed. The BWA operators were assigned carriers as per the guidelines of 16<sup>th</sup> March 2012 which were based on a committee report. But it is possible that some of the 2G/3G operators may already be having more MWA and MWB carriers than what is prescribed by the committee. In that case, a valid issue that needs to be consulted upon is how to align the existing assignments with the actual requirement, which shall evolve after the consultation on previous section (i.e. Q1). The TSPs may have deployed their network based upon the assigned MW carriers and withdrawing the MW carriers will require changes in their network.

2.23 In view of above, following issue needs deliberation:

**Q3. Should excess spectrum be withdrawn from existing TSPs?**

**Q4. If yes, what should be the criteria for withdrawal of excess allocation of MWA and MWB carriers, if any, allocated to the existing service providers?**

## **CHAPTER III: ASSIGNMENT OF MICROWAVE BACKHAUL ACCESS CARRIERS**

### **AVAILABILITY OF MICROWAVE CARRIERS**

3.1 In India, MW Access carriers are assigned in 13 GHz, 15 GHz, 18 GHz and 21 GHz spectrum bands. As per the data provided by WPC, all the available carriers (15 carriers in each LSA) in the 15 GHz band have already been assigned to the TSPs; hence there is no carrier available in this band. Availability of carriers in other bands is given in Table 3.1. Overall, out of total 2090 carriers, 810 carriers have been assigned and 1280 carriers are available with the WPC.

**Table 3.1**  
**Availability status of MW Access carriers**

<b>S. No.</b>	<b>Service Area</b>	<b>Number of carriers in 13 GHz</b>			<b>Number of carriers in 18 GHz</b>			<b>Number of carriers in 21GHz</b>		
		<b>Total</b>	<b>allotted</b>	<b>Balance</b>	<b>Total</b>	<b>allotted</b>	<b>Balance</b>	<b>Total</b>	<b>allotted</b>	<b>Balance</b>
1	Delhi	8	4	4	32	14	18	40	8	32
2	Mumbai	8	4	4	32	21	11	40	12	28
3	Kolkata	8	8	0	32	14	18	40	4	36
4	Maharashtra	8	8	0	32	15	17	40	5	35
5	Gujarat	8	8	0	32	14	18	40	4	36
6	A.P.	8	3	5	32	13	19	40	8	32
7	Karnataka	8	5	3	32	12	20	40	9	31
8	Tamilnadu	8	5	3	32	14	18	40	7	33
9	Kerala	8	3	5	32	10	22	40	7	33
10	Punjab	8	3	5	32	12	20	40	6	34
11	Haryana	8	3	5	32	10	22	40	5	35
12	UP(West)	8	6	2	32	11	21	40	5	35
13	UP(East)	8	6	2	32	11	21	40	5	35
14	Rajasthan	8	6	2	32	12	20	40	4	36
15	M.P.	8	3	5	32	9	23	40	4	36
16	West Bengal	8	3	5	32	8	24	40	4	36
17	H.P.	8	8	0	32	7	25	40	4	36
18	Bihar	8	7	1	32	9	23	40	5	35
19	Orissa	8	3	5	32	9	23	40	3	37
20	Assam	8	5	3	32	7	25	40	5	35
21	North East	8	5	3	32	7	25	40	5	35
22	J&K	8	3	5	32	8	24	40	5	35
	<b>Total</b>	<b>176</b>	<b>109</b>	<b>67</b>	<b>704</b>	<b>247</b>	<b>457</b>	<b>880</b>	<b>124</b>	<b>756</b>

- 3.2 MWB carriers are assigned in 6 GHz and 7 GHz spectrum bands. As per the information provided by WPC, there are total 13 MWB carriers (8 carriers in 6 GHz band and 5 carriers in 7 GHz band, each of 28 MHz) in these bands, and these are almost fully occupied.

#### **ASSIGNMENT OF MICROWAVE CARRIERS**

- 3.3 Presently, in India, the assignment of microwave backhaul carriers is made administratively, subject to availability of spectrum. Regarding the assignment of carriers for MW access and backbone networks, WPC order dated 18th April 2002 stated that- *“Assignment of frequencies for MW access and MW backbone networks for cellular operations would continue to be considered on the basis of full justification on the requirements and availability of the spectrum on case-to case and link-to-link basis after taking into consideration the interest of the other users with a view to ensure electromagnetic compatibility etc. The complete technical analysis and all related aspects of frequency assignments, including efficient use of spectrum will apply before assigning frequencies for various MW access/backbone links. There will be no obligations on the part of the Government to assign frequencies for such purposes”*.
- 3.4 In November 2006, WPC issued another order regarding the assignment methodology to be followed for MW carriers for GSM and CDMA based TSPs, which *inter alia*, stated that:
- The first microwave access carrier can be allotted for the complete service area; subsequently carriers shall be allotted based on justification and for cities/districts where it is found to be essential.
  - Assignment of frequencies for MW access and MW backbone networks for GSM and CDMA based telecom networks would continue to be considered on the basis of full justification of the requirements and availability of the spectrum, on case-to-case and link-to-link basis, after taking into consideration the spectrum



requirement of the other users with a view to ensuring electromagnetic compatibility etc. The complete technical analysis and all related aspects of frequency assignments, including efficient use of spectrum, will apply before assigning frequencies for various MW access and MW backbone links. There will be no obligation on the part of the Government to assign frequencies for such purposes.

- The assignment of MW access and MW backbone frequencies shall not be exclusive for any service provider and will be shared with other services / users.

3.5 This order of WPC was set aside by Hon'ble TDSAT on 22<sup>nd</sup> April 2010 on a petition of GSM telecom service providers and their association (COAI) on the issue of modification in the spectrum charges. The Government has filed an appeal before the Hon'ble Supreme Court against the TDSAT judgment and the matter now is sub-judice.

3.6 For the BWA technology also, the WPC/DoT has assigned the MW Access RF carriers through administrative process. The DoT issued the guidelines for allocation of MW Access RF carriers for BWA services were issued by the DoT in March 2012.

3.7 From the above discussion, it is clear that administrative assignment mechanism has been used by the DoT for the assignment of MW Access and Backbone Carriers for all telecom services viz. 2G, 3G and BWA services.

3.8 Efficient and effective allocation of spectrum is one of the prime objectives of any assignment process. The procedure adopted for assignment must be just, non-arbitrary and transparent so as to ensure the maximisation of societal goods. The assignment process should encourage investment in the deployment of networks and the implementation of new services.

- 3.9 The Hon'ble Supreme Court in its judgement dated 2.2.2012 has observed that as natural resources are public goods, the doctrine of equality, which emerges from the concepts of justice and fairness, must guide the State in determining the actual mechanism for distribution of natural resources.
- 3.10 Auction is one approach available to government and regulators to allocate spectrum to operators. Auctions are preferred mechanism, especially when demand is expected to exceed supply. Auctions are however not appropriate in all circumstances and administrative assignment is an alternative approach that may, in certain circumstances, be more appropriate for the allocation of spectrum resources.
- 3.11 Different countries follow different method of assigning backhaul spectrum to its service providers. Unlike access spectrum which is assigned mostly by auction in a number of countries, backhaul spectrum in most of the countries is generally assigned administratively on a link-by-link or case-by-case basis while taking care of various technical (spectrum bands, interference, antenna characteristics and path length) factors. In the recent past, some countries also tried to auction these microwave backhaul spectrum bands but they are very less in number. This approach was adopted by the UK, for example, for its auction in 2008 of spectrum in the 10.5, 28, 32 and 40 GHz bands. The methodology followed by some of the countries has been discussed in **Annexure-3.1**.
- 3.12 The requirement of mobile backhaul carriers by a TSP may be less at the time of rolling-out of its network. Therefore, fewer carriers may be sufficient for the TSPs initially. However, as the demand for the mobile broadband applications increases leading to higher traffic to be backhauled, there may be requirement of additional microwave access carriers, particularly in dense urban or urban areas where there is no

further scope of reducing the inter-BTS distances and reuse the already assigned carriers due to interference.

3.13 In view of the ongoing discussion, the stakeholders are requested to comment upon:

- Q5. What should be the preferred basis of assignment of MWA/MWB carriers to the TSPs i.e. 'exclusive basis assignment' or 'link-to-link based assignment'?**
- Q6. In case 'exclusive basis' assignment is preferred, whether MWA and MWB carriers should be assigned administratively or through auction. Please comment with full justifications.**
- Q7. In case 'link-to-link basis' assignment is preferred, how the carrier assignment for different links should be carried out, particularly in nearby locations?**
- Q8. Considering the fact that different TSPs may require additional carriers at different point of time, what should be the assignment criteria for allocation of additional carriers for MWA and MWB?**

#### **PRICING OF MW ACCESS/BACKBONE CARRIERS**

3.14 Apart from the assignment of spectrum, pricing of spectrum is another important aspect of spectrum management. Initially, in India, the methodology adopted for spectrum charging was based on a mathematical formula accounting for number of R.F. channels used, adjacent channel separation etc, which was affected by WPC's order dated 20<sup>th</sup> July 1995. It *inter-alia* prescribed the annual royalty charges for Microwave Links for GSM based Cellular Mobile Telephone Service as given below:

Annual Royalty (R) = M x W x C, where;

- i. M (Constant Multiplier) = 4800 for GSM Standard CMTS Microwave Networks within a city/town/service area and point-to-multipoint network;  
M= 4800 for point to point microwave link(s) with end-to-end distance less than or equal to 60 Km.  
M= 9000 for point to point microwave link(s) with end-to-end distance greater than 60 Km but less than or equal to 120 Km.  
M= 15000 for point to point microwave link(s) with end-to-end distance greater than 120Km but less than or equal to 500 Km.  
M= 20000 for point to point microwave link(s) with end-to-end distance greater than or equal to 500 Km.
- ii. Weighing Factor 'W' which is decided by the adjacent channel separation of the R.F channelling plan deployed where:  
W = 30 for adjacent channel separation up to 2 MHz.  
W = 60 for adjacent channel separation greater than 2 MHz but less than or equal to 7 MHz.  
W = 120 for adjacent separation greater than 7 MHz but less than or equal to 28 MHz.  
W = 0.15 X Number of equivalent voice channels that can be accommodated within the adjacent channel separation greater than 28 MHz.
- iii. Number of R.F. Channels used (equal to twice the number of duplex R.F. channel pairs) represented by 'C';

3.15 In April 2002, WPC modified the calculation methodology for spectrum charges for MW access links<sup>7</sup> and MW backbone networks<sup>8</sup> of GSM based cellular networks from link-to-link basis to an AGR based regime as given below:

For MW access networks

- For spectrum bandwidth up to 112 MHz in any of the circles, or 224 MHz in any of the 4 metros, spectrum charges shall be levied @ 0.25% of AGR per annum; and

<sup>7</sup> Normally in the frequency band 10 GHz and beyond.

<sup>8</sup> Generally below 10 GHz frequency band and used to provide connectivity in the circle including spur routes.

- For every additional 28 MHz or part thereof (if justified and assigned) in circles or 56 MHz or part thereof in any of 4 metro areas, additional spectrum charges shall be levied @ 0.05% of AGR per annum.
- These would also include the royalty charges for spectrum usages and license fee for the fixed stations in the Microwave access links.

#### For MW backbone networks

- For spectrum bandwidth upto 56 MHz, spectrum charges shall be levied @ 0.10% of AGR per annum; and
- For every additional 28 MHz or part thereof (if justified and assigned), additional spectrum charges shall be laid read @ 0.05% of AGR per annum.
- These would also include the royalty charges for spectrum usages and license fee for the fixed stations in the Microwave backbone links.

3.16 Through its order of 03.11.2006 followed by and its amendments dated 10.11.2008 and 19.02.2009, WPC amended the AGR based royalty charges for MW Access and MW Backbone networks of GSM based cellular networks and also made them applicable for CDMA based telecom service providers, which hitherto were determined on link-by-link basis. The revised share percentage(s) for assignment of Microwave networks of GSM and CDMA based Telecom Service Providers (TSPs) were prescribed as given below<sup>9</sup>:

**Table 3.2**

<b>Spectrum Bandwidth</b>	<b>Spectrum charges as percentage of AGR</b>	<b>Cumulative spectrum charges as percentage of AGR</b>
First carrier	0.15 %	0.15%
Second carrier	0.20%	0.35%
Third carrier	0.20 %	0.55 %
Fourth carrier	0.25 %	0.80 %
Fifth carrier	0.30 %	1.10 %
Sixth carrier	0.35 %	1.45 %

<sup>9</sup> Charges for Seventh carrier and beyond were prescribed by WPC in November 2008.

Seventh carrier	0.40%	1.85%
Eighth carrier	0.45%	2.30%
Ninth carrier	0.50%	2.80%
Tenth carrier	0.55%	3.35%
Eleventh carrier	0.60%	3.95%

Remark: Each carrier denotes paired spectrum of 28 MHz.

- 3.17 The revenue share is based on the AGR for complete service area for simplicity of calculations. These charges include the royalty charges for spectrum usages and license fee for the fixed stations in the MW access and MW backbone links. As mentioned earlier, the above spectrum charging orders were set aside by the Hon'ble TDSAT judgment dated 22.04.2010 and the matter is now sub-judice and is before the Hon'ble Supreme Court.
- 3.18 This pricing methodology, based on the AGR, is unique to India. As it is dependent upon the AGR of the TSP rather than a fixed amount, the payment liability of the TSP is less at the time of initial network roll-out. This mechanism is quite simple and non-ambiguous. Rather, it is sort of over-simplification. The slab of spectrum usage charge does not change as long as number of carriers assigned to a TSP remains the same, irrespective of the fact whether the TSP has deployed few MW RF links in the LSA or is largely dependent upon MW RF links only. It does not encourage the laying of OFC in the network and therefore, it can't be called as the optimal use of the spectrum. Different operators pay different amount of spectrum charges for the same amount of spectrum. The present methodology does not take into account the obviously relevant factors such as no. of links, distance between end points, frequency being allocated and the area of operation is whether Metro, 'A', 'B', or 'C' category LSA.
- 3.19 An obvious alternate to the present pricing mechanism is the adoption of charging on link-by-link basis as is being done by majority of the countries. In fact, from 1995 till 2002, when AGR based pricing mechanism was introduced for MW RF links for cellular networks, the pricing for all types of MW RF links was being done on link-by-link

basis only. In 2002, the pricing mechanism for MWA/MWB carriers used in cellular based networks was modified to AGR based charging, whereas for all other terrestrial MW links, formula based link-by-link based charging is continuing till date also.

3.20 Link-by-link basis may lead to more optimal utilisation of spectrum as TSPs shall use the carrier frequencies judiciously as they will have to make payment based on number of links. TSPs shall be forced to explore other possibilities such as deploying OFC, wherever feasible and economically viable. On the other hand, it will add to the complexity in the sense that charges for each and every link will need to be determined.

3.21 The Authority in its recommendations on 'Spectrum related issues' dated 13th May 2005, had dealt with the issue of spectrum charging and allocation for Terrestrial Wireless Links (other than MWA/MWB links used for the cellular based networks) and had recommended the following pricing model:

$$R = (\sqrt{M}) * W * C * A * S * P * B$$

Where:

R = the annual rate to be charged for the spectrum allocation (Rs.)

M = the distance in Kilometers between the two farthest antennas for which the link is being provisioned

W = the bandwidth in Megahertz being allocated

C = the number of RF channels used (twice the number of duplex RF channel pairs)

A = constant multiplier factor, set to equal 6,724 at that point of time for purposes of equalizing the new pricing structure with the previous one

S = the factor for discounting based on spectrum allocated on non-interference, non-protection and non-exclusive basis. When allocation is with these properties, the value should be 0.33 otherwise 1.00

P = the factor for discounting based on population density

B = the factor for discounting based on band of deployment

The values for P and B should be determined based on the following:

$$P = 0.5 \times \left( 1 - \frac{\text{population density}}{2,000} \right)$$

where population density is expressed in persons per square kilometer as per the Census of India 2001 for the district in which the link is being deployed

$$B = 0.5 \times \left( \frac{\text{center frequency of allocation} - 3,000}{20,000} \right)$$

where center frequency of allocation is defined in megahertz (MHz)

The charge for additional transceiver station required by the operator should be calculated as minimum of either Rs. 1000 or 10% of R, where R is the value for the annual spectrum usage fee as calculated above with discounts.

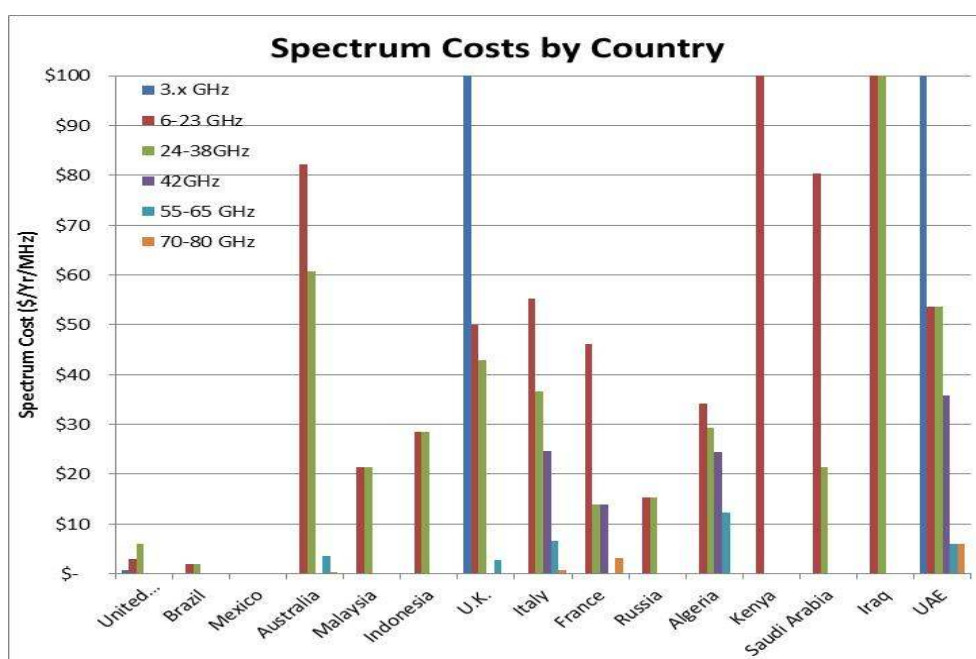
3.22 Internationally, administratively determined spectrum prices have been set by a number of regulators with a view to promote efficient spectrum use. As mentioned in **Annexure 3.2**, some of the countries have prescribed a formula for determining the price of this spectrum. The formula is generally achieved by relating the prices to the key value drivers namely:

- The amount of spectrum as demanded by the service providers.
- The geographical coverage area.
- The frequency band, with higher values in bands that are internationally harmonized.
- Lower frequencies command higher valuation due to better propagation characteristics.
- The location of use with higher values in more congested areas e.g. higher values in urban versus rural areas.
- The fraction of the national population covered as a proxy for the value of a regional as compared with a national license.

3.23 Different countries charge different spectrum prices for the same backhaul spectrum bands as shown in chart below. For e.g. USA charges a meagre amount of \$5/Year/MHz for 6–23 GHz spectrum bands whereas Australia charges \$83/Year/MHz for the same spectrum band. It can be also observed that in some countries the spectrum price is linked to the spectrum bands e.g. in some countries 6–23 GHz spectrum band command more price than 24–38 GHz band.



**Chart 3.1**



Source: Dragonwave

3.24 In the recent past some countries like UK, USA and Ireland have also tried auctioning of backhaul spectrum bands. However, frequency bands for fixed links are not normally auctioned and so there are very few market benchmarks for setting spectrum usage prices. A summary of lump sum prices obtained in auctions of fixed service bands conducted in the last five years are given in Table 3.3.

**Table 3.3**

Country	Date	Frequency Bands	Winning Bids
Ireland	June 2008	26 GHz band, each block is 2x 28 MHz for national use	€70,000 per 2x28 MHz One bidder paid an additional €30,679 per block and another paid an additional €39,609 per block to secure their preferred blocks
UK	February 2008	10 GHz band, 28 GHz, 32 GHz and 40 GHz bands	Prices for national blocks range from £60-975/MHz
USA	July 2004	880 licenses of 80 MHz in the band of 24 GHz in a range of geographic areas	Only 7 licenses sold prices ranged from \$13,000 to \$62,400 depending on the area.

Source: Study of radio Spectrum pricing System: A report for OFTA by PLUM, December 2009

3.25 In view of the above, following issue needs consultation:

- Q9. How can it be ensured that spectrum carriers assigned are used optimally and the TSPs are encouraged to move towards the OFC?**
- Q10. Should an upfront charge be levied on the assignment of MWA or MWB carriers, apart from the annual spectrum charges?**
- Q11. What should be the pricing mechanism for MWA and MWB carriers? Should the annual spectrum charges be levied as a percentage of AGR or on link-by-link basis or a combination of the two?**
- Q12. In case of percentage AGR based pricing, is there any need to change the existing slabs prescribed by the DoT in 2006 and 2008? Please justify your answer.**
- Q13. In case link-by-link based charging mechanism is adopted then:**
- (a) Should the spectrum be priced differently for different MW spectrum bands (6GHz/7GHz/13GHz/15GHz/18GHz/21 GHz/26 GHz/28GHz/32GHz/42 GHz etc)? If yes, by what formula should these be charged?**
- (b) What are the factors (viz as mentioned in para 3.22), that should appear in the formula? Please elaborate each and every factor suggested.**

#### **SPECTRUM BANDS FOR THE ALLOCATION OF MICROWAVE CARRIERS**

3.26 Conventionally licensed frequency bands from 6 GHz to 42 GHz are used for the licenced operations of the microwave point-to-point communications. Over a period of time, with the requirement arising due to congestions in these bands and demand for more capacity, wireless technology has expanded the frequency range at which commercially viable communication systems can be built and deployed. Millimeter wave is a new generation of point-to-point radio communication operating at very high frequencies, typically including

71–76 GHz, 81–86 GHz, and 92–95 GHz. Frequencies up to 300 GHz are also the subject of wireless communications research. Different frequency bands in the 6-42 GHz range as well as the frequency bands beyond this range are discussed with the point of view of their suitability and adoption by various countries for point-to-point MW links.

### **Spectrum Bands in 6-42 GHz Range**

3.27 Presently, in India, allotment of carriers for microwave point-to-point links is done in the 6 GHz, 7 GHz, 13 GHz, 15 GHz, 18 GHz and 21 GHz. As frequencies in the 6 GHz and 7 GHz bands are earmarked for the MWB carriers, only 13 GHz, 15 GHz, 18 GHz and 21 GHz are being used for MWA carriers. As mobile broadband network traffic is continuously growing, demand for PTP fixed links will also increase. It is quite likely that demand for fixed links in these frequency bands cannot be met and it may be required to use alternative frequencies. Apart from these bands, there are other frequency bands in the 6-42 GHz range, which are used for MW point-to-point links by a number of countries. A summary of spectrum bands, which are used in other countries for MW links but not being assigned for MW links in mobile network in India, is enlisted in Table 3.4.

3.28 The sub-42 GHz bands are expected to become increasingly saturated in future, as mobile broadband traffic rises and operators introduce LTE networks over the next three to five years. In particular, it will become increasingly difficult to accommodate high bandwidths required for LTE backhaul in the existing PTP fixed link bands. Mobile operators are constantly searching new backhaul alternatives (like more backhaul spectrum bands and optical fiber solutions) to increase their backhaul capacity which is expected to increase upto 100 Mbps (approx.) per site. To meet future demand for high-capacity fixed links, regulators are opening up higher frequency bands, such as 60 and 70 GHz.

**Table 3.4**

<b>Frequency Band</b>	<b>Frequency Range</b>	<b>Present allocation in India</b>
10 GHz	10.5-10.68 GHz	As per IND 74 of NFAP2011, the requirement for LMDS may be considered in the frequency band 10.15-10.65 GHz on case-by-case basis. The technical parameters of terrestrial systems in the band 10.6-10.68 GHz should be in conformity with Resolution 751(WRC 2007) of radio Regulations of ITU.
11 GHz	10.7-11.7 GHz	As per IND75 of NFAP2011, frequency bands 10.95-11.2 GHz, 11.45-11.7 GHz and 12.2-12.75 GHz may be predominantly used for fixed satellite service (down links).
26 GHz	24.5-26.5 GHz	As per IND79 of NFAP2011, requirements of LMDS and MMDS may be considered in the frequency bands 24.5-26.5 GHz and 27.5-29.5 GHz on a case-by-case basis. Requirements of EESS earth Station downlink operation in 25.5-27 GHz at few locations may also be considered on a case-by-case appropriately.
28 GHz	27.5-29.5 GHz	
32 GHz	31.8-33.4 GHz	As per IND80 of NFAP2011, requirements of high capacity dense network may be considered in the frequency bands 31.8-33.4, 37-40 GHz, 40.5-43.5, 51.4-52.6 GHz, 55.78-59 GHz and 64-66 GHz. Requirements of Deep Space Research (Space-to-Earth) in the band 31.8-32.3 GHz and protection of the same may be considered at a few locations.
38 GHz	37.0-39.5 GHz	
42 GHz	40.5-43.5 GHz	

**Issue for Consultation:**

**Q14. Should the option of assignment of MWA carriers in all the spectrum bands in 6-42 GHz range be explored in line with other countries? What are the likely issues in its assignment MWA carriers in these additional spectrum bands?**

**E-Band (71-76 GHz/ 81-86 GHz):**

3.29 Operators in many countries are looking for new wireless spectrum bands that are scalable and flexible in providing necessary bandwidth as well as also allow them to reduce wireless backhaul expenditures. One such spectrum band is E-Band spectrum (71-76 GHz, 81-86 GHz)

which has the potential to deliver high throughput in urban areas/ geography. It is sufficiently capable for ultra-high capacity point-to-point communications (fixed links) and may act as a suitable replacement for optical fibers particularly in dense urban areas where laying of optical fibers is particularly difficult.

3.30 The Federal Communications Commission (FCC) was first to regulate and allocate the E-Band spectrum in 2003, followed by Ofcom in the UK in early 2007. Regulators worldwide are also following the FCC and Ofcom's lead, by allocating this spectrum in a steady manner. Following are the key drivers of E-Band microwave as a mobile backhaul solution:

- Higher capacities per site.
- Dense network as the 3G and LTE sites will be higher than traditional 2G sites demanding pencil beam microwave ensuring less or minimal inter link interference.
- Increased data rate at lower cost per bit.
- Secure network and investment.

3.31 E-Band gives a total spectrum bandwidth of 10 GHz which is sufficient to deliver very high capacity data along a single radio path relative to conventional microwave spectrum. ITU in its recommendation No. ITU-R F.2006 and CEPT in its recommendation ECC/ REC / (05/07) have provided a detailed channel plan for this band. In FDD case there are 19\*250 MHz channels with a duplex separation of 10 GHz or less between them along with a guard band of 5 GHz. The channel sizes in E-band are sufficiently greater than conventional microwave spectrum for fixed links which creates the capability to transfer very high data rates of 1 Gbps and above.

3.32 Systems of E-band cast very narrow beams which allow deployment of multiple independent links in close proximity. A key benefit of the highly narrow beam millimeter wave links is the scalability of their deployments. Millimeter wave is well suited for network topologies such as point-to-point mesh, a dense hub-and-spoke or even a ring. Despite

being affected by rain attenuation, the robust system design and higher antenna gains allows E-Band wireless systems to provide the necessary high capacities with 99.999% carrier grade service availability at link distances of up to three kilometers.

3.33 Presently, almost 40 countries have released license plan for E-Band. In some countries like USA and UK, there is light licensing approach while in some countries like Germany, Italy, and Belgium, it is fully licensed. In Light licensed category, individual link licenses are issued by the licensor, but the licensees take their own responsibility for coordinating these links. Links are registered on Licensor's wireless telegraphy register and are given priority in the band on a 'date of registration' basis, which can be referred if an interference case arises.

3.34 In India, as per National Frequency Allocation Plan (NFAP) - 2011<sup>10</sup>, *'Use of high capacity dense network may be considered in the frequency bands 71-76 GHz and 81-86 GHz on FDD and TDD basis subject to their co-existence.'*

#### **60 GHz Band (57-64 GHz):**

3.35 Availability of large 7 GHz bandwidth in 60 GHz band, also known as V-Band, makes it suitable for very high capacity (e.g. 100Mbps ~ 1Gbps Ethernet systems) and short hop (1-2 Kms) fixed wireless systems. The 60 GHz band has unique propagation characteristics with high oxygen gas absorption of 15dB/km – i.e. the radiation from a particular radio transmitter is quickly reduced. Though, this limits the distances that 60GHz links can cover, it makes these links highly immune to interference from other 60GHz radios. Another link in the immediate vicinity will not interfere if its path is just slightly different from that of the first link, while oxygen absorption ensures that the signal does not extend far beyond the intended target, even with radios along the exact same trajectory.

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<sup>10</sup> Footnote IND 81

3.36 At 60 GHz, systems are quite susceptible to rain attenuation as raindrops are roughly the same size as the wavelength of the electromagnetic wave and they make the radio signal scatter. During heavy rain the specific attenuation can exceed 40dB/km. Hence 60 GHz Band is license exempt spectrum band in countries like USA, UK, Australia and Japan. Although, a little ecosystem is developed for this band and equipments available for this band are expensive but if planned efficiently this band has the capability of solving bandwidth crunch.

3.37 As per IND80 of NFAP2011, requirements of high capacity dense network may be considered in the frequency bands 31.8-33.4, 37-40 GHz, 40.5-43.5, 51.4-52.6 GHz, 55.78-59 GHz and 64-66 GHz. Requirements of Deep Space Research (Space-to-Earth) in the band 31.8-32.3 GHz and protection of the same may be considered at a few locations.

3.38 The issue which needs to be considered is the need to assign the MW carriers in E-band and V-Band in line with international trend. These bands are required be considered for assignment to Telecom Service Providers for roll-out of high capacity backhaul networks to cater high throughput needs that will be generated by roll-out of future technologies like LTE etc. In view of the above, the stakeholders are requested to comment upon on the following issues:

**Q15. In your opinion, what is the appropriate time for considering assignment of MWA carriers in higher frequency bands viz. E-band and V-band?**

**Q16. Should E-band be fully regulated or there should be light touch regulations?**

**Q17. What charging/pricing mechanism would be appropriate for these bands?**

**Q18. Apart from Q1-Q17, stakeholders are requested to bring out any other issue, which needs to be examined, with justification.**

## **CHAPTER-IV: ISSUES FOR CONSULTATION**

**Q1. How many total Microwave Access and Backbone (MWA/MWB) carriers should be assigned to a TSP deploying:**

- a. 2G technology only.**
- b. 3G technology only.**
- c. BWA technology only.**
- d. Both 2G and 3G technologies.**
- e. 2G and BWA technologies.**
- f. 2G, 3G and BWA technologies.**

**Please give rationale & justification for your answer.**

**Q2. How many MWA/MWB carriers need to be assigned to TSPs in case of 2G, 3G and BWA at the start of their services[ i.e. at beginning of rolling of services] Please justify your answer.**

**Q3. Should excess spectrum be withdrawn from existing TSPs?**

**Q4. If yes, what should be the criteria for withdrawal of excess allocation of MWA and MWB carriers, if any, allocated to the existing service providers?**

**Q5. What should be the preferred basis of assignment of MWA/MWB carriers to the TSPs i.e. 'exclusive basis assignment' or 'link-to-link based assignment'?**

**Q6. In case 'exclusive basis' assignment is preferred, whether MWA and MWB carriers should be assigned administratively or through auction. Please comment with full justifications.**

**Q7. In case 'link-to-link basis' assignment is preferred, how the carrier assignment for different links should be carried out, particularly in nearby locations?**

**Q8. Considering the fact that different TSPs may require additional carriers at different point of time, what should be the assignment criteria for allocation of additional carriers for MWA and MWB?**



- Q9. How can it be ensured that spectrum carriers assigned are used optimally and the TSPs are encouraged to move towards the OFC?**
- Q10. Should an upfront charge be levied on the assignment of MWA or MWB carriers, apart from the annual spectrum charges?**
- Q11. What should be the pricing mechanism for MWA and MWB carriers? Should the annual spectrum charges be levied as a percentage of AGR or on link-by-link basis or a combination of the two?**
- Q12. In case of percentage AGR based pricing, is there any need to change the existing slabs prescribed by the DoT in 2006 and 2008? Please justify your answer.**
- Q13. In case link-by-link based charging mechanism is adopted then:**
- (a) Should the spectrum be priced differently for different MW spectrum bands (6GHz/7GHz/13GHz/15GHz/18GHz/21 GHz/26 GHz/28GHz/32GHz/42 GHz etc)? If yes, by what formula should these be charged?**
  - (b) What are the factors (viz as mentioned in para 3.22), that should appear in the formula? Please elaborate each and every factor suggested.**
- Q14. Should the option of assignment of MWA carriers in all the spectrum bands in 6-42 GHz range be explored in line with other countries? What are the likely issues in its assignment MWA carriers in these additional spectrum bands?**
- Q15. In your opinion, what is the appropriate time for considering assignment of MWA carriers in higher frequency bands viz. E-band and V-band?**
- Q16. Should E-band be fully regulated or there should be light touch regulations?**
- Q17. What charging/pricing mechanism would be appropriate for these bands?**
- Q18. Apart from Q1-Q17, stakeholders are requested to bring out any other issue, which needs to be examined, with justification.**

Government of India  
Ministry of Communications & IT  
Department of Telecommunications  
WPC Wing

Sanchar Bhavan, 20 Ashoka Road,  
New Delhi – 110 001

No. J-14025/200(11)/06-NT

Dated the 3<sup>rd</sup> November 2006

**ORDER**

Sub: Spectrum charges for Microwave (MW) Access and MW Backbone  
Networks of GSM and CDMA based telecom service providers

In pursuance of the powers conferred by Section 4 of the Indian Telegraph Act, 1885 (13 of 1885) and in supersession of the Order No. L-14047/01/2002-NTG dated 18<sup>th</sup> April 2002 and in partial modification of Order No. R-11014/4/87-LR(Pt) dated 20<sup>th</sup> July 1995 and Corrigendum No. R-11014/26/2002-LR dated 1<sup>st</sup> April 2003, the central government hereby prescribes the following royalty charges (based on revenue share) for Microwave (MW) Access (normally in the frequency band 10 GHz and beyond) and MW Backbone networks (generally below 10 GHz frequency band) of GSM and CDMA based telecom service providers:

2.1 The following revenue share percentage(s) shall be levied for assignment of Microwave networks of GSM and CDMA based telecom service providers

Spectrum Bandwidth	Spectrum charges as percentage of AGR	Cumulative spectrum charges as percentage of AGR
First carrier of 28 MHz (paired)	0.15 %	0.15%
Second carrier of 28 MHz (paired)	0.20%	0.35%
Third carrier of 28 MHz (paired)	0.20 %	0.55 %
Fourth carrier of 28 MHz (paired)	0.25 %	0.80 %
Fifth carrier of 28 MHz (paired)	0.30 %	1.10 %
Sixth carrier of 28 MHz (paired)	0.35 %	1.45 %

2.2 The above spectrum charges (as percentage of AGR) are applicable for both for MW access carriers (in Metros and other telecom service areas) as well as the MW backbone carriers separately.

2.3 While the first microwave access carrier can be allotted for the complete service area, subsequent carriers shall be allotted based on justification and for the cities/ districts where it is found to be essential.

2.4 However, the revenue share would be based on the AGR for complete service area for simplicity of calculations, which is one of the main features of the revenue share regime.

Contd... 2/-

2.5 Assignment of frequencies for MW access and MW backbone networks for GSM and CDMA based telecom networks would continue to be considered on the basis of full justification of the requirements and availability of the spectrum, on case-to-case and link-to-link basis, after taking into consideration the spectrum requirement of the other users with a view to ensuring electromagnetic compatibility etc. The complete technical analysis and all related aspects of frequency assignments, including efficient use of spectrum, will apply before assigning frequencies for various MW access and MW backbone links. There will be no obligation on the part of the Government to assign frequencies for such purposes.

2.6 These charges include the royalty charges for spectrum usages and licence fee for the fixed stations in the MW access and MW backbone links.

2.7 The assignment of MW access and MW backbone frequencies shall not be exclusive for any service provider and will be shared with other services / users.

2.8 In addition, the charges for GSM spectrum ( in 900 / 1800 MHz band) and CDMA spectrum (in 800 MHz band) will continue to be levied in accordance with the existing orders on the subject.

3. These orders shall come into force from the date of issue.

S/d  
(Sukhpal Singh)  
Assistant Wireless Adviser to the Government of India

Copy to:

1. All Concerned.
2. COAI.
3. AUSPI
4. All GSM based Operators.
5. All CDMA based operators.
6. Monitoring Organisation
7. Wireless Finance Division



Government of India  
Ministry of Communications & IT  
Department of Telecommunications  
(WPC WING)

Sanchar Bhawan, 20-Ashoka Road,  
New Delhi-110001

No. J-14025/200(11)/06-NT

Dated the 10th November 2008

**ORDER**

**Subject: Spectrum Charges for Microwave Access and Backbone Networks of GSM and CDMA based telecom services.**

1. In continuation of this office Order No: J-14025/200(11)/06-NT dated 03-11-2006, regarding the Spectrum charges for Microwave Access and Backbone networks of GSM and CDMA based telecom services, the Central Government prescribes the spectrum charges (licence fee plus royalty) beyond the 6<sup>th</sup> (sixth) carrier as under:

Microwave (MW) Spectrum Bandwidth	Spectrum charges as percentage of AGR effective from 03-11-2006	Cumulative spectrum charges as percentage of AGR effective from 03-11-2006
Seventh carrier of 28 MHz (paired)	0.40	1.85
Eighth carrier of 28 MHz (paired)	0.45	2.30
Ninth carrier of 28 MHz (paired)	0.50	2.80
Tenth carrier of 28 MHz (paired)	0.55	3.35
Eleventh carrier of 28 MHz (paired)	0.60	3.95

2. All telecom service providers, presently using MW bandwidths of 3.5MHz /7MHz/ 14MHz, in different 28 MHz carrier (bands) shall take immediate steps and consolidate the same within one or two carriers of 28 MHz by 31-12-2008. From 03-11-2006 till 31-12-2008, the aggregate of such small carriers shall be charged at *full* rate if their total quantum is more than or equal to 14 MHz bandwidth in a Service Area. On the other hand, if the quantum of such small carrier's aggregate is *less* than 14 MHz bandwidth in the Service Area, the same shall be charged at *half* the rate applicable to the specific 28 MHz (Paired) bandwidth carrier.

3. With effect from 1<sup>st</sup> January 2009, one or more small carriers of 3.5MHz /7MHz/ 14MHz, falling *within* a specific 28 MHz (Paired) bandwidth carrier in a Service Area, shall be charged at the rate applicable to the *full* carrier of 28 MHz (paired) bandwidth.

4. All other terms and conditions as mentioned in the Order No: J-14025/200(11)/06-NT dated 03-11-2006 remain unchanged.

5. This issues with the concurrence of Member (Finance), telecom Commission vide Dy. No.1321-M (F)/08 dated 03-11-2008.

  
(P. Chandrasekharan)

Deputy Wireless Adviser to the Government of India

Copy to:

1. All concerned.
2. COAI and AUSPI.
3. All GSM and CDMA based Service Providers/Operators.
4. Monitoring Organization, Pushpa Bhawan, New Delhi.
5. Wireless Finance Division, DOT.

Government of India  
Ministry of Communications & IT  
Department of Telecommunications  
WPC Wing

Sanchar Bhavan, 20 Ashoka Road,  
New Delhi 110 001

No. J-14025/200(11)/06-NT

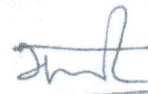
Dated the 19th February 2009

**ORDER**

Sub: Spectrum Charges for Microwave Access and Backbone Networks of GSM and CDMA based telecom services.

In continuation of this Office Order No. J-14025/200(11)/06-NT dated 10<sup>th</sup> November 2008, regarding the spectrum charges for Microwave Access and Backbone Networks of GSM and CDMA based telecom services, the Central Government makes the following amendments.

- I. In partial modification of para 2 of the Order cited above, the deadline of 31.12.2008, given to all telecom service providers using the smaller MW carrier bandwidths of 3.5 MHz / 7 MHz / 14 MHz in different 28 MHz carrier bands, to consolidate the same within one or two carriers of 28 MHz is extended to 30.6.2009.
- II. In partial modification of paragraph 2 of WPC Order No. J-14025/200(11)/06-NT dated 10.11.2008, after aggregation, the remaining small carriers (if any) shall be charged on pro rata basis using the incremental % rate of revenue share applicable to the relevant 28 MHz carrier if it is the seventh or higher carrier (of 28 MHz). In other words, the existing charging structure of half or full rate small carrier will continue to be applicable in case the aggregation of small carriers results in a balance within a carrier that is up to and including the 6<sup>th</sup> carrier.
- III. In partial amendment of paragraph 3 of the said 10.11.08 order, the date of 1<sup>st</sup> January 2009 mentioned therein shall be substituted by 1<sup>st</sup> July 2009.
2. All other terms and conditions as mentioned in the Order No. J-14025/200(11)/06-NT dated 10<sup>th</sup> November 2008 remains unchanged.
3. This issues with the concurrence of Member (Finance), Telecom Commission, vide U.O. No. 182-M(F)/08 dated 16.2.09.



(MAHA SINGH)

Assistant Wireless Adviser

- Copy to:
1. All concerned.
  2. COAI and AUSPI, All GSM and CDMA based Service Providers / Operators



Government of India  
Ministry of Communications & IT  
Department of Telecommunications  
WPC Wing  
Sanchar Bhavan, 20 Ashoka Road, New Delhi – 110001.

File No.L-14035/19/2010-BWA

Dated the 16<sup>th</sup> March, 2012

**Subject :** Guidelines for allocation of Microwave (MW) Access RF Carriers for BWA Services.

In order to formulate guidelines, following has been decided for allocation of Microwave (MW) Access RF Carriers for BWA services, as an interim measure :

Service	Metro & A Circle	B Circle	C Circle	Remarks
BWA	4 – 6 Carriers	3- 4 Carriers	3 Carriers	Requirement for a standalone BWA operator as well as for an operator having 2G & 3G services in a service area.

Note : Each MW Access RF Carrier refers to 28 MHz paired bandwidth.

2. Initially, a total of 4 MW Access Carriers in Metros & A circles and 3 in B & C circles respectively may be allotted to the new BWA operators as well as existing 2G/3G operators offering BWA services on their request. Allotment will be considered in the frequency bands as per channeling plan provisioned in National Frequency Allocation Plan-2011 amended from time to time, subject to availability and execution of legally vetted frequency agreement.
3. Additional MW Access spectrum beyond 4 MW Access Carriers in Metros & A circles and 3 in B circles may be considered by the Government after formulation of necessary criteria.
4. The rate for Spectrum Usage Charges shall be paid as prescribed by WPC Wing of DOT from time to time.
5. These guidelines shall come into force from the date of issue.

  
( R. K. Saxena )

Deputy Wireless Adviser to the Government of India.

To,

1. All concerned.
2. The Director, Wireless Monitoring Organization, New Delhi.
3. The Director (Finance), Wireless Finance Division, DOT, WPC Wing, Sanchar Bhawan, New Delhi.
4. Concerned service providers/associations.
5. WPC Wing website.



Government of India  
Ministry of Communication & Information Technology  
Department of Telecommunications  
(WPC Wing)

SL No-19(I)

F. No. L-14035/19/2010-BWA

Dated, the 26<sup>th</sup> November, 2012

To,

The Secretary,  
Telecom Regulatory Authority of India,  
MTNL Doorsanchar Bhawan,  
Jawahar Lal Nehru Marg,  
New Delhi-110002

Subject : Recommendation for allocation and pricing of Microwave Access (MWA) and  
Microwave Backbone (MWB) RF carriers.

Sir,

Presently, the charging of Microwave Access & Backbone (MWA/MWB) carriers is regulated as per the AGR based annual spectrum usage charges mentioned in this Ministry's orders No.J-14025/20(11)/06-NT dated 03.11.2006, its amendments dated 10.11.2008 and 19.02.2009 respectively as may be modified by the Govt. from time to time (copy enclosed) and allotment, as provisioned in National Frequency Allocation Plan, subject to availability of spectrum. The above spectrum charging orders were challenged in Hon'ble court of TDSAT by GSM telecom service providers and their association (COAI) vide petition no. 122 of 2007. These orders were set aside vide Hon'ble TDSAT judgment dated 22.04.2010. The orders are now subjudice in view of a Civil appeal no.D29714 of 2010 filed by the Government before Hon'ble Supreme Court against the above TDSAT judgment.

2. It may be mentioned that in another judgment dated 18.07.2011 passed by Hon'ble TDSAT i.r.o. petition no.116 of 2007 filed by AUSPI and other CDMA operators v/s Union of India, part of the judgment order states that ".....we, therefore, are of the opinion that the impugned order dated 3<sup>rd</sup> November, 2006 can not be struck down, as being discriminatory or violative of the National Telecom Policy." The same has been placed before Hon'ble Supreme Court in case of Civil Appeal No.D29714 of 2010. The appeal has been admitted on 07.09.2012 and the hearing is to take place.

3. In 2010 timeframe, pending decision of Hon'ble Supreme Court on the above spectrum charging orders, Telecom Commission in its meeting held on 29.10.2010 decided to allot two(2) nos. of MW Carriers to new operators offering 3G/BWA services to ensure timely roll out of their services. The TC also directed to conduct a technical study for actual requirement of MW Access carriers for different services (2G/3G/BWA).

4. Accordingly, two MW Access carriers were allotted to new BWA operators, after executing the legally vetted Frequency Agreement (copy enclosed). It may be mentioned that MW Backbone carriers are being allotted in the bands 6/7GHz and MW Access carriers above 10GHz bands, in general, usually with the bandwidths of 28MHz, 14 MHz, 7MHz (paired). (Ref. Annexure-I)

5. The Government constituted a committee under chairmanship of DDG (Radio), TEC, DOT which submitted its report to determine the actual requirement of MW Access Carriers for different services on 07.10.2011 (copy enclosed). The committee made the following recommendations:

- i) The service providers should lay more fibers so as to reduce dependence on the RF pairs to the extent possible.
- ii) E-band radios should be used for increased capacities and additional availability of RF carries. Similarly, other bands may also be explored for this purpose



iii) The following table may be referred for allocation of RF carriers:

Service	Metro & A circle	B Circle	C Circle	Remarks
2G	3-4	2-3	2	
3G	One additional RF pair in each category compared to 2G.			
BWA	4-6	3-4	3	This is the requirement for a standalone BWA operator as well as for an operator having 2G & 3G services in a service area

Note : Each MW Access RF Carrier refers to 28 MHz paired bandwidth.

6. The above Recommendations were submitted and it was considered that the recommendations of the committee may be accepted for reference for allotment of MW Access carrier to various 2G/3G/BWA service providers subject to the operators abiding to pay by the methodology and MW Carriers spectrum usage charges mentioned in order No.J-14025/20(11)/06-NT dated 03.11.2006, its amendments dated 10.11.2008 and 19.02.2009 as may be modified by the Government from time to time.

7. Following were taken into consideration :

7.1 After considering many factors viz. technical facts and considering recommendations of the committee, AGR based charging method of MW Access Carrier, requirement of the BWA operators, also the spectrum availability and keeping in view of the relevant NIA provisions, a total of 4 MW Access Carriers in Metros & A circles and 3 in B & C circles respectively may be allotted initially, to the BWA operators as well as existing 2G/3G operators offering BWA services on their request, as per channeling plan provisioned in National Frequency Allocation Plan amended from time to time subject to availability of spectrum and only after execution of a legally vetted Frequency Agreement by the operators.

7.2 There is a clause in the Frequency Agreement for MWA Network under ISP-BWA License that "The Licensee hereby agrees that as and when the rates for Microwave Access are revised by a rule or regulation made under the Telegraph Act, the Licensee will be bound by the said revised rates and hereby agrees and undertake to pay the said rates as and when revised." (Clause 4).

7.3 Beyond the above initial allotment of MW Access Carrier for BWA services, the further allotment would be subject to roll out, growth and generation of AGR from the service and other criteria, if any, to be decided by the competent authority. Accordingly, additional MW Access spectrum beyond 4 MW Carriers in Metros & A circles and 3 in B circles may be considered by the Government after formulation of necessary criteria.

7.4 In this regard, it may be mentioned that as per provision under NIA clause 2.3, subject to the usual processes, terms and conditions, and applicable charges, the Government shall make available spectrum for these purposes under the prevailing terms and conditions (specified by the WPC), subject to availability. However, it must be noted that these frequencies are not part of the Auctions, are not bundled with the 3G spectrum or the BWA spectrum and payment of the Successful Bid Amount does not grant usage rights to such backhaul spectrum. Separate charges, as applicable, are payable for backhaul spectrum.

7.5 To impose charges on all the operators in respect of all their existing and future MW Access carrier allotments. These charges may include charges as a percentage of presumptive AGR wherever the actual AGR is NIL or delayed, from the date of allotment of MW carriers besides the spectrum usage charges as per AGR based annual spectrum charges mentioned in orders dated 03.11.06, 10.11.08 & 19.02.09.



7.6 Existing 2G/3G operators having MW carriers more than the limits as described in Para 5(iii) above, may have to surrender the excess, as it was observed that most of the existing 2G GSM/CDMA & 3G operators are having MW Access carriers either comparable or more than that recommended by the committee. It may be mentioned that all 3G service providers are existing 2G operators, and are operational as on date. Further, in some cases of the existing 2G/3G operators, the implementation of recommendations of the committee may also require consideration of allotment of additional MW carriers, wherever the existing allocation is less than the minimum recommended numbers. Since, the spectrum charging orders of MW carriers have been challenged by existing 2G/3G operators and are subjudice before the Hon'ble Supreme Court, and the immediate withdrawal of carriers in concerned cases might result into revenue loss to the Government, the decision in the matter of 2G/3G services may be taken separately after consulting TRAI.

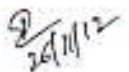
7.7 Keeping in view the recommendations of CANR (Committee on Allocation of Natural Resources), the necessary criteria for allocation and pricing of MW Access and Backbone carriers (MWA/MWB) for all the new service providers and the existing service providers needs to be decided by the Government in consultation with TRAI. Further, the necessary criteria for allotment of additional MW Access carriers beyond the initial allocation and the charges to be levied as mentioned above in respect of all operators also needs to be decided by the Government in consultation with TRAI.

8. Based on above considerations, and until the consultation process with TRAI are completed and a final decision is taken by the Government after receiving the necessary TRAI recommendations in this regard, guidelines have been issued as an interim measure i.r.o. allotment of MWA carriers for BWA services vide L-14035/19/2010-BWA dated 16<sup>th</sup> March, 2012 (copy enclosed). WPC Wing has initiated the process of assignment of MW Access carriers to the operators offering BWA services, only after execution of legally vetted Frequency Agreement.

9. In view of above and to regulate allocation and pricing of MW Access and Backbone carriers in an efficient manner, recommendations are sought on the following issues :

- a. Methodology for Allocation & Pricing of Microwave Access & Backbone (MWA / MWB) carriers for new service providers and the existing service providers for initial and additional allocations of MW Access and MW backbone carries.
  - b. Criteria for withdrawal of excess allocation of MWA & MWB carriers from existing service providers.
  - c. Annual spectrum usages charges & criteria for pricing for different bands of MWA & MWB carriers including any upfront charges, alongwith date of applicability.
10. TRAI is requested to furnish their recommendations on above in terms of clause 11 (1)(a) of TRAI Act 1997 as amended by TRAI Amendment Act 2000.

This issues with the approval of Secretary (T).



(R.K. Saxena)  
Deputy Wireless Adviser to Govt. of India  
Tel : 23359561

Enclosures :

- (i) Spectrum Charging Orders.
- (ii) Frequency Agreement.
- (iii) Committee Recommendation i.r.o. MW Access carriers.
- (iv) Guide lines dated 16<sup>th</sup> March, 2012.
- (v) Copies of Hon'ble TDSAT judgment dated 22.04.2010 i.r.o. petition no. 122 of 2007 and judgement dated 18.07.2011 i.r.o. petition no.116 of 2007.
- (vi) Annexure-I .

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Government of India  
Ministry of Communications & IT  
Department of Telecommunications  
WPC Wing

Sanchar Bhavan, 20 Ashoka Road,  
New Delhi - 110 001

No. J-14025/200(11)/06-NT

Dated the 3<sup>rd</sup> November 2006

ORDER

Sub: Spectrum charges for Microwave (MW) Access and MW Backbone Networks of GSM and CDMA based telecom service providers

in pursuance of the powers conferred by Section 4 of the Indian Telegraph Act, 1885 (13 of 1885) and in supersession of the Order No. L-14047/01/2002-NTS dated 18<sup>th</sup> April 2002 and in partial modification of Order No. R-11014/4/87-LR(Pt) dated 20<sup>th</sup> July 1995 and Corrigendum No. R-11014/26/2002-LR dated 1<sup>st</sup> April 2003, the central government hereby prescribes the following royalty charges (based on revenue share) for Microwave (MW) Access (normally in the frequency band 10 GHz and beyond) and MW Backbone networks (generally below 10 GHz frequency band) of GSM and CDMA based telecom service providers:

2.1 The following revenue share percentage(s) shall be levied for assignment of Microwave networks of GSM and CDMA based telecom service providers.

Spectrum Bandwidth	Spectrum charges as percentage of AGR	Cumulative spectrum charges as percentage of AGR
First carrier of 28 MHz (paired)	0.15 %	0.15%
Second carrier of 28 MHz (paired)	0.20%	0.35%
Third carrier of 28 MHz (paired)	0.20 %	0.55 %
Fourth carrier of 28 MHz (paired)	0.25 %	0.80 %
Fifth carrier of 28 MHz (paired)	0.30 %	1.10 %
Sixth carrier of 28 MHz (paired)	0.35 %	1.45 %

2.2 The above spectrum charges (as percentage of AGR) are applicable for both for MW access carriers (in Metros and other telecom service areas) as well as the MW backbone carriers separately.

2.3 While the first microwave access carrier can be allotted for the complete service area, subsequent carriers shall be allotted based on justification and for the cities/districts where it is found to be essential.

2.4 However, the revenue share would be based on the AGR for complete service area for simplicity of calculations, which is one of the main features of the revenue share regime.

Contd... 27-

2.5 - Assignment of frequencies for MW access and MW backbone networks for GSM and CDMA based telecom networks would continue to be considered on the basis of full justification of the requirements and availability of the spectrum, on case-to-case and link-to-link basis, after taking into consideration the spectrum requirement of the other users with a view to ensuring electromagnetic compatibility etc. The complete technical analysis and all related aspects of frequency assignments, including efficient use of spectrum, will apply before assigning frequencies for various MW access and MW backbone links. There will be no obligation on the part of the Government to assign frequencies for such purposes.

2.6 - These charges include the royalty charges for spectrum usages and licence fee for the fixed stations in the MW access and MW backbone links.

2.7 - The assignment of MW access and MW backbone frequencies shall not be exclusive for any service provider and will be shared with other services / users.

2.8 - In addition, the charges for GSM spectrum (in 900 / 1800 MHz band) and CDMA spectrum (in 800 MHz band) will continue to be levied in accordance with the existing orders on the subject.

3. These orders shall come into force from the date of issue.

(Sukhpal Singh)

Assistant Wireless Adviser to the Government of India

Copy to:

1. All Concerned.
2. COAI.
3. AUSPI.
4. All GSM based Operators.
5. All CDMA based operators.
6. Monitoring Organisation.
7. Wireless Finance Division.



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Ministry of Communications, Govt. of India  
Department of Telecommunications  
(MPC WBS)

Sardar Bhawan, 20, Ashoka Road,  
New Delhi-110001

No. J-14025/200(11)/06-NT

Dated: 10th November 2008

ORDER

**Subject:** Spectrum Charges for Microwave Access and Backhaul Networks of GSM and CDMA based telecom services.

1. In continuation of this office Order No. J-14025/200(11)/06-NT dated 03-11-2006, regarding the Spectrum charges for Microwave Access and Backhaul networks of GSM and CDMA based telecom services, the Central Government prescribes the spectrum charges (licence fee plus royalty) beyond the 6<sup>th</sup> (sixth) carrier as under:

Microwave (MW) Spectrum Bandwidth	Spectrum charges as percentage of AGR effective from 03-11-2006	Cumulative spectrum charges as percentage of AGR effective from 03-11-2006
Seventh carrier of 28 MHz (paired)	0.40	1.05
Eighth carrier of 28 MHz (paired)	0.45	2.30
Ninth carrier of 28 MHz (paired)	0.50	2.80
Tenth carrier of 28 MHz (paired)	0.55	3.35
Eleventh carrier of 28 MHz (paired)	0.60	3.95

2. All telecom service providers, presently using MW bandwidths of 3.5MHz/7MHz/14MHz, in different 28 MHz carrier (bands) shall take immediate steps and consolidate the same within one or two carriers of 28 MHz by 31-12-2008. From 03-11-2006 till 31-12-2008, the aggregate of such small carriers shall be charged at full rate if their total quantum is more than or equal to 14 MHz bandwidth in a Service Area. On the other hand, if the quantum of such small carrier's aggregate is less than 14 MHz bandwidth in the Service Area, the same shall be charged at half the rate applicable to the specific 28 MHz (Paired) bandwidth carrier.

3. With effect from 1<sup>st</sup> January 2009, one or more small carriers of 3.5MHz/7MHz/14MHz, falling within a specific 28 MHz (Paired) bandwidth carrier in a Service Area, shall be charged at the rate applicable to the full carrier of 28 MHz (paired) bandwidth.

4. All other terms and conditions as mentioned in the Order No. J-14025/200(11)/06-NT dated 03-11-2006 remain unchanged.

5. This issues with the concurrence of Member (Finance), telecom Commission vide Dy. No. 12-1-M (F)/08 dated 03-11-2008.

(P. Chandrasekharan)  
Deputy Wireless Adviser to the Government of India

**Copy to:**

1. All concerned.
2. COAI and AUSPI.
3. All GSM and CDMA-based Service Providers/Operators.
4. Monitoring Organization, Sardar Bhawan, New Delhi.
5. Wireless Finance Division, DOT.

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Government of India  
Ministry of Communications & IT  
Department of Telecommunications  
WPC Wing

Sanchar Bhavan, 20 Ashoka Road,  
New Delhi 110 001

No. J-14025/200(11)/06-NT

Dated: the 19th February 2009

ORDER

Sub. Spectrum Charges for Microwave Access and Backbone Networks of GSM and CDMA based telecom services.

In continuation of this Office Order No. J-14025/200(11)/06-NT dated 10<sup>th</sup> November 2008, regarding the spectrum charges for Microwave Access and Backbone Networks of GSM and CDMA based telecom services, the Central Government makes the following amendments:

- I. In partial modification of para 2 of the Order cited above, the deadline of 31.12.2008, given to all telecom service providers using the smaller MW carrier bandwidths of 3.5 MHz / 7 MHz / 14 MHz in different 28 MHz carrier bands, to consolidate the same within one or two carriers of 28 MHz is extended to 30.6.2009.
  - II. In partial modification of paragraph 2 of WPC Order No. J-14025/200(11)/06-NT dated 10.11.2008, after aggregation, the remaining small carriers (if any) shall be charged on pro rata basis using the incremental % rate of revenue share applicable to the relevant 28 MHz carrier if it is the seventh or higher carrier (of 28 MHz). In other words, the existing charging structure of half or full rate small carrier will continue to be applicable in case the aggregation of small carriers results in a balance within a carrier that is up to and including the 6<sup>th</sup> carrier.
  - III. In partial amendment of paragraph 3 of the said 10.11.08 order, the date of 1<sup>st</sup> January 2009 mentioned therein shall be substituted by 1<sup>st</sup> July 2009.
2. All other terms and conditions as mentioned in the Order No. J-14025/200(11)/06-NT dated 10<sup>th</sup> November 2008 remains unchanged.
  3. This issues with the concurrence of Member (Finance), Telecom Commission, vide U.O. No. 182-M(F)/08 dated 16.2.09.



(MAHA SINGH)

Assistant Wireless Adviser

Copy to:

1. All concerned.
2. COAI and AUSPI, All GSM and CDMA based Service Providers / Operators

110

(3)

Government of India  
Ministry of Communications  
Department of Telecommunications  
(MPC Wing)

Sanchar Bhavan,  
20, Ashoka Road,  
New Delhi-110 001

Dated: 20 July, 1995

No. A-11014/4/B7-LR(PT)

ORDER

Subject: Royalty Charges for the grant of licence to establish, maintain and work GSM Cellular Mobile Telephone Service, microwave point-to-point and point to multi-point networks under the provisions of the Indian Telegraph Act, 1885.

1. In pursuance of powers conferred by Section 4 of the Indian Telegraph Act, 1885 (15 of 1885), the Central Government hereby prescribes the following rates of royalty charges for the grant of licence to establish, maintain and provide service for:-

- 1.1 GSM Cellular Mobile Telephone Service (CHTS);
- 1.2 Fixed Radio Relay Network; and
- 1.3 Point to multi-point network.

2. The Order shall come into force from 20th July, 1995.

3. Royalty rates for GSM Cellular Mobile Telephone Service

the royalty shall be charged on the basis of:

- i) Fixed Multiplier -  $M$  ( $M=4800$ )
- ii) Number of RF channels each of 200 kHz bandwidth represented by  $C$
- iii) Constant Multiplier  $K$  ( $K=8$  for GSM Standard)
- iv) Weighting factor  $W$  dependent on the number of subscribers where  $W=1000$  for every thousand subscriber or part thereof.

Then Annual Royalty  $R = M \times C \times K \times W$  cont.

Royalty for Microwave Links for:

- 4.1 Cellular Mobile Telephone Services;
- 4.2 Fixed Radio Relay Networks;
- 4.3 Point to Multi-Point Networks;

5. The royalty for Microwave Links for CMTS shall be charged on the basis of :

5.1 Constant Multiplier M where:

M = 4800 for GSM Standard CMTS Microwave Networks within a city/town/service area and point-to-multipoint network;

M = 4800 For Point to Point Microwave Link (s) with end-to-end distance less than or equal to 60 kms

M = 9000 For point-to-point microwave Link (s) with end-to-end distance greater than 60 but less than or equal to 120 kms.

M = 15000 For point-to-point microwave Link(s) with end-to-end distance greater than 120 but less than or equal to 500 kms.

M = 20000 For point-to-point microwave link(s) with end-to-end distance greater than 500 kms

5.2 Weighting Factor "W" which is decided by the adjacent channel separation of the R.F. channelling plan deployed where:

W= 30 For adjacent channel separation upto 2 MHz

W= 60 For adjacent channel separation greater than 2 MHz but less than or equal to 7MHz

W= 120 For adjacent separation greater than 7 MHz but less than or equal to 28 MHz

$W=0.15 \times$  (Number of equivalent voice channels that can be accommodated within the adjacent channel separation greater than 28 MHz)

5.3 Number of R.F. channels used (equal to twice the number of duplex R.F. channel pairs) represented by "C"; cont.

Then,

Annual Royalty  $R = M \times W \times C$

6. Circuits above shall be charged on 24 hrs. basis.

7. Royalty for the first year may be charged on quarterly basis, the quarter being January-March, April-June, July-September and October-December.

8. This issues with the concurrence of the Rates & Costing Branch vide their U.O. No. 247-R&C/S dated 10.7.1945.

9. Separate order for rates of licence fee may be seen.

(S. Venkatasubramanian)  
Asstt. Wireless Adviser to the  
Government of India  
Tel.

Copy to:

1. All Concerned
2. The Director, Monitoring Organisation, New Delhi.
3. Dep'tt. of Telecom. (Rates & Costing Branch), New Delhi.





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File No. L-14047/01/2002-NTG  
Government of India  
Ministry of Communications and Information Technology  
Department of Telecommunications  
Wireless Planning & Coordination (WPC) Wing  
\*\*\*\*\*

Dated: April 18, 2002

### ORDER

**Subject: Spectrum charges for MW access and backbone networks of cellular networks**

This is in continuation to the Government of India Order Nos. L14041/06/2000-NTG dated 22.9.2001 and 1 February, 2002 specifying spectrum charges for GSM frequencies in 900/1800 MHz band.

2. Assignment of frequencies for MW access and MW backbone networks for cellular operations, would continue to be considered on the basis of full justification of the requirements and availability of the spectrum, on case-to-case and link-to-link basis, after taking into consideration the interest of the other users with a view to ensuring electromagnetic compatibility etc. The complete technical analysis and all related aspects of frequency assignments, including efficient use of spectrum, will apply before assigning frequencies for various MW access backbone links. There will be no obligation on the part of the Government to assign frequencies for such purposes. Migration to revenue sharing concept is basically to simplify the system for charging of spectrum and in no way it should be linked to the grant of frequency spectrum.

3. Subject to the above conditions, the spectrum charges for microwave access networks (normally in the frequency band 10 GHz and beyond) would be as given below.

- for spectrum bandwidth upto 112 MHz in any of the circles, or 224 MHz in any of the 4 metros, spectrum charges shall be levied @ 0.25% of AGR per annum and
- for every additional 28 MHz or part thereof (if justified and assigned) in circles or 56 MHz or part thereof in any of 4 metros areas, additional spectrum charges shall be levied @ 0.05% of AGR per annum.

3.1 These will include the royalty charges for spectrum usages and licence fee for the fixed stations in the MW access links.

4. Further, the spectrum charges for MW backbone networks to provide connectivity in the circle including spur routes, (generally below 10 GHz frequency band) would be as given below.

- for spectrum bandwidth upto 56 MHz, spectrum charges shall be levied @ 0.10% of AGR per annum and
- for every additional 28 MHz or part thereof (if justified and assigned), additional spectrum charges shall be levied @ 0.05% of AGR per annum.

Contd-2

- 4.1 These will include the royalty charges for spectrum usages and licence fee for the fixed stations in the MW backbone links.
5. The assignments of MW access and backbone frequencies shall not be exclusive for any service provider and will be shared with other services/users.
6. In addition, the charges for GSM spectrum (900/ 1800 MHz band) will continue to be levied in accordance with Government of India orders No. L-14041/06/2000-NTG dated 22.9.2001 and 01.02.2002.
7. The above package, of spectrum charging on percentage revenue share will be available to the cellular operators on the premise that it is accepted in its entirety and simultaneously all legal proceedings, with regard to spectrum charging, instituted by them or COAI against the Government in Courts and Tribunals (TDSAT) etc shall be withdrawn. The cellular operators without prejudice should make payments of all outstanding dues of spectrum charges in accordance with the applicable Government of India orders within a month from the date of issue of this order.
8. This Order will come into force from the date of issue.
9. Acceptance of the above shall be communicated to this Ministry within seven days from the date of issue of this Order.

(u) 18/4/02

(K.R. MAHENDRA KUMAR)  
Assistant Wireless Adviser to the Government of India

To:

1. Cellular Operators Association of India, New Delhi. This refers to their Letter No. TVR/COAI/013 dated 16.01.2002.
2. All Cellular Operators, including BSNL, and MTNL.



Government of India  
Ministry of Communications & IT  
Department of Telecommunications  
WPC-Wing

No:R-11014/26/2002-LR

Date: 01.04.2003

**CORRIGENDUM**

Sub: Royalty Charges for the grant of licence to establish, maintain and work **Terrestrial Microwave Point-to-point** and point to multi-point networks under the provisions of the Indian Telegraph Act, 1885.

In pursuance of the powers conferred by section 4 of the Indian Telegraph Act, 1885(13 of 1885) and in partial modification to this Ministry's order No.R-11014/4/87-LR (Pt) dated 20<sup>th</sup> July 1995, it has now been decided that Para 4 and Para 5 of the above order be read as

1. (Para-4 ) Royalty for all kind of terrestrial Microwave Links for

4.1 Fixed Microwave Radio Relay Networks

4.2 Point to Multi-point Networks

2. (Para-5) The royalty for all kind of terrestrial Microwave Links shall be charged on the basis of

5.1 Constant Multiplier M where

M=1200 for point to point Microwave Link(s) with end-to-end distance  
Less than or equal to 05Kms.

M=2400 for point to point Microwave Link(s) with end-to-end distance  
greater than 05Kms but less than or equal to 25Kms.

M=4800 for point to point Microwave Link(s) with end-to-end distance  
greater than 25Kms but less than or equal to 60Kms.

M=9000 for point to point Microwave Link(s) with end-to-end distance  
greater than 60Kms but less than or equal to 120Kms.

M=15000 for point to point Microwave Link(s) with end-to-end distance  
greater than 120Kms but less than or equal to 500Kms.

M=20000 for point to point Microwave Link(s) with end-to-end distance  
greater than 500Kms.

Contd-2

5.2 Weighting Factor 'W' which is decided by the adjacent channel separation of the R.F. channeling plan deployed where:

W= 30 for adjacent channel separation upto 2MHz

W= 60 for adjacent channel separation greater than 2MHz, but less than or equal to 7MHz

W= 120 for adjacent channel separation greater than 7MHz, but less than or equal to 28MHz

W= (120)+(30 for each additional 7MHz Bandwidth or part thereof) for adjacent channel separation greater than 28MHz

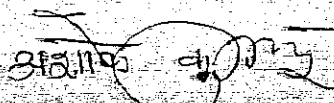
5.3 Number of RF channel used (equal to twice the number of duplex RF Channel pairs) represented by 'C'

Then, Annual Royalty  $R = M \times W \times C$

3. The order shall come into force from the date of issue.

4. These issue with the concurrence of wireless finance branch vide their Dy. No.WPF/139/03 dated 26.03.2003.

5. All other conditions of the order no. R-11014/4/87-LR (Pt) dated 20<sup>th</sup> July 1995, as amended from time to time, will remain the same.

  
(Ashok Kumar)

Joint Wireless Adviser to the Govt. of India

Copy to :

1 All Concerned

2 The Director, Wireless Monitoring Organisation, New Delhi

3 The Director (Finance), DOT, WPC Wing, Sanchar Bhavan, New Delhi

✓ 4. DWA (v)

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-22-

OFFICE OF THE  
ADDITIONAL SOLICITOR GENERAL  
(Ms. Indira Jaising)

Dy. No. 1499/AS/CAS/11 dated 7.5.2011

Subject: **In the matter of legal vetting on frequency agreement for Microwave Access Network under ISP-BWA Licence.**

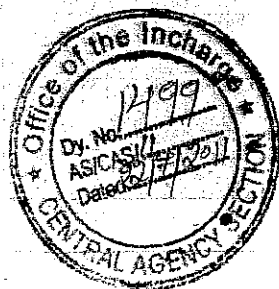
The instant file has been referred to me by the Ministry of Communication, Department of Telecom for my considered opinion and legal vetting of the draft agreement prepared by the Department for the purpose of fixing tariff for Microwave Access Network.

2. It is to be pointed out that the instant file was initially referred to me in February, 2011 wherein I was asked to give my opinion regarding what method of tariff fixation should be adopted by the Department in the absence of any Office Order of the concerned Department in case of Microwave Access Network. Office Order dated 2.11.2006 fixing tariffs was challenged by Cellular Operators Association of India (COAI) before the Telecom Dispute and Settlement and Appellate Tribunal (TASAT) in 2007 and the same was struck down by the Tribunal on the ground of fixing tariff unilaterally and in the absence of any rules and regulations.

3. I vide opinion dated 22.2.2011 advised the Department that a contract between the Department and the Service Provider would be a lawful manner for fixation of tariff. This was recommended for the reason that in such a case the tariff fixation would be bilateral by informed consent of both parties to the contract and not unilateral.

4. Based on my opinion, the Department has now prepared a draft agreement and has sought my legal opinion of the same. Dr. S.M. Sharma, Deputy Wireless Advisor met me on 16.7.2011 and discussed the draft agreement wherein I gave my inputs.

5. I am herewith attaching a copy of the agreement which has vetted by me and the necessary changes have been made.



Incharge, CAS  
22/7/2011

54  
Sh. S. K. Mahapatra  
JS & LA (DOF)  
22/7/11

Indira Jaising  
(Ms. Indira Jaising)  
Addl. Solicitor General  
21.7.2011

Government of India  
Ministry of Communications & IT  
Department of Telecommunications  
(Wireless Planning and Coordination Wing)  
Sanchar Bhavan, 20, Ashoka Road  
New Delhi-110001, India

FREQUENCY AGREEMENT

FOR

MICROWAVE ACCESS NETWORK UNDER ISP-BWA LICENSE

No. 2-14035/20/2010-BWA Dated 25.07.2011

21/07/2011

for  
(Sandeep Kumar Ghosh)



## FREQUENCY AGREEMENT

### FOR

### MICROWAVE ACCESS NETWORK UNDER ISP-BWA LICENSE

THIS AGREEMENT is made on 29/07/2011 by and between the President of India acting through Shri Ram Lagan Ram Assistant Wireless Advisor (T), Wireless Planning and Coordination Wing, Department of Telecommunications (DOT), Government of India, Sanchar Bhawan, 20 Ashoka Road New Delhi-110 001 (hereinafter called the WPC Wing) of the FIRST PARTY.

AND

M/s Infotel Broadband Services Pvt. Ltd. a company registered under the Companies Act, 1956, having its registered office at C-157, Industrial Area, Phase-VII, Mohali-160055, Punjab, India acting through Shri Sandeep Kumar Chahal authorised signatory (hereinafter called the LICENSEE) of the SECOND PARTY.

WHEREAS by the virtue of the provisions of Section 4 of Indian Telegraph Act, 1885, the WPC Wing of the Department of Telecommunications has privilege to issue decision or agreeing to frequencies for microwave access network subject to availability AND WHEREAS the LICENSEE has requested to the Party of the first part to grant a have LICENSE to establish, install operate and maintain Microwave Access Network to provide Broadband Wireless Access SERVICE hereinafter called 'BWA'.

2/11/2015

*(Signature)*  
Sandeep Kumar Chahal

AND WHEREAS in pursuance of the said Section 4 of Indian Telegraph Act, 1885 the license agreement dated 15.11.2007 was entered into between the LICENSEE and LICENSOR therein being the Department of Telecom.

AND WHEREAS Clause 36 of the said license dated 15.11.2007 provides that a separate specific authorization and license called WPC license shall be required from the WPC Wing of the Department of Telecommunications, permitting utilization of appropriate frequency/band for the establishment and possession and operation of wireless element of the telecom services, under specified terms including permission for authorization of WPC license.

AND WHEREAS in pursuance of the said Clause the LICENSEE request Party of the First part the WPC Wing to issue microwave access frequencies to the LICENSEE to establish, install, operate and maintain MICROWAVE ACCESS NETWORK on the terms and conditions appearing hereinafter.

AND WHEREAS Department of Telecom (WPC Wing) Party of the First Part fixed spectrum charges for the utilization of the said Microwave Access Spectrum by WPC Wing, DOT Order No.L-14047/01/2002-NTG dated 18<sup>th</sup> April, 2002 amended vide WPC Wing, DOT Order No.J-14025/200(11)/01 dated 3<sup>rd</sup> November, 2006 and its amendment dated 10<sup>th</sup> November, 2008 and 1 February, 2009.

AND WHEREAS the Party of the First Part WPC Wing had fixed the said Microwave Access Spectrum fees by circular order dated 3<sup>rd</sup> November, 2006 issued by the Wireless Advisor to Government of India and by which the Department fixed the tariff for access to said Microwave Access Spectrum

21/11/2007

for



AND WHEREAS the Hon'ble TDSAT by its Order dated 22<sup>nd</sup> April, 2010 struckdown the order of 2006 mainly on the ground that the said Order was not delegated legislation nor a regulation as per the Indian Telegraph Act, 1885 and the tariff could not be fixed unilaterally by an Order.

AND WHEREAS the Union of India through DOT has filed a Special Leave Petition No. CA D29714 of 2010 against the said order and the matter is pending in the Hon'ble Supreme Court.

AND WHEREAS in the light of the said TDSAT Order dated 22<sup>nd</sup> April, 2010 it has become necessary to fix the tariff by bilateral negotiation between the WPC Wing and LICENSEE to operationalise Clause 36 of the License Agreement dated 15<sup>th</sup> November, 2007.

AND WHEREAS the WPC Wing Party of the First Part offered to the LICENSEE tariff rate mentioned in WPC Order No. J-14025/200(11)/06-NT dated 3<sup>rd</sup> November, 2006 and its amendments dated 10<sup>th</sup> November 2008 and 19<sup>th</sup> February, 2009 and the LICENSEE has agreed to the said rates.

AND WHEREAS the LICENSEE has given its informed consent being fully aware of the proceedings mentioned therein.

AND WHEREAS the LICENSEE has desired to enter into agreement paying the License fee as per Clause 36 of the said license agreement fixing the tariff being used for said Microwave Access Spectrum.

Now the license is being entered into on terms and conditions agreeable to by the WPC Wing and the LICENSEE which are incorporated herein.

21/05/08

h

**NOW THIS AGREEMENT WITNESSETH AS FOLLOWS:**

1. In furtherance of the ISP license agreement dated 15<sup>th</sup> November, 2007 and in particular Clause 36 there under whereby a separate specific authorization and license shall be required from the WPC Wing, DOT for utilization of appropriate frequency/band for establishment and possession of wireless element of the telecom service under the License Agreement of Internet Service under specified terms and conditions including payment for said authorization / WPC License. WPC Wing hereby assigns MW Access Spectrum to the LICENSEE on terms thereto for the said use of Microwave Access Network at the rate specified hereunder and as agreed by the WPC Wing and the LICENSEE by putting their signatures on this document.

2. The LICENSEE agrees to pay to the WPC Wing at the following rates for the use of the use of MW Access Spectrum.

Spectrum Bandwidth	Spectrum charges as percentage of AGR	Cumulative spectrum charges as percentage of AGR
First carrier of 28 MHz(paired)	0.15%	0.15%
Second carrier of 28 MHz(paired)	0.20%	0.35%
Third carrier of 28 MHz(paired)	0.20%	0.55%
Fourth carrier of 28 MHz(paired)	0.25%	0.80%
Fifth carrier of 28 MHz(paired)	0.30%	1.10%
Sixth carrier of 28 MHz(paired)	0.35%	1.45%
Seventh carrier of 28 MHz(paired)	0.40%	1.85%
Eighth carrier of 28 MHz(paired)	0.45%	2.30%
Ninth carrier of 28 MHz(paired)	0.50%	2.80%
Tenth carrier of 28 MHz(paired)	0.55%	3.35%
Eleventh carrier of 28 MHz(paired)	0.60%	3.95%

3. The WPC Wing Party of the First Part hereby agrees to assign Microwave Access Spectrum subject to its availability which will remain valid during the

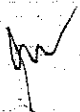
21/11/2015

*[Signature]*

period of the validity of the License Agreement dated 15<sup>th</sup> November, 2007 or such extended period of the said License dated 15<sup>th</sup> November, 2007 as may be agreed upon and subject to the payment of Spectrum charges unless terminated earlier in terms of the Agreement dated 15<sup>th</sup> November, 2007.

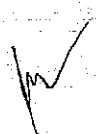
4. The LICENSEE hereby agrees that as and when the rates for Microwave Access are revised by a rule or regulation made under the Telegraph Act, the LICENSEE will be bound by the said revised rates and hereby agrees and undertake to pay the said rates as and when revised.
5. The LICENSEE hereby agrees and unequivocally undertakes to fully comply with all terms and conditions stipulated in the FREQUENCY AGREEMENT and without any deviations or reservations.
6. Unless otherwise mentioned or appearing in the text, the Guidelines for provision of Broadband Wireless Access Service as per Notice Inviting Application (NIA) issued by this Ministry on 25<sup>th</sup> February, 2010 including the application for BWA Spectrum shall form part and parcel of this AGREEMENT.
7. EFFECTIVE DATE of this WPC LICENSE is 29/07/2019 i.e. the date of signing of this FREQUENCY AGREEMENT.
8. The spectrum charges shall be payable on quarterly basis in advance i.e. within 15 days of the commencement of the each quarter.
9. Interest and penalty in case of short payment or delayed payment and all other financial conditions shall be governed by terms and conditions of License Agreement dated 15<sup>th</sup> November, 2007 for Spectrum charges and the orders issued by WPC Wing from time to time.

2-11-2019



10. Financial Bank Guarantee (FBG) shall be submitted by the licensee as per terms and conditions of License Agreement dated 15<sup>th</sup> November, 2007.
11. The frequencies earmarked/assigned under this agreement shall not be activated unless wireless operating license is obtained from WPC Wing.
12. ITU/TEC and other international standard equipment conforming to National Frequency Allocation Plan (NFAP) shall be deployed in MW Access Network for which frequencies under this agreement shall be issued.
13. WPC Wing reserve the right to change / modify frequencies assigned to licensee without any notice in the interest of public or for proper conduct of telegraphs and or for the security considerations.
14. This frequency agreement shall be governed by the provision of Indian Telegraph Act 1885 and Indian Wireless Telegraphy Act 1933 and telecom Regulatory Authority of India Act 1997 as modified or replaced from time to time.
15. The LICENSEE agrees that for all future allocations of Microwave Access Spectrum and Microwave Backbone Spectrum will be made on a non-discriminatory manner subject to its availability and spectrum usage charges will be uniform in relation to all BWA Operators.
16. The Party of the First Part further agrees that there would be no discrimination in the Spectrum allotment principle and also Spectrum Usage Charges will be uniform in relation to all BWA Operators vis-à-vis other service providers using BWA spectrum.

2/11/2005 198



IN WITNESS WHEREOF the parties hereto have caused this AGREEMENT to be executed through their respected authorized representative on the

29/07/2011.

21/07/2011

Signed for and on behalf of the President of India

Ghosh

Signed on behalf of M/s

By Mr. Ram Lagan Ram

by Mr. Sandip Kumar Ghosh

Assistant Wireless Advisor (T)

Authorised Signatory and holder

Wireless Planning and Coordination Wing

of General Power of Attorney

Deptt. Of Telecom (DOT)

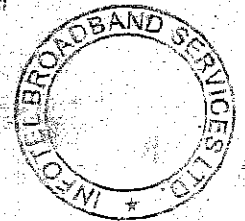
dated 25/07/2011 executed in

Government of India  
राम लगन राम  
RAM LAGAN RAM  
सहायक दूरसंचार सलाहकार  
Assistant Wireless Advisor  
दूरसंचार विभाग, भारत सरकार  
Deptt. of Telecom, Govt. of India  
नई दिल्ली / New Delhi

accordance with the Resolution

Dated 07/06/2011 passed by the

Board of Directors



IN THE PRESENCE OF:

1. Signature [Signature]  
Name Khagendra Singh

1. Signature [Signature]  
Name AVNISH KUMAR SAINI

Occupation Service

Occupation SERVICE

Address M-3, Sec-3, Rajendra Nagar, Sahibabad, GZB

Address 132 BHAGWAN NAGAR P.O. JANGPORA, NEW DELHI - 110014

2. Signature [Signature]  
Name BRAHMA KAL SINGH

2. Signature [Signature]  
Name KAPIL DEV KUMAR

Occupation Service

Occupation SERVICE

Address H-M-0-115 Vijay Nagar, Narela, Delhi-40

Address C-11, FIRST FLOOR SOUTH EXTENSION II NEW DELHI-110049

TELECOMMUNICATION ENGINEERING CENTRE  
DEPARTMENT OF TELECOMMUNICATION  
K. L. BHAWAN, JANPATH, NEW DELHI

\*\*\*\*\*

No. TEC/R/MW Access Carriers/2011

Dated: 07.10.2011

To;

Wireless Advisor  
Sanubar Bhawan  
New Delhi

Subject: Report of Committee for assessment of MW Access Carriers

Ref: Your office letter no L-14021/18/2001-NT dated 15/12/2010.

The report of committee, set up vide letter under reference, is attached for further disposal please.

IAS/WA  
07/10/11

This may pl be put up  
on file for approval of competent  
authorities -  
Annexure  
7/x/11

S. K. Srivastava  
(U.K. Srivastava)  
DDG (Radio)  
TEC, New Delhi

Copy sent  
10/10/11  
IWA  
DDG (Radio)  
10/10/11

7/10/11

PR put up  
as decided by IWA on  
or new file.

AWA (BWA)

10/10/11  
10/10/11

## REPORT OF THE COMMITTEE TO DETERMINE ACTUAL REQUIREMENT OF MW ACCESS CARRIERS FOR DIFFERENT SERVICES

### 1. Background:

- 1.1 A Committee comprising of the following officers was constituted to determine actual requirement of microwave access carriers, as per WPC memo no. L-14021/18/2007-NT dated 15.12.2010:

- i. Shri U. K. Srivastava, DDG (Radio), TEC
- ii. Dr. S. M. Sharma, DWA, WPC
- iii. Shri Bal Kishan, Director (R), TEC

The Committee co-opted Shri Rajeev Bansal, Director (M-1), TEC.

### 2. Microwave Backhaul Carriers:

Microwave backhaul carriers are typically used by Cellular Mobile operators for their backhaul operations. These carriers are used for providing the last mile connectivity to the BTS by way of implementing the Abis link and also for aggregating the backhaul network in such a way so as to use the RF frequencies to their maximum possible geographical extent. These carriers are used in pairs for carrying transmit and receive signals separately.

### 3. Microwave Radio Network:

Microwave radios play a vital part in the entire network, as they are used to connect the BTS, NodeB and eNodeB to the aggregation location.

Microwave radio typically requires licensing of costly spectrum to ensure that the frequency used is not being used by another operator in the surrounding area, which could result in serious interference and services can abruptly be stopped.

The allocated MW frequency spots can be used efficiently with an effective network plan.

### 4. Capacity Projections for a Mobile Network:

Mobile services in India were started with the basic features of voice with no data requirement.

These services are becoming popular with the decreasing prices and increasing VAS portfolio day by day.

RS  
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Being a critical part of entire mobile network system, transport network should be designed in such a way, that it can support the current bandwidth and scalable to sustain the future requirement.

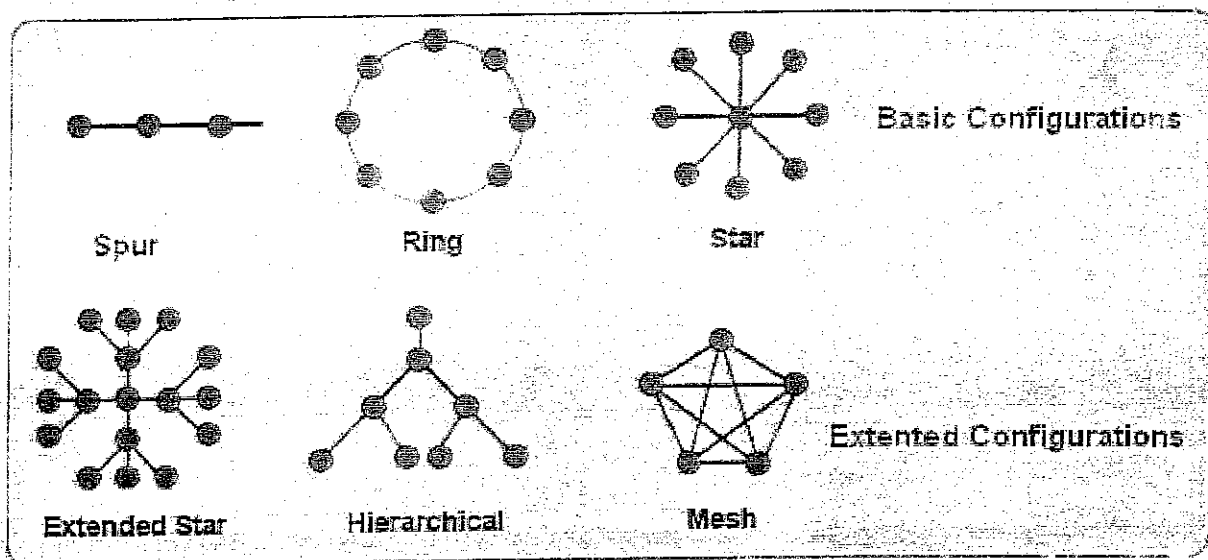
Per site bandwidth requirement is different for different technology i.e.

2G Network	1E1 per site with the primary RF spectrum of 4.4MHz $\equiv$ 2mbps
3G Network	21 Mbps (with HSPA +)
BWA Network	100 – 150 Mbps

Page 4

### 5. Microwave Network Topologies:

Six types of network topologies are commonly used for efficient microwave network design. The topology is selected based on the site location, capacity and propagation conditions. No network can be made with only one topology, all type of network configurations are required to be used in a network.



#### 5.1 MW Chain / Spur Topology

One or more number of sites connected in sequence, where every intermediate site is connected to only two sites in the chain.

In the figure below, If same frequency is assigned in the complete network, Transmit frequency at A and D will interfere the receiver at D and A respectively. Therefore the frequency allocated to the last hop i.e. C-D, has to be a different frequency than A-B link.

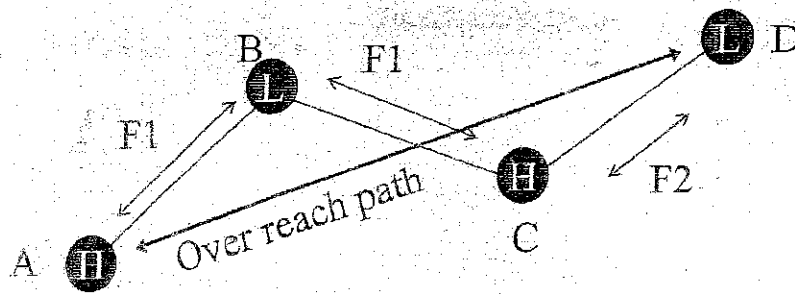
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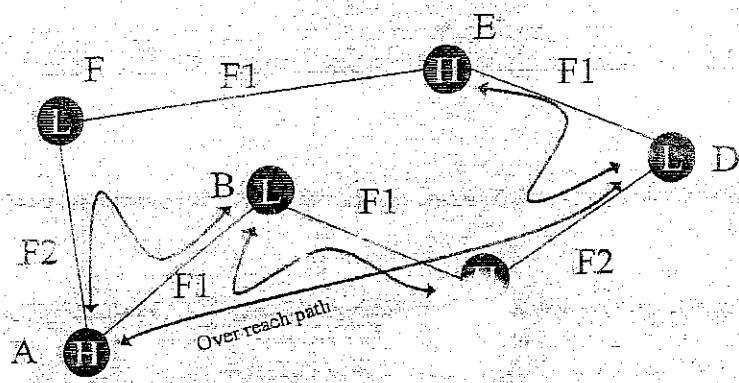
Minimum two frequency spots are required to make a MW chain route.

This topology is not recommended for more than 2 sites and also in case of 3G due to the non-protection of BTS or Node Bs. However in case ring topology is not feasible in a particular location, chain topology can be approved and to be reviewed case to case basis.

## 5.2 Ring Topology

High degree of availability in the network can be achieved by deploying Ring topology. And this becomes a necessity for some of the 3G applications requiring continuous data streaming. Now a day's all microwave equipment of high capacity or low capacity, supports ring protection configurations.

This is the most desired topology; however mostly feasible in the access network (intra-city network) only. Figure below indicates the different type of interference discussed above.



## 5.3 Star NW Topology

Each BTS is connected to the BSC/Hub Site independent of the rest of the traffic. This causes high concentration of hops at Hub site resulting in high frequency interference and threshold degradation. This topology is mostly used in areas with LOS limitations, OFC POP limitation. This is not suited for city network. The BTS will not have redundant path and only option is to have equipment redundancy. In

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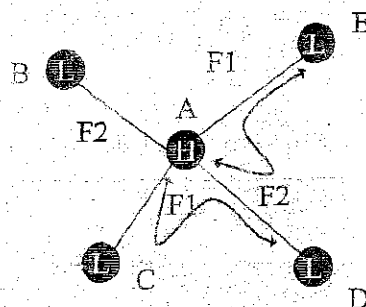
*[Signature]*  
Shivani

*[Signature]*  
S. S. S.

star topology no. of hops Emanate from hub location is limited by the Interference Level and Tower Loading only not by the Hops count.

This topology is recommended where more no. of hub locations are available and high capacity is to be transported to nearest sites with a limited no. of site dependency.

With the help of two different frequency spots theoretically 6 hops can emanate from one location. However in most of the cases only 4 hops can be installed at one location. That means with more no. of frequency channels, more no. of radio links can be installed at one location.



## 6. Technologies in Microwave Equipment

Before 3G all the MW equipments used in the network are based on Time Division Multiplex (TDM) technology, which supports Plesiochronous Digital Hierarchy (PDH) and Synchronous Digital Hierarchy (SDH) frames only. Current install base is consisting only two types on MW radios in the network, as described below.

### 6.1 Plesiochronous Digital Hierarchy (PDH) radios

When operators began to implement the network for 2G services, PDH or the plesiochronous digital hierarchy radios were the most reliable and flexible radios. As the primary choice of MW network planner. It provides flexible features like extendable capacity and modulation, which keeps the overall cost of PDH radios low and increases the life time of radio.

Most of the sites were connected on PDH MW hops as the bandwidth required per BTS 1E1 or 2Mbps only. PDH radios support different levels of throughput ranging from 4E1, 8E1 to 16E1 by changing the channel bandwidth from 7, 14MHz to 28MHz respectively. High system gain makes PDH radios highly reliable, more robust for longer distance and in interfering environment too.

As such PDH technology does not support ring closures. However, by using additional equipment, which supports Sub Network Connection Protection (SNCP) on E1 granularity, ring topology is made possible. Ring topology feature along with the low equipment cost, makes the usage of PDH radios continued for more time.

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The weaknesses that PDH faced, paved way for the introduction and use of the SDH systems. Although the PDH proved to be a breakthrough in the field of digital transmission, the weaknesses that made it less demanded includes:

1. Limited capacity (Maximum 16E1)
2. Asynchronous structure that is rigid.
3. Restricted management capacity.
4. Non availability of world standard on the digital formats.
5. No optical interfaces standard and without an optical level, networking is not possible

## 6.2 Synchronous digital hierarchy (SDH) Radios

SDH Radios were introduced in the Indian GSM networks in the year 2000. These radios can support 63E1, ring topology and auxiliary channels in one frame. Initially these radios were used in the backbone hops to carry huge BW from one city to the MSC in different city. Since the SDH radios use high modulation of 128QAM, the receiver sensitivity reduces. This overall reduction in system gain decreases the maximum hop length with the same antenna size, when compared with PDH radios.

SDH radios then replaces the PDH near to the Point of Presence (POP), BSC and MSC due to the heavy traffic flow from all the BTS spread over an area.

### Benefits of a SDH radio

1. optical interfaces
2. capability of powerful management
3. Common International standard digital format
4. synchronous structure is simple and flexible
5. cost effective and easy traffic cross connection capacity and add and drop facility
6. forward and backward compatibility
7. High capacity of 155Mbps ~ 63E1s
8. Ring support for high level reliability
9. performance management
10. Security and access management
11. configuration management and the event or the alarm management

## 6.3 Hybrid Radios

Traditionally, to transmit Ethernet traffic over TDM microwave radios, operators relied upon external adapters that encapsulated Ethernet packets within TDM frames i.e. EoSDH (Ethernet over SDH). But with this method large amount of BW is gone waste in overheads. To overcome this problems Hybrid radios were developed.

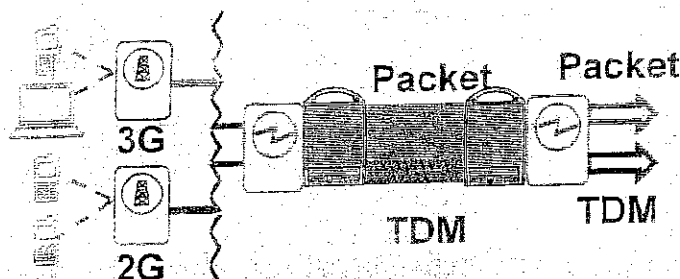
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Hybrid microwave systems combined the traditional features of TDM transport with the ability to transport Ethernet/IP traffic natively over the same radio path. With the combination of both TDM and Ethernet traffic, operators could support the backhaul of new IP-enabled base stations (NodeB) deployed with their existing TDM (2G) sites. Hybrid systems support the legacy TDM flavor with same Next Generation Packet Microwave transport features, such as high throughput and low latency, integrated Layer 2 switching.



Hybrid radios simply add side-by-side processing of TDM data, without any encapsulation of Ethernet/IP over TDM and without emulation of TDM over Ethernet/IP. They are ideal for operators who want a gradual migration path to all-IP and save a large amount of Capex involved in TDM radios to support 2G traffic, giving a fresh lease of life to TDM BTS in the network. Hybrid systems enable operators to seamlessly introduce IP transport at their own pace, without disruption of TDM-based voice services, for low cost and low risk network evolution.

Hybrid microwave solutions can also support all required Packet Microwave features, such as high packet throughput with low latency, integrated Pseudowires (PWE), packet-based synchronization and advanced Operations and Maintenance (OAM). In addition, Hybrid systems also include native support for TDM for legacy traffic, giving operators the best of all possible network migration solutions in a single platform.

In order to increase the standard SDH capacity of 63E1 to 75 E1s, the SDH radio is converted in to PDH frame by converting the Section Over Head part of SDH frame into traffic bearing E1s, which is why sometimes referred as Super SDH also.

These radios are modular by design. With the variety of interfaces, they can support any combination of E1 and Ethernet traffic based on the user requirement.

Hybrid radios support variable capacity by changing the modulation. Generally change of modulation from lower to higher can be done through a end user license carrying an additional fee.

Some of the new features added into the new generation Hybrid radios are:

- a. **Adaptive Code Modulation (ACM):** Changes modulation automatically, in bad weather conditions modulation decreases as against the total outage in PDH /

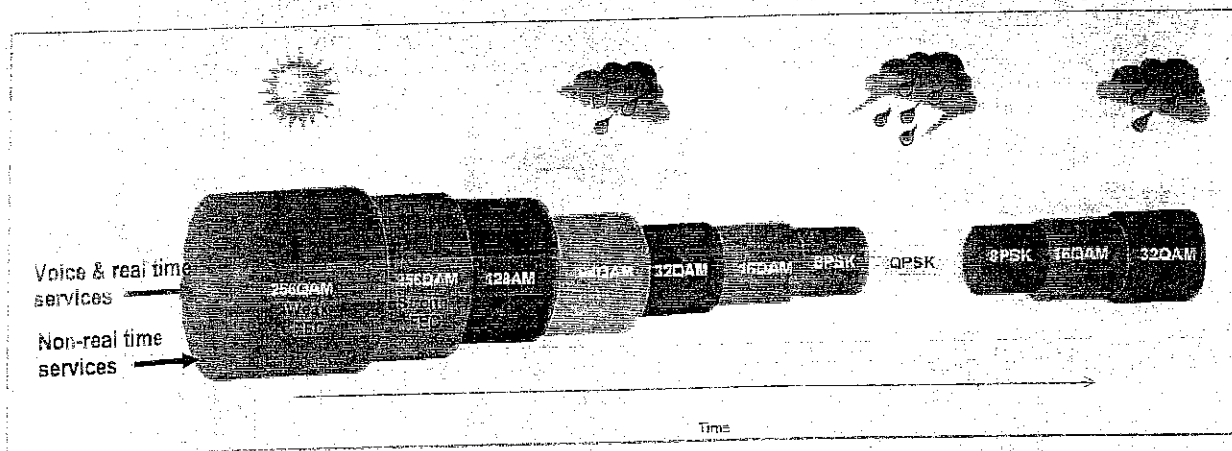
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SDH radios, however decrease on modulation hits the throughput but link can be stable and high priority data will not be blocked.



b. **Selectable Modulation** based on the propagation conditions: Links can be planned for different modulation levels for normal operation.

ACM Level	Modulation @ 28MHz	No. of E1s	Ethernet Capacity (Mbps) (Depending on frame size)
1	QPSK	16	38 - 54
2	8 PSK	22	53 - 76
3	16 QAM	32	77 - 110
4	32 QAM	44	103 - 148
5	64 QAM	54	127 - 182
6	128 QAM	66	156 - 223
7	256 QAM	75	183 - 262

c. Scalable capacity from 32Mbps to 180Mbps

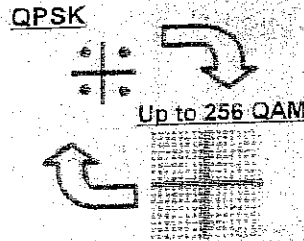
d. High Modulation of 256QAM for higher throughput.

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- e. Variable TDM and Ethernet traffic based on the user requirement
- f. Integrated ADM functionality
- g. Native IP transport with built-in Layer 2 Ethernet switching
- h. Nodal functionality (integrating the no. of indoor unit (IDU) into one chassis) and provide cross connect functionality and Ethernet switching between them

All the above features are software configurable.

#### 6.4 Packet Radios

There is no industry standard definition of what constitutes a Packet Microwave radio, which has led to a variety of claims from various vendors. However Packet radio can be defined as Packet radios support only Ethernet traffic to transport over the air and even TDM traffic is first converted to Ethernet and then transported over the air. Sometimes it also referred as All-IP radios.

Practically microwave products are available since 2003, with integrated Ethernet interfaces (10/100/1000BaseT), which enabled Ethernet packets to be mapped directly onto the radio airframe, without any encapsulation, which is the fundamental definition of a Packet Microwave radio. But used for the industrial application only.

Packet Microwave systems offer the ability to support TDM traffic using circuit emulation technologies, such as Pseudowires (PWE). Circuit emulation introduces additional overhead and latency, so it is more suitable for when TDM traffic volumes are relatively low, or can be deployed at aggregation nodes, where TDM traffic from multiple base stations can be optimized and then transported further back over an all-IP transport link.

1. Packet Microwave platforms offer a perfect solution for 4G mobile networks, providing a highly scalable solution that leverages new technology features, which enables higher throughputs to keep pace with expected growth in demand. Legacy TDM traffic is supported using emulation technologies such as Pseudowire (PWE)
2. Packet synchronization support (e.g., IEEE 1588v2, Synchronous Ethernet)
3. Support for all outdoor configuration

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4. Proprietary IDU can be replaced by a L2 switch, up to 10 directions can be connected on one IDU/Switch.

7. **Technology Upgrade - Ethernet Support in Microwave:**

The introduction of 3G and the services that 3G can provide are not likely to be supported by existing Networks. Therefore, the capacity requirements compared with 2G/ 2.5G, is necessitating an upgrade of current microwave links to support 3G networks.

The legacy installed base of microwave does not support the native Ethernet, but new generation radios are supporting:

- a. High modulation to transmit high capacity throughput.
- b. Hybrid microwave radios (Ethernet traffic with or without good old TDM traffic)
- c. Nodal functionality (integrating the no. of indoor unit (IDU) into one chassis) and provide cross connect functionality and Ethernet switching between them
- d. Adaptive Modulation (An automatic modulation selector based on the environment conditions)
- e. Transmit in two adjacent spots in one stream (to carry double the capacity as that of one spot)

There are practical difficulties in upgrading existing PDH/SDH links to hybrid w.r.t. availability requirement (>99.99%) within the same frequency band.

A possible upgrade path is available with a particular emphasis on the spectrum allocations that are necessary to support the upgrade.

8. In order to understand the complexity of the issue and requirement of the industry, the following presentations were requested and arranged from various stakeholders:

- (a) NEC India Pvt. Ltd.
- (b) Hupac Telecommunications Co. Pvt. Ltd.
- (c) Agni Technologies India Pvt. Ltd.
- (d) Ericsson India Pvt. Ltd.
- (e) Aircel Limited
- (f) Airtel
- (g) Infotel Broadband Services Ltd.
- (h) Tikona Digital Networks

The following descriptions are based on the understanding developed during the course of these presentations:

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a) *Existing 2G Network*

Current GSM network is majorly dependent on microwave radio infrastructure to link up the MSC - BSC - BTS connectivity. The vast majority of links are PDH with capacities of 8/16E1 in 15/18/23 GHz for the hop lengths between <1-15Km.

Typically 1E1 - 2E1 per site capacity is required and per site BW demand can be met with above said PDH hops.

Approximately 8 - 12 BTS sites of GSM can be connected on a 16E1 PDH link. If there are two RF pairs, 4 to 6 hops (2 to 3 rings) can be terminated on a POP location. Therefore, a total of 32 - 60 sites can be connected through microwave and the ratio of OFC:POP: Microwave hops can be approximately 1:50.

In dense urban areas where POP ratio is less than the required 1:50 ratio, SDH radio is a viable solution to meet the capacity requirement. With the introduction of SDH radios, high capacity rings can support 32 - 54 sites per ring. Therefore, the OFC requirement comes down to 1:125.

In this scenario, for GSM network 3 - 4 RF pairs are sufficient in dense urban and class B circle environment and 2-3 are sufficient in the Class C circles.

b) *Evolution to 3G Network*

3G network is majorly built on mix of OFC and microwave radio infrastructure to link up the MSS - RNC - NodeB connectivity. Typically, 10 to 21Mbps dynamic BW is required per 3G sites in addition to the existing 2G requirement of 1E1 to 2E1 per site. As a general practice, the BW required for 3G is Ethernet (due to variable BW advantages over fixed BW in ATM), upgradation of TDM MW radios to Hybrid MW radios is a must, which can support TDM and Ethernet simultaneously for the co-located sites of 2G and 3G.

This hybrid microwave network has to be designed to carry heavy traffic with a network availability of 99.999%. To achieve this high availability in any network, ring topology is deployed. In order to have maximum sites protected through ring topology, using existing RF pairs, additional OFC hops are needed.

With the help of two RF pairs, maximum three MW rings can be terminated on a single POP location. The usable capacity per MW ring is limited to 128Mbps considering 80% utilization of 160 Mbps capacity, using 28 MHz channelization bandwidth and 128 QAM modulation. Therefore, around 8 sites of 14Mbps (10Mbps for 3G and 4Mbps for 2G) can be connected through a hybrid MW ring, with the OFC: MW site ratio of 1: 24 (considering three MW rings as mentioned above).

To provide BW of 21Mbps per 3G site, number of sites needs to be reduced to 5 in each ring (21Mbps for 3G and 4Mbps for 2G). So four MW ring needs to be

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terminated on a single POP to keep OFC: MW ratio 1:24. In order to terminate four rings, practically four number of RF pairs are required.

c) *Forward path to BWA Network*

100Mbps per site can be supported by LTE with today's available technology and goes up to 150MBPS in LTE Advance. For building LTE network along with 2G and 3G network, 100Mbps of bandwidth per BWA site is required in addition to bandwidth needed for 2G and 3G sites. Therefore, a total of around 125 Mbps is required at each site having 2G, 3G and BWA collocated.

This high capacity hybrid/packet microwave network should be designed with a network availability of 99.999%. Due to the huge BW requirement MW ring size has to be smaller than the ring deployed for 3G network, as less number of sites can be served in a microwave ring.

The maximum capacity, that a present day MW radio can deliver is 160Mbps, using the presently provided channel BW. Some vendors do claim rate up to 200Mbps but this figure cannot be taken as a rule.

Therefore considering 3 BWA sites per ring, only 50Mbps can be provisioned on a MW link, and even with the OFC: MW ratio of 1:9. 9-10 BWA sites can be connected on a OFC POP with the help of 3 ring terminated.

In order to provide 100Mbps per site, two RF carriers can be utilized simultaneously on a single link. In these scenario three MW rings utilizing two carriers for each hop can be planned.

Considering the above engineering restrictions, which are site capacity and equipment limitation specific, 4-6 RF pairs may also be justified, especially in big cities.

A separate overlay topology can be a good solution to support BWA BW requirement. But to build a overlay MW network additional RF pairs are needed. Simultaneously, more OFC pops are required to meet the huge capacity demand.

After the links for BWA are installed, network optimization should be carried out by re-terminating and re-routing the entire network for interference free network.

9. **Issues impacting requirement of microwave frequencies:**

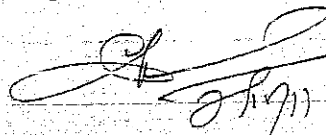
The microwave frequencies are typically allotted in 7, 15, 18 & 23 GHz bands. These bands suffer from all the basic interference and attenuation problems as would be faced by any wireless microwave system. Terrain, vegetation and climate too play a important role in planning and usages of these spot frequencies in a typical scenario. 7 GHz is basically used for long haul applications.

At 15/18/23 GHz bands, rain attenuation plays a very important role, hence its usage in places with extremely high and frequent rainfalls form a very important design

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criteria. Further, in urban areas, where the haul length is relatively small, antenna sizes of 0.6 m are normally used, whereas for long hauls, especially for interconnecting rural BTS, normally antenna size of 1.2 m or even 1.8 m are used. Crowding and loading of towers is always a practical requirement to be watched for.

Although these microwave frequencies are re-used extensively within a geographical area, however, the reuse pattern is ultimately governed by the interference that they tend to introduce into each other. This increase in interference decreases the fade margin thereby increasing the threshold degradation value. Any increase in threshold degradation means increase in threshold level which will deteriorate the quality of these microwave links.

To understand the impact of interference on the performance of these frequencies, a real life scenario is given below:

- Assume that a BER of  $10^{-3}$  is attained at a receive level of -90.5 dbm, then, if there is a threshold degradation of 10 db due to interference, then will get a BER value of  $10^{-3}$  at a receive level of -80.5 dbm itself.
- If the interference increases increasing the noise, the threshold degradation value will increase. Suppose it increases to 20 dbm, then we will get the  $10^{-3}$  BER at a receive level of -70.5 dbm. This means that the threshold value has increased.
- Suppose during commissioning, our receive level is -45 dbm and there is heavy rainfall which will cause fading in the link. The link will be down if the receive level decreases to -70.5 dbm. In fact the quality of transmission will start degrading heavily after receive level reaches -60.5 dbm.
- Had the threshold degradation been only 10 dbm, then the link would have been completely down only when the receive level is -80.5 dbm.

#### 10. Spectrum Limitations:

In order to use spectrum efficiently all 3G sites should be connected on high capacity radio-links leaving smaller capacity hops only for 2G sites, which require re-routing of the existing microwave links. As all these networks have evolved from green field to a mature network, the P location may not necessarily be in the optimal position.

As we know that, with the help of one microwave frequency spot, only 4-5 hops can emanate from one location. This limitation is not from the spectrum band but from the physics of the microwave antenna. Any dish parabolic microwave antenna exhibits the maximum attenuation as compared to 3dB bandwidth at around 100 - 120 degrees. Therefore antennas transmitting same frequencies should have an angular separation of at-least 120 degrees between them.

The second limitation comes from the spectrum bandwidth allocated per channel, i.e. 28MHz. Microwave radios can transmit maximum of 160Mbps at 128 QAM or 180Mbps at 256 QAM. However 256 QAM is available only in the latest radios, not

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in the existing install base. That means existing install base is capable to support 3G network only. To deploy 150-180Mbps bandwidth for co-located BWA, 2G and 2G site, microwave radios with high capacity and modulation, and broader bandwidth of 56MHz are required. Such radios can support approximately 350Mbps. So that at least two sites of co-located BWA, 2G and 2G can be connected on one MW spur.

# 11. Recommendations:

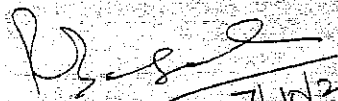
On the basis of detailed discussions with the equipment vendors and service providers, the Committee is of the following view with regard to the RF pairs' requirement for microwave backhaul for cellular mobile networks.


11.1 The service providers should lay more fibres so as to reduce dependence on the RF pairs to the extent possible.

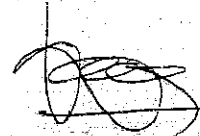
11.2 E-band radios should be used for increased capacities and additional availability of RF carries. Similarly, other bands may also be explored for this purpose.

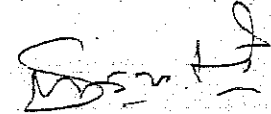
11.3 The following table may be referred for allocation of RF carriers:

Service	Metro & A Circle	B Circle	C Circle	Remarks
2G	3-4	2-3	2	
3G	One additional RF pair in each category compared to 2G.			
BWA	4-6	3-4	3	This is the requirement for a standalone BWA operator as well as for an operator having 2G & 3G services in a service area.

  
(Rajeev Bansal) 7/10/2011  
Director (M-1), TEC

  
(Dr. S. M. Sharma) 7/10/11  
DWA, WPC

  
(Bal Kishan) 7/10/2011  
Director (Radio & Satellite), TEC

  
(U. K. Srivastava)  
DDG (Radio), TEC

Government of India  
Ministry of Communications & IT  
Department of Telecommunications  
WPC Wing

Sanchar Bhavan, 20 Ashoka Road, New Delhi - 110001.

File No. L-14035/19/2010-BWA

Dated the 16<sup>th</sup> March, 2012

**Subject : Guidelines for allocation of Microwave (MW) Access RF Carriers for BWA Services.**

In order to formulate guidelines, following has been decided for allocation of Microwave (MW) Access RF Carriers for BWA services, as an interim measure :

Service	Metro & A Circle	B Circle	C Circle	Remarks
BWA	4 - 6 Carriers	3-4 Carriers	3 Carriers	Requirement for a standalone BWA operator as well as for an operator having 2G & 3G services in a service area.

Note : Each MW Access RF Carrier refers to 28 MHz paired bandwidth.

2. Initially, a total of 4 MW Access Carriers in Metros & A circles and 3 in B & C circles respectively may be allotted to the new BWA operators as well as existing 2G/3G operators offering BWA services on their request. Allotment will be considered in the frequency bands as per channelling plan provisioned in National Frequency Allocation Plan-2011 amended from time to time, subject to availability and execution of legally vetted frequency agreement.
3. Additional MW Access spectrum beyond 4 MW Access Carriers in Metros & A circles and 3 in B circles may be considered by the Government after formulation of necessary criteria.
4. The rate for Spectrum Usage Charges shall be paid as prescribed by WPC Wing of DOT from time to time.
5. These guidelines shall come into force from the date of issue.

  
(R. K. Saxena)

Deputy Wireless Adviser to the Government of India

To,

1. All concerned.
2. The Director, Wireless Monitoring Organization, New Delhi.
3. The Director (Finance), Wireless Finance Division, DOT, WPC Wing, Sanchar Bhawan, New Delhi.
4. Concerned service providers/associations.
5. WPC Wing website.

**TELECOM DISPUTES SETTLEMENT & APPELLATE TRIBUNAL  
NEW DELHI****Dated 22<sup>nd</sup> April, 2010****Petition No.122 of 2007**

(M.A.Nos.29 and 36 of 2009)

Cellular Operators Association of India &amp; Ors.

...Petitioners

Vs

Department of Telecommunications &amp; Anr.

...Respondents

**BEFORE:****HON'BLE MR.JUSTICE S.B. SINHA, CHAIRPERSON****HON'BLE MR.G. D. GAIHA, MEMBER**

For Petitioners : Mr.C.S. Vaidyanathan, Sr.Advocate,  
Mr.Manjul Bajpai, Mr.Ashish Yadav,  
Ms.Devika Bajpai

For Respondents : Mr.Vineet Malhotra, Advocate  
Mr.Shankar Chhabra, Advocate

**ORDER****S.B. Sinha**

Levy of Spectrum Charges for Micro Wave (MW) access and MW Backbone networks, GSM based Telecom Service upon the service providers by the respondent herein, in terms of an order dated 3.11.2006 is in question before us in this petition.

The Petitioner Nos.2 to 12 are service providers. They hold licenses for providing Cellular Services to their customers. The licenses had been granted in their favour by the respondent No. 1 in terms of Section 4 of the Indian Telegraph Act, 1885

(The Act). It reads as under:

**“4. Exclusive privilege in respect of telegraphs, and power to grant licenses.**

(1) Within [India], the Central Government shall have exclusive privilege of establishing, maintaining and working telegraphs:

Provided that the Central Government may grant a license, 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 [India]:

[Provided further that the Central Government may, by rules made under this Act and published in the Official Gazette, permit, subject to such restrictions and conditions as it thinks fit, the establishment, maintenance and working-

(a) of wireless telegraphs on ships within Indian territorial waters [and on aircraft within or above [India], or Indian territorial waters], and

(b) of telegraphs other than wireless telegraphs within any part of [India].

(2) The Central Government may, by notification in the Official Gazette, delegate to the telegraph authority all or any of its powers under the first proviso to sub-section (1).

The exercise by the telegraph authority of any power so delegated shall be subject to such restrictions and conditions as the Central Government may, by the notification, think fit to impose.]”

In terms of the licenses granted to them, the petitioner Nos. 2 to 12 were not only required to pay license fees, but also the spectrum charges.

Spectrum utilized by them are of two categories :- i) being GSM, which is absolutely necessary for connecting the Cellular Mobile user to the nearest tower of the licensees; and ii) the spectrum in question which is not absolutely necessary and in

respect whereof the cellular operators would be able to connect the nearest tower to their own exchanges.

Payment of license fee as also the spectrum charges, indisputably, are governed by the conditions of the license. We would refer to the same a little later.

The Act was enacted to amend the law relating to 'Telegraph' in India. The term 'Telegraph' has been defined in Section 3 (1) (AA) inter alia to mean "appliance, instrument, material or apparatus used or capable of use for transmission or reception of science, signals, writing, images and sounds or intelligence of any nature by where, visual or other electromagnetic emissions, radio waves and hertz eon wave, galvanic, electric or magnetic means".

Part II of the Act provides for the privileges and powers of the Central Government. Section 4 purports to confer exclusive privilege to it for maintaining and working telegraphs. Two provisos have been appended thereto. As has been noticed heretobefore, the first proviso enables the Central Government to grant licences on such terms and 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 India enabling them to do the same.

We, in this case, are not concerned with the second proviso.

The explanation appended to the said provision postulates that the payments made for the grant of a license would include such sum attributable to the universal

service obligations as may be determined by the Central Government after considering the recommendations made in this behalf by Telecom Regulatory Authority of India established under Sub-Section 1 of Section 3 of Telecom Regulatory Authority of India Act 1997 (1997 Act).

Before however, adverting to the rival contentions raised by the parties hereto, we may notice the factual matrix involved herein.

Licenses had been granted to the petitioners commonly known as Metro Licenses in the year 1994. It is accepted, that the same did not contain any clause in terms whereof the respondent was entitled to enhance the royalty/license fee inter alia for microwave spectrum. It however appears that the respondent in terms of its letter dated 19<sup>th</sup> July, 1995 fixed royalty rates both for GSM Cellular Mobile Telephone Service as also for Microwave links.

By another letter of the same date the rates of license fee were levied. It gave rise to a dispute resulting in filing of a petition by the first petitioner before this Tribunal on or about 24.02.2001 questioning the legality thereof. On or about 25.09.2001 the respondent issued 'draft license amendment No. 2' thereby causing to amend WPC charges and in furtherance of an order dated 22.09.2001 issued by it in this behalf, an offer was made to the licensees by the respondent to accept the said royalty charges and withdraw the petition pending before this Tribunal. Pursuant to or in furtherance of the said offer, the petitioners agreed to withdraw the said petition.

We may notice some of the terms of the offer made to the petitioner by the



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respondent by its letter dated 18<sup>th</sup> April 2002, which reads as under:

“3. Subject to the above conditions, the spectrum charges for microwave access networks (normally in the frequency band 10 GHz and beyond) would be as given below:

- for spectrum bandwidth upto 112 MHz in any of the circles, or 224 MHz in any of the 4 metros, spectrum charges shall be levied @ 0.25% of AGR per annum; and
- for every additional 28 MHz or part thereof (if justified and assigned) in circles or 56 MHz or part thereof in any of 4 metros areas, additional spectrum charges shall be levied @ 0.05% of AGR per annum.

7. The above package of spectrum charging on percentage revenue share will be available to the cellular operators on the premise that it is accepted in its entirety and simultaneously all legal proceedings, with regard to spectrum charging, instituted by them or COAI against the Government in Courts and Tribunals (TDSAT) etc. shall be withdrawn. The cellular operators without prejudice should make payments of all outstanding dues of spectrum charges in accordance with the applicable Government of India orders within a month from the date of issue of this order.”

On or about 3.11.2006 the impugned order increasing microwave spectrum charges was unilaterally issued, stating: -

“2.1 The following revenue share percentage(s) shall be levied for assignment of Microwave networks of GSM and CDMA based telecom service providers

Spectrum Bandwidth	Spectrum charges as percentage of AGR	Cumulative spectrum charge as percentage of AGR
First carrier of 28 MHz (paired)	0.15%	0.15%
Second carrier of 28 MHz (paired)	0.20%	0.35%
Third carrier of 28 MHz (paired)	0.20%	0.55%
Fourth carrier of 28 MHz (paired)	0.25%	0.80%
Fifth carrier of 28 MHz (paired)	0.30%	1.10%
Sixth carrier of 28 MHz (paired)	0.35%	1.45%

2.2 The above spectrum charges (as percentage of AGR) are applicable for both for MW access carriers (in Metros and other telecom service areas) as well as the MW backbone carriers separately.

2.3 While the first microwave access carrier can be allotted for the complete service area, subsequent carriers shall be allotted based on justification and for the cities/districts where it is found to be essential.

2.4 However, the revenue share would be based on the AGR for complete service area for simplicity of calculations, which is one of the main features of the revenue share regime.

2.5 Assignment of frequencies for MW access and MW backbone networks for GSM and CDMA based telecom networks would continue to be considered on the basis of full justification of the requirements and availability of the spectrum, on case-to-case and link-to-link basis, after taking into consideration the spectrum requirement of the other users with a view to ensuring electromagnetic compatibility etc. The complete technical analysis and all related aspects of frequency assignments, including efficient use of spectrum, will apply before assigning frequencies for various MW access and MW backbone links. There will be no obligation on the part of the Government to assign frequencies for such purposes.

2.6 These charges include the royalty charges for spectrum usages and licence fee for the fixed stations in the MW access and MW backbone links.

2.7 The assignment of MW access and MW backbone frequencies shall not be exclusive for any service provider and will be shared with other services/users.

2.8 In addition, the charges for GSM spectrum (in 900 / 1800 MHz band) and CDMA spectrum (in 800 MHz band) will continue to be levied in accordance with the existing orders on the subject."

The first petitioner protested thereagainst by its letter dated 21.11.2006, whereafter a meeting between the parties was held on or about 5<sup>th</sup> January 2007. Paragraph 4 of the Minutes of the Meeting dealt with Microwave Access and Backbone Spectrum charges.

The respondent by a letter dated 12.04.2007 addressed to the first petitioner raised a contention that the 2002 agreement was with regard to the principle of revenue sharing and not by way of a particular percentage, stating :-

“1.2 In the year 2002, Government had agreed to the COAI plea for principle of revenue share for Microwave spectrum and not any particular percentage. The revenue share (percentage) has been reviewed and revised in view of the experience gained during this intervening period.

1.3 Microwave access and backbone links connect fixed locations, for which other alternatives like OFC etc. are available. With the increasing demand from new service providers, there is a greater need for more optimum use of spectrum including urging the service providers to gradually change over to OFC links.”

According to the petitioners the contentions raised therein are wholly incorrect as the percentage of revenue share governed the field.

In response to a letter dated 11<sup>th</sup> April, 2007 issued by the first petitioner the respondent asked it to provide inputs on the issues for its further examination/discussions. It is, however, admitted that some service providers made payment in terms of the order made by the respondent increasing the spectrum charges under protest and/or without prejudice to their rights and contentions. Meetings were held by and between the parties. Additional datas were also supplied by the petitioners in support of their contentions but no agreement between the parties could be arrived at.

At that point of time this petition was filed questioning inter alia the validity of the aforementioned order issued by the respondent.

Some events also took place during pendency of this petition. The respondent issued another order on or about 10.11.2008 in continuation of its earlier order, increasing the microwave spectrum charges unilaterally.

It was given retrospective effect w.e.f. 3.11.2006.

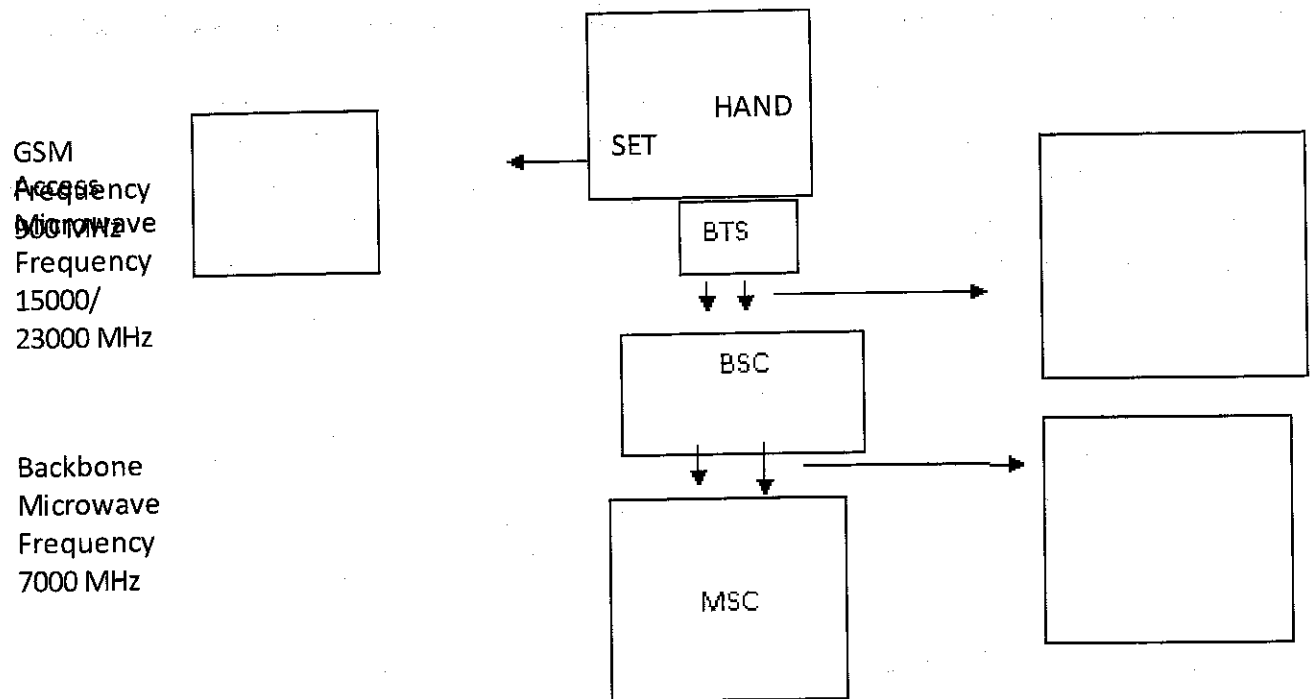
The respondent furthermore asked the Cellular operators to consolidate smaller carriers of 3.5 MHz/7 Mhz/14 MHz, in different 28 MHz carrier bands within one or two carriers of 28 MHz by 31<sup>st</sup> October, 2008.

Petitioners protested thereagainst too.

An application for amendment of this petition was filed on or about 4.3.2009.

Having regard to the subsequent event, we allow the same, keeping in view the fact that the question raised herein are pure questions of law and the principal contention raised by Mr.Malhotra is that the respondent has the requisite jurisdiction to enhance the charges in terms of 18.3.1 of the license agreement issued under Section 4 of the Act. In that view of the matter we are of the opinion that no additional reply need be filed as the relevant contentions raised by the petitioner have already been adverted to in the original reply. No other or further contention has been raised before us.

By an order dated 13.04.2009 the respondent was asked not to give retrospective effect to the said order. We may notice the carriage of the manner in which the spectrum are used.



BTS – Base Transceiver Station  
 BSC – Base Station Controller  
 MSC – Mobile Switching Centre

Mr. C. S. Vaidyanathan, learned senior counsel appearing on behalf of the petitioners would contend :

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1. The respondent has no jurisdiction to increase the spectrum charges in absence of any contract enabling it to do the same.
2. Only 18 out of 128 GSM Cellular licenses having contained clause 18.3.3 in terms whereof unilateral enhancement of spectrum charges is impermissible, the impugned orders are liable to be set aside.
3. The retrospective effect given to the said orders must be held to be illegal and without jurisdiction.

Mr. Malhotra, learned counsel appearing on behalf of the respondent, on the other hand, urged : -

1. All licenses issued in favour of petitioner No. 2 to 8 would clearly show that the respondent has jurisdiction to levy charges for use of Spectrum in addition to the licencees on revenue share basis, which were to be notified separately from time to time by WPC Wing and in that view of the matter, no illegality can be said to have been committed by the respondent in issuing the impugned orders.
2. The impugned orders were issued as spectrum is a scarce commodity and the demand therefor was much more than its availability and furthermore in view of the fact that the operators have an option of taking recourse to the alternate method of connecting the towers with their exchanges through optical fiber, this petition should be dismissed.
3. The petitioners Nos. 2 to 12 being established Cellular Operators, use 7-8 carriers each of which has 28 MHz space available and in that view of the matter they use a huge space which creates difficulties in allotment of spectrum to the new licensees who in fact could be allotted maximum of 2 carriers.

4. The source of power of the respondent to increase the spectrum charges flows from Section 4 of the Act and the petitioners having accepted the terms of contract, the impugned orders are wholly unassailable.
5. As an exclusive privilege exists in favour of respondent, its demand can also be given a retrospective effect.

The Act is a 19<sup>th</sup> Century Act. The exclusive privilege doctrine was evolved for the benefit of the crown dealing in 'telegraph'. This said Act, however, after the Constitution of India has come into being must be read subject to Part III thereof. It is, moreover, not a prohibited trade. Merely a monopoly had been created by reason of the provisions of the said Act in favour of the Government of India. When the statute itself provides for the mode and the manner in which the licences are to be granted, the terms and conditions thereof and working out of interconnect agreements being exclusively within the realm of the jurisdiction of TRAI, in our opinion, it cannot be said that the Central Government would be entitled to do whatever it likes. It's actions, as a 'State' must be fair and reasonable. The State is bound to comply with the constitutional requirements of 'equality before law and equal protection of law'. Right of a citizen of India to carry on a business being a fundamental one, the same can be restricted/regulated only in accordance with law and not otherwise.

The respondent while doing so was liable to keep in mind its constitutional obligations to also maintain the level playing field as has been held by the Supreme Court of India in a large number of decisions.

See for example – Reliance Energy Ltd. And Another Versus Maharashtra State Road Development Corpn. Ltd. And Others – 2007(8) SCC 1.



With that backdrop in mind, we may notice the terms of the licenses. We may also notice that the licenses originally held by the petitioners other than the Petitioner No.1 were CMTS ones. They migrated to UASL Licenses. Migration took place also in respect of the licenses which were granted to them as basic service operators (BSOs).

License agreements thereafter have been entered into providing for unified access services circlewise and metrowise. Each of the licenses contains detailed terms and conditions.

Financial conditions are enumerated in part III thereof. Clause 19 of the said licenses provides for the 'fees' payable to the licensor. Clause 19.1 provides for the entry fees which is payable only one time. Clause 19.2 provides for payment of license fee which, subject to variation, was to be paid usually at the rate of 12% of 'Adjusted Gross Revenue'. Clause 19.3 provides for Radio Spectrum Charges which is payable in addition to the license fees. It reads as under:

**"19.3 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 & 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 band width, if allotted subject to availability and justification shall attract additional Licence fee as revenue share (typically 1% additional revenue share if Bandwidth allocated is upto 6.2 MHz + 6.2 MHz 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 as per the details and prescription of Wireless Planning & Coordination Wing. The fee/royalty for the use of spectrum/possession of wireless telegraphy equipment depends upon various factors such as frequency, hop and link length, area of operation etc. Authorization of frequencies for setting up Microwave links by Cellular Operators and issue of Licences shall be separately dealt with WPC Wing as per existing rules.

The above spectrum charge is subject to review by WPC Wing from time to time.”

Clause 19.3, thus, is in two parts. The first part provides for levy of spectrum charges on revenue share basis which is known as GSL. There is no dispute in regard to aforementioned provision.

The second part, however, provides for payment of royalty for the use of spectrum in respect whereof payments were to be made separately to the WPC Wing as per the existing rules. To our query, it was clearly stated that no rules under the Act has been framed. Admittedly separate circular letters are issued from time to time by the WPC which does not satisfy the requirements of law so far as rule making power of the Central Government is concerned.

It is, however, of some significance to notice that clause 19.3 provides for 'Spectrum Charges' and 'Royalty' separately. That part of the power conferred upon the WPC Wing to review the spectrum charges from time to time, thus, would not extend to its in regard to royalty. The term 'royalty' has a definite connotation. Royalty being not leviable in terms of the provisions of a statute, it must be given its ordinary meaning. [See State of West Bengal Vs. Kesoram Industries Limited & Ors.- 2004 (10) SCC 201]

Different provisions of the licenses relating to spectrum charges and allocation thereof have been brought to our notice. Before however, we advert thereto the financial conditions stipulated in the UASL regime as contained in clause 18 therein providing for spectrum charges may also be noticed. They read as under:-

**"18. FEES PAYABLE**

**18.1 Entry Fee**

One Time non-refundable Entree Fee of Rs.1.00 crores (one crore only) has been paid by the LICENSEE prior to signing of this Licence agreement.

**18.2 Licence Fees :**

In addition to the Entry fee described above, the Licensee shall also pay Licence fee annually @ 10 (TEN) % of Adjusted Gross Revenue (AGR), excluding spectrum charges.

Annual Licence fee w.e.f. 1.4.2004 shall be @ 8 (EIGHT) % of

AGR. The Licensor reserves the right to modify the above mentioned Licence Fee any time during the currency of this Agreement.

We may also notice clause 18.3.3 which is contained in only 18 of the licenses relating to grant of unified access service by CMTS. It reads as under:

**“18.3      Radio Spectrum Charges :**

18.3.1      The LICENSEE shall pay spectrum charges in addition to the Licence Fees on revenue share basis as notified separately from time to time by the WPC Wing. However, while calculating ‘AGR’ for limited purpose of levying spectrum charges based on revenue share, revenue from wireline subscribers shall not be taken into account.

18.3.2      Further royalty for the use of spectrum for point to point links and other access links shall be separately payable as per the details and prescription of Wireless Planning & Coordination Wing. The fee/royalty for the use of spectrum/ possession of wireless telegraphy equipment depends upon various factors such as frequency, hop and link length, area of operation and other related aspects etc. Authorization of frequencies for setting up Microwave links by Licensed Operators and issue of Licenses shall be separately dealt with WPC Wing as per existing rules.”

As our attention has also been drawn to the different conditions in the CMSP Licenses, we may notice the same also:

“18.3.3      The above spectrum charge is subject to unilateral review by

WPC Wing from time to time which shall be binding on the licensee.

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

The provisions are the same, both in respect of the licenses granted circlewise and metrowise.

GSM Spectrum charges and the MW Backbone Spectrum with which we are concerned, therefore, stand on different footings. The purposes for which they are used are also different. We have noticed heretofore that whereas GSM Spectrum is absolutely mandatory for operation of the cellular mobile services, it is not so, so far as the Microwave Spectrum is concerned.

It may be true that the spectrum is a scarce commodity. It may further be true that appropriate regulations are required to be made so that the new operators can also be allotted some spectrum.

The same however, in our opinion, would not mean that increase in the charges thereof is the only remedy. Even otherwise, increase in the charges is required to be done in accordance with law. Charges whether in terms of a license or otherwise can be increased only in terms of the provisions of statute or a contract. Unlike the prohibited items like liquor or gambling, the State can not claim an absolute power in relation to grant of licenses for operating telegraphs as otherwise, the same would otherwise be an arbitrary act on its part. It having granted license, must act within the four corners of a statute or the provisions contained in the license. The Petitioners pay about 4% of AGR towards spectrum charges. The respondent, therefore, was not correct to

contend that revenue sharing in respect of spectrum was only on principle and not in reality. Even otherwise, it could have been categorically spelt out in the license or the statute.

The Petitioner No. 1 in its letter dated 28<sup>th</sup> November, 2008 has shown adverse financial impact on operators as a result of repeated increase in microwave charges; wherefor it had set out certain tables from a perusal whereof it would appear that the impact of increase is severe, being manifold. It is as under :

### MICROWAVE ACCESS

S. No.	Frequency Bandwidth (Frequency spot of 28 MHz)	Original Charges Contractually settled 18.04.2002		Revised charges - 1 03.11.2006 (applied prospectively)	Revised charges - 2 10.11.2008 (applied retrospectively)
		(Circle)	(Metro)		
1	28	0.25	0.25	0.15	
2	56				
3	84			0.35	
4	112				
5	140	0.30		0.55	
6	168	0.35			
7	196	0.40		0.80	
8	224	0.45			
9	252	0.50	0.30	1.10	
10	280	0.55			
11	308	0.60	0.35	1.45	
12	336	0.65			
13	364	0.70	0.40	Not prescribed*	1.85
14	392	0.75			
15	420	0.80	0.45	Not prescribed*	2.30
16	448	0.85			
17	476	0.90	0.50	Not prescribed*	2.80
18	504	0.95			
19	532	1.00	0.55	Not prescribed*	3.35
20	560	1.05			
21	588	1.10	0.60	Not prescribed*	3.95

22	616	1.15	
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**ICROWAVE BACKBONE**

S. No.	Frequency Bandwidth (Frequency spot of 28 MHz)	Original Charges Contractually settled 18.04.2002	Revised charges -1 03.11.2006 (applied prospectively)	Revised charges - 2 10.11.2008 (applied retrospectively)
1	28	0.10	0.15	
2	56			
3	84	0.15	0.35	
4	112	0.20		
5	140	0.25	0.55	
6	168	0.30		
7	196	0.35	0.80	
8	224	0.40		
9	252	0.45	1.10	
10	280	0.50		
11	308	0.55	1.45	
12	336	0.60		
13	364	0.65	Not prescribed*	1.85
14	392	0.70		
15	420	0.75	Not prescribed*	2.30
16	448	0.80		
17	476	0.85	Not prescribed*	2.80
18	504	0.90		
19	532	0.95	Not prescribed*	3.35
20	560	1.00		
21	588	1.05	Not prescribed*	3.95
22	616	1.10		

Another question which arises for our consideration as is to whether the respondent could revise the rates unilaterally.

An offer was made to the petitioners in terms of an order dated 18<sup>th</sup> April 2002 followed by a letter and accepted by the petitioner No.1 in terms of its letter dated 23<sup>rd</sup> August, 2002. Petition No. 5 of 2001 was withdrawn from this Tribunal on 19<sup>th</sup>



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September, 2002. We have noticed that charges were to be paid instead of a fixed percentage basis on revenue sharing basis in the UASL Licenses.

It has not been denied or disputed that all charges, not only before the initiation of the instant proceedings but also even during the pendency thereof, no proposal was mooted, no discussions were held, no opportunity of hearing had been granted and as such no consensus was arrived at between the parties.

Any order for allocation of spectrum has never been issued. The spectrum charges are subject to the provision of a contract. It is now almost a well settled principle of law that when a matter is governed by a contract, the parties must be *ad idem* in regard to variation and/or novation of the terms and conditions thereof which would include the charges payable by one party to the other in terms thereof unless there exists any provision therefor in the contract itself or in any provision of statute governing the field.

Before, however, we refer to the decisions relied upon by the learned counsel for the petitioners, we may notice the requisite averments made by them in the petition:

“With respect to Clause 18.3.3 in the CMTS migrated to UASL License it is submitted that as out of 128 GSM Cellular Licenses, 110 Licenses do not have Clause 18.3.3, it goes to show that DoT did not intend to have a Clause 18.3.3 in any Licence, and therefore, Clause 18.3.3 ought to be treated as redundant. It is submitted that the same Bharti/Airtel has new UASL License which does not contain Clause 18.3.3 at the same time it has some Licenses i.e. UASL migrated from CMTS which do contain Clause 18.3.3. Understandably, two different yardsticks for levying microwave charges cannot be applied on the same Licensee for providing

the same kind of service. Similarly, as submitted earlier, out of 128 relevant Licenses, 110 Licenses do not have Clause 18.3.3 and, therefore, the power thereunder admittedly cannot be invoked in the case of these 110 Licenses and further that application of such a Clause in case of other 18 Licences would be violative of Article 14 of the Constitution of India qua such 18 Licences. It is further submitted that after having executed mutually agreed contract between the parties, insertion of such Clause 18.3.3 in migrated UASL License would be unreasonable. The power as contained in Clause 18.3.3 cannot override a specific contract between the parties, whereunder as a specific consideration the Cellular Operators had given up their rights by withdrawing their pending litigation and therefore Clause 18.3.3 are not applicable to the facts of the present case."

The respondent does not dispute that the spectrum charges were increased during pendency of the proceeding. It is also not in dispute that the effect in the increase in the spectrum charges is from 0.5 paise to 1.15 paise in different bands in circle and the charges 0.25 percent to 0.60 percent then prevailing in different band was increased to about Rs.1.50 to Rs.1.45 which in terms of circular letter dated 10.11.2008 in respect of band frequency. Bands contained in serial No. 13 to 22 in respect of which no rate was prescribed theretobefore was fixed from 1.85 paise to 3.95 paise.

It is furthermore not in dispute that in the UASL license, maximum committed spectrum circlewise are laid down in Annexure IX.

The power to increase an amount under a contract unilaterally, must flow from it.

In Delhi Development Authority Vs. Joint Action Committee reported in 2008 Vol. 2 SCC page 672, the Supreme Court of India held as under:

“62. It is well-known principle of law that a person would be bound by the terms of the contract subject of course to its validity. A contract in certain situations may also be avoided. With a view to make novation of a contract binding and in particular some of the terms and conditions thereof, the offeree must be made known thereabout. A party to the contract cannot at a later stage, while the contract was being performed, impose terms and conditions which were not part of the offer and which were based upon unilateral issuance of office orders, but not communicated to the other party to the contract and which were not even the subject-matter of a public notice. Apart from the fact that the parties rightly or wrongly proceeded on the basis that the demand by way of fifth installment was a part of the original Scheme, DDA in its counter-affidavit either before the High Court or before us did not raise any contra plea. Submissions of Mr. Jaitley in this behalf could have been taken into consideration only if they were pleaded in the counter-affidavit filed by DDA before the High Court.

66. The stand taken by DDA itself is that the relationship between the parties arises out of the contract. The terms and conditions therefor were, therefore, required to be complied with by both the parties. Terms and conditions of the contract can indisputably be altered or modified. They cannot, however, be done unilaterally unless there exists any provision either in contract itself or in law. Novation of contract in terms of Section 60 of the Contract Act must precede the contract-making process. The parties thereto must be ad idem so far as the terms and conditions are concerned. If DDA, a contracting party, intended to alter or modify the terms of contract, it was obligatory on its part to bring the same to the notice of the allottee. Having not done so, it, relying on or on the basis of the purported office orders which are not backed by any statute, new terms of contract could (sic not be) thrust upon the other party to the contract. The said purported policy is, therefore, not beyond the pale of judicial review. In fact, being in the realm of contract, it cannot be stated to be a policy decision as such.

It was observed :

80. A definite price is an essential element of binding agreement. A definite price although need not be stated in the contract but it must be worked out on some premise as was laid down in the contract. A contract cannot be uncertain. It must not be vague. Section 29 of the Contract Act reads as under:

“29. Agreements void for uncertainty. – Agreements, the meaning of which is not certain, or capable of being made certain, are void.”

A contract, therefore, must be construed so as to lead to a conclusion that the parties understood the meaning thereof. The terms of agreement cannot be vague or indefinite. No mechanism has been provided for interpretation of the terms of the contract. When a contract has been worked out, a fresh liability cannot be thrust upon a contracting party”

Yet again in Bharat Sanchar Nigam Limited and another Vs. BPL Mobile Cellular Limited, 2008, (13) SCC, page 597, the law has been laid down in the following terms:-

“44. If the parties were ad idem as regards terms of the contract, any change in the tariff could not have been made unilaterally. Any novation in the contract was required to be done on the same terms as are required for entering into a valid and concluded contract. Such an exercise having not been resorted to, we are of the opinion that no interference, with the impugned judgment is called for.”

A three judge bench of the Apex Court in City Bank Vs. Chartered Bank reported in 2004 (1) SCC page 12 held as under :

“47. Novatio, rescission or alteration of a contract under Section 62 of the Indian Contract Act can only be done with the agreement of both the parties of a contract. Both the parties have to agree to substitute the original

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contract with a new contract or rescind or alter. It cannot be done unilaterally. The Special Court was right in observing that Section 62 would not be applicable as there was no novatio of the contract. Further, it is neither Citi Bank's nor CMF's case nor even SCB's case that there was a tripartite arrangement between the parties by which CMF was to accept the liability. Such a case of novatio does not arise for consideration. Shri Andhyarujina, the learned Senior Counsel for Citi Bank has also not seriously pressed for Citi Bank's case being considered by reference to Section 61 abovesaid"

With regard to level playing field in the matter of payment of interest, this Tribunal, in Cellular Operators Association of India Vs. Deptt. of Telecommunications in Petition No.123 of 2008 82, held as under :

"Levy of interest or penalty must be supported by an authority of law. The respondents themselves quantified/crystalised the amount and/or rates payable towards WPC Charges only in the year 2002. Any modification or novation on a contract is permissible when both the parties thereto agree. If no interest or penalty could be levied in terms of the provisions of the contract, the purported Office Orders, which have no force of law, would not make a demand of interest enforceable in law."

In any event, the increase in the rates could not have been given a retrospective effect and retroactive operation.

In City Bank(Supra), the Supreme Court of India held as under:

"Now it is a well settled rule of interpretation hallowed by time and sanctified by judicial decisions that, unless the terms of a statute expressly so provide or necessarily require it, retrospective operation should not be

given to a statute so as to take away or impair an existing right or create a new obligation or impose a new liability otherwise than as regards matters of procedure. The general rule as stated by Halsbury in Vol. 36 of the Laws of England (3<sup>rd</sup> Edn.) and reiterated in several decisions of this Court as well as English courts is that all statutes other than those which are merely declaratory or which relate only to matters of procedure or of evidence are prima facie prospective."

Before us, the respondents have produced certain orders being dated 20.7.1995 and 1.2.2002. The relevant portions of the Order dated 20.7.1995 read as under:-

**"Royalty rates for GSM Cellular Mobile Telephone Service**

The royalty shall be charged on the basis of :

- i) Fixed Multiplier 'M' (M=4800)
- ii) Number of RF channels each of 200 KHz bandwidth represented by 'C'
- iii) Constant Multiplier 'K' (K=B) for GSM Standard).
- iv) Weighing factor W dependent on the number of subscribers where W=1000 for every thousand subscriber or part thereof.

Then Annual Royalty  $R = M \times C \times K + 1200 \times W$

Annual royalty was to be charged for the first year on quarterly basis. It was clearly stated therein that the license fee would be paid in terms of a separate order issued in that behalf. So far as the order dated 20.7.1995 is concerned, similar rates of license fee were prescribed. It does not contain any license fee for GSM Cellular

Mobile Telephone service.

Another Order was issued on 1.2.2002, whereby, the cellular licensees were to pay spectrum charges on revenue sharing basis from 1.8.1999 @ 2% of AGR for spectrum upto 4.4 MHz + 4.4 MHz and 3% of the AGR for spectrum upto 6.2 MHz + 6.2 MHz.

A corrigendum was issued on 1.4.2003 stating that paragraphs 4 and 5 of the Order dated 20.7.1995 to be read as under:-

### **“CORRIGENDUM**

Sub : Royalty Charges for the grant of licence to establish, maintain and work Terrestrial Microwave Point-to-point and point to multi-point networks under the provisions of the Indian Telegraph Act, 1885.

In pursuance of the powers conferred by section 4 of the Indian Telegraph Act, 1885 (13 of 1885) and in partial modification to this Ministry's Order No. R-11014/4/87-LR (Pt) dated 20<sup>th</sup> July 1995, it has now been decided that Para 4 and Para 5 of the above order be read as

1. (Para-4) Royalty for all kind of terrestrial Microwave Links for
  - 4.1 Fixed Microwave Radio Relay Networks
  - 4.2 Point to Multi-point Networks
2. (Para-5) The royalty for all kind of terrestrial Microwave Links shall be charged on the basis of :
  - 5.1 Constant Multiplier M where :
 

M=1200 for point to point Microwave Link(s) with end-to-end distance  
Less than or equal to 05 Kms.

M=2400 for point to point Microwave Link(s) with end-to-end distance  
greater than 05 Kms but less than or equal to 25 Kms

M=4800 for point to point Microwave Link(s) with end-to-end distance



greater than 25 Kms but less than or equal to 60 Kms.

M=9000 for point to point Microwave Link(s) with end-to-end distance  
greater than 60 Kms but less than or equal to 120 Kms.

M=15000 for point to point Microwave Link(s) with end-to-end  
distance

greater than 120 Kms but less than or equal to 500 Kms.

M=20000 for point to point Microwave Link(s) with end-to-end  
distance

greater than 500 Kms

5.2 Weighting Factor 'W' which is decided by the adjacent channel  
separation of the R.F. channeling plan deployed where:

W=30 for adjacent channel separation upto 2MHz

W=60 for adjacent channel separation greater than 2MHz, but less  
than or equal to 7 MHz

W=120 for adjacent channel separation greater than 7MHz, but less  
than or equal to 28 MHz

W=(120)+(30 for each additional 7MHz Bandwidth or part thereof)  
for adjacent channel separation greater than 28MHz

5.3 Number of RF channel used (equal to twice the number of duplex  
RF Channel pairs) represented by 'C'

Then, Annual Royalty  $R = M \times W \times C$

3. The order shall come into force from the date of issue.
4. These issue with the concurrence of wireless finance branch vide their Dy.  
No. WPF/139/03 dated 26.03.2003.
5. All other conditions of the order No. R-11014/4/87-LR (Pt) dated 20<sup>th</sup> July  
1995, as amended from time to time, will remain the same.

Sd/- (Ashok Kumar)  
Joint Wireless Adviser to the Govt. of India"


The executive orders do not partake to any statutory rules framed under the Act. Clause 18.3.2 of the UASL license provides that authorization of frequencies for setting up microwave links by cellular operators and issue of licenses should separately be dealt with WPC Wing as per the existing rules. The rules in terms of the provisions of 'the Act' would mean rules framed thereunder. Indisputably, such rules were required to be laid before both the Houses of Parliament in terms of the statute. The word 'prescribed' would ordinarily mean prescribed by rules. It is true that the said provision is directory in nature but there cannot be any doubt or dispute that all such rules should ordinarily be published in the official Gazette.

The Office Orders filed by the respondent herein, thus, are not rules; but are merely circular letters. There is furthermore nothing on record to show that these circular letters were issued by the authority, who could frame the rules. By reason thereof, the terms and conditions of license might have been fixed but in absence of any statutory sanction in regard thereto, they cannot fall in the category of a subordinate legislation. The parties having entered into a contract, the terms thereof could not be modified in absence of any express provision.

We, therefore, are of the opinion that the impugned Orders cannot be sustained. They are set aside accordingly.

This petition is allowed. However, in the facts and circumstances of the case, there shall be no order as to costs.

.....J

  
**(S.B. Sinha)**  
**Chairperson**

.....  
**(G. D. Gaiha)**  
**Member**

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TELECOM DISPUTES SETTLEMENT & APPELLATE TRIBUNAL  
NEW DELHI

DATED 18<sup>TH</sup> JULY, 2011

**PETITION No. 116 of 2007**

Association of United Telecom Service  
Providers of India & Ors.

...

Petitioners

Versus

Union of India & Anr.

...

Respondents

**BEFORE :**

HON'BLE MR. JUSTICE S.B. SINHA, CHAIRPERSON

HON'BLE MR. G.D. GAIHA, MEMBER

HON'BLE MR. P.K. RASTOGI, MEMBER

For Petitioner

:

Mr. C.S. Vaidyanathan, Sr. Advocate

Mr. Nakul Mohta, Advocate

Ms. Shikha Sareen, Advocate

For Respondent

:

Mr. Ruchir Mishra, Advocate

**J U D G M E N T**

**S.B. SINHA FOR SELF AND MR. P. K. RASTOGI, MEMBER**

The First Petitioner is an Association of Operators of Telecommunication Services using CDMA technology.

The petitioners Nos. 2 to 5 are licensees; licenses having been granted in their favour in terms of the Indian Telegraph Act, 1885 (hereinafter called and referred to for the sake of brevity as 'the said Act').

WS

**Facts**

2. The Union of India adopted National Telecom Policy in the year 1994; pursuant to or in furtherance whereof, licenses were granted to the Cellular Operators on GSM technology (hereinafter called and referred to for the sake of brevity as 'the Cellular Operators').

3. Another National Telecom Policy was adopted in the year 1999 whereby and whereunder the Central Government intended to grant licenses also to the operators operating on CDMA technology.

4. Indisputably, the royalty for use of microwave frequency and backbone frequency used to be charged on a the basis of formula  $R = MWC$ .

5. It is stated that for effecting a call from the handset of a mobile, Base Trans Receiver Stations (BTSs) are required to be set up to transmit signals. Several BTSs are controlled by Base Station Controller (BSC), which in turn, are controlled by Mobile Switching Centre (MSC).

6. For the purpose of transmitting the signals from one location to the other, BTSs are established. The transmission of signals from one location to another is basically for the domestic network access of the operators of telecommunication services. The network connectivity i.e. access can be

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provided either through cable network, which has optical fibre connectivity, or through airwaves i.e. microwave connectivity.

7. It is not in dispute that whereas the connectivity through use of optical fibre is not only difficult to achieve but is extremely expensive, the microwave connectivity being a high frequency wave (above 1 GHz) is the preferred one.

8. It is also not in dispute that for the said purpose, the first respondent is not statutorily obligated to grant access microwave frequency in the range of 15/18/23 GHz. It is also not imperative in terms of the conditions of license. It is, however, necessary for the licensees. Start up spectrum is to be ordinarily provided by the W.P.C. Wing of the Respondent No.1.

It may be true that the conditions of licence do not contain any bar in grant of spectrum, but there is nothing on record to show that the same is imperative in character. The procedure laid down for grant does not ipso-facto create a legal right. However, to our mind, this is not of much relevance.

9. The petitioner has brought on record definition of some terms, which are relevant for our purpose, being as under :-

*"a. **POINT TO POINT MICROWAVE LINK** is a link which is used to transmit signals/ data from one point to another point i.e. from one BTS site to another BTS site. Point to Point link is used for transmission of both voice and data.*

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b. **POINT TO MULTIPOINT TRANSMISSION** is achieved through local multi point distribution system (LMDS). Frequencies used for LMDS are 10.5, 3.3 and 2.4-2.5 GHz.

c. **HUB** is a communication device which is used to distribute data to several devices which have been received from some other particular device i.e. hub basically redistributes the received data. Hub acts as a server in local multipoint distribution system.

d. **SPOT/CARRIER** is a radio wave to carry out transmission at one particular frequency. In Cable Division Multiple Access (CDMA) technology, one carrier allocated is of 1.25 MHz."

10. So far as transmission of signals from BSCs to MSCs are concerned, however, Backbone Microwave Frequency of 6/7 GHz (as has been contended by the respondent), being necessary to reach the consumers, the respondent No.1 are obligated to provide for the same.

11. We may, in this connection, notice the statements made by the petitioner in para 10 of the petition.

*"Microwave Access Network (MWA) refers to the terrestrial wireless links interconnecting the service provider's MSC(s), BSC(s) and/or BTS(s) in a station using MW frequency normally in the frequency*



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*band of 10 GHz & above. On the other hand Microwave Backbone Network (MWBB) refers to the terrestrial wireless links interconnecting the service provider's MSC/BSC or BTS in one station to MSC/BSC/BTS in another long distant station using Microwave Frequency, generally below 10 GHz frequency band. The frequencies for access and back bone networks are allotted to the Service Providers by the Licensor who realizes annual charges as Royalty for usage of the Frequency Spectrum."*

12. In the year 2001, in terms of the National Telecom Policy, 1999, the CDMA operators were also allowed to provide for the limited mobile services as basic service operators.

13. So far as Cellular Operators are concerned, however, with effect from 01.8.1999, Royalty on the Backbone and Access Frequency were charged on 'Revenue Share' (AGR) basis. On 18.4.2002, an order was issued by respondent No.2 specifying spectrum charges in respect of cellular network for MW access and MW backbone network based on revenue sharing. Herein, we are not concerned with the percentage thereof.

14. On or about 01.4.2003, a corrigendum was issued by the Respondent No.2 modifying the formula as contained in its order dated 20<sup>th</sup> July, 1995 for the BSOs, which is in the following terms :-

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*"In pursuance of the powers conferred by Section 4 of the Indian Telegraph Act, 1885 (13 of 1885) and in partial modification to this Ministry's order No.R-11014/4/87-LR(Pt) dated 20<sup>th</sup> July 1995, it has now been decided that Para 4 and Para 5 of the above order be read as :*

- 1. (Para-4) Royalty for all kind of terrestrial Microwave Links for*
  - 4.1 Fixed Microwave Radio Relay Networks*
  - 4.2 Point to Multi-point Networks*
- 2. (Para-5) The royalty for all kind of terrestrial Microwave Links shall be charged on the basis of :*

*5.1 Constant Multiplier M where :*

*M=1200 for point to point Microwave Link(s) with end-to-end distance  
Less than or equal to 05 Kms.*

*M=2400 for point to point Microwave Link(s) with end-to-end distance  
greater than 05 Kms but less than or equal to 25 Kms*

*M=4800 for point to point Microwave Link(s) with end-to-end distance  
greater than 25 Kms but less than or equal to 60 Kms.*

*M=9000 for point to point Microwave Link(s) with end-to-end distance  
greater than 60 Kms but less than or equal to 120 Kms.*

*M=15000 for point to point Microwave Link(s) with end-to-end distance  
greater than 120 Kms but less than or equal to 500 Kms.*

*M=20000 for point to point Microwave Link(s) with end-to-end distance  
greater than 500 Kms.*

*5.2 Weighing Factor 'W' which is decided by the adjacent channel separation of the R.F. channeling plan deployed where*

*W = 30 for adjacent channel separation upto 2MHz*

*W=60 for adjacent channel separation greater than 2MHz, but less  
than or equal to 7MHz*

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*W=120 for adjacent channel separation greater than 7MHz, but less than or equal to 28MHz*

*W=(120)+(30 for each additional 7MHz Bandwidth or part thereof) for adjacent channel separation greater than 28MHz*

- 5.3 *Number of RF channel used (equal to twice the number of duplex RF Channel pairs) represented by 'C'*

*Then, Annual Royalty  $R = M \times W \times C$*

3. *The order shall come into force from the date of issue.*
4. *These issue with the concurrence of wireless finance branch vide their Dy. No.WPF/139/03 dated 26.03.2003.*
5. *All other conditions of the order no. R-11014/4/87-LR(Pt) dated 20<sup>th</sup> July 1995, as amended from time to time, will remain the same."*

15. On and from 14.11.2003, the Central Government introduced UASL regime in terms whereof the Basic Service Operators were given options to shift thereto. By reason of the said policy, terms and conditions were substituted to the extent that amended licenses were to be issued so far as the technology is concerned. By reason thereof, the license fee was to be charged on AGR basis.

16. We may furthermore notice the financial conditions laid down therein in this behalf, from a perusal whereof it would appear :-

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- (i) An entry fee, being one-time non-refundable amount of Rs.203.66 crores, was to be paid.
  - (ii) The license fee was to be paid annually at the rate of 12 percent of the Adjusted Gross Revenue; and
  - (iii) Beside the same, Radio Spectrum charges were to be paid both for access microwave frequency and backbone microwave frequency separately.

We may also notice Clauses 18.3.1 and 18.3.2 of the license governing the field :-

*"18.3.1 In addition to the Licence Fee as per Clause 18.2, Annual Royalty and Licence Fee for wireless licence for Base Stations and wireless subscriber terminals shall be payable to the Wireless Planning & Coordination Wing as a percentage of Adjusted Gross Revenue (AGR) earned from wireless subscribers. The said percentage of AGR shall be 2% or as amended from time to time for utilizing spectrum upto 5+5 MHz. While calculating the AGR for the limited purpose of levying such annual royalty and licence fee, revenue from wire-line subscribers shall not be taken into account.*

*18.3.2 Further royalty for the use of spectrum for point to point links and other access links shall be separately payable as per the details and prescription of Wireless Planning & Coordination Wing. The fee/ royalty for the use of*

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*spectrum/possession of wireless telegraphy equipment depends upon various factors such as frequency, hop and link length, area of operation and other related aspects etc. Authorization of frequencies for setting up Microwave links by Licensed Operators and issue of Licenses shall be separately dealt with WPC Wing as per existing rules."*

- (iv) Indisputably, the CDMA operators have been obtaining allocation of spectrum on the basis of a separate government order. Such allocation had been made to one of the operators on or about 21.4.2005 for various circles. Clauses 2.3, 3 and 4 of the said communication read as under :-

*"2.3 SACFA clearance is to be obtained separately.*

*3. You are requested to submit the deployment in prescribed format available on website [www.dot.gov.in](http://www.dot.gov.in) in electronic format for further necessary action. Frequency earmarked should not be activated before obtaining the operating License.*

*4. Spectrum charges will be realized w.e.f. the date of issue of this letter."*

The stage from which, however, the spectrum charges should be realized has been the subject matter of a policy decision, correctness whereof is in

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question and we shall consider the legality and validity thereof at an appropriate stage.

17. Validity and/or legality of clause 4 of the said communication dated 21.4.2005 is in question.

18. By reason of a letter dated 02.7.2004, the petitioner No.1 requested that the procedure for allocation of spectrum as well as spectrum charges (royalty and license fee) being streamlined for UASLs in accordance with the conditions applicable to Cellular Operators, which would thereby conform to the guidelines issued in this behalf. The said request was also repeated by other letters as well. It is not in dispute that having regard to the representations made by the petitioner and, in particular the Petitioner No.1 Association, the first respondent sought for a brief comments from it. The respondent No.1 by a letter dated 13.9.2006 emphasized the need of providing for a level playing field. It was furthermore requested that payment for LMDF frequency be based on revenue share in stead and in place of number of Hubs.

19. By reason of an order dated 03.11.2006, the Central Government, however, acceded to the said request with prospective effect, stating :-

*"2.2 The above spectrum charges (as percentage of AGR) are applicable for both for MW access carriers (in Metros and other telecom service areas) as well as the MW backbone carriers separately.*

*3. These orders shall come into force from the date of issue."*

20. One of the challenges made by the petitioner herein is the validity of Clause 3 aforementioned. We may, however, notice that although it was not a part of the pleadings, the respondent herein has placed before us a report of the Working Group constituted for the purpose of examining and recommending the quantum of spectrum charges (revenue share) for MW access and backbone network for GSM and CDMA based telecom service providers. According to the respondent, the said Group was constituted pursuant to the recommendations made by the TRAI, the relevant portions whereof read as under :

*"4.5 Spectrum charging for terrestrial links :*

**TRAI Recommendation :** *To promote the most efficient usage of spectrum for links utilizing technologies other than the traditional cellular platforms, and deployed in point-to-point or point-to-multi-point links, the system of charging for those spectrum allocations should be altered from its current form. For the new system of charging the proposed method is as follows :*

$$R = (\sqrt{M}) * W * C * A * S * P * B \text{ (para 5.5.4.3).}$$



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**Committee's views :** The Committee finds that the formulae recommended by TRAI is too complicated & difficult to implement and may lead to disputes. The Committee feels that the present formula for spectrum charging for terrestrial links is much simpler, non-controversial and therefore may continue.

#### 4.5.1 Spectrum Charges for Service Providers

For the Service Providers, the present charging method on percentage of AGR basis for backbone and access networks of GSM Operators may continue and the same may be adopted for the CDMA Operators also. Further, it is noticed that the present percentages are too low to ensue optimal utilization of the spectrum. Therefore the Committee recommends revision of these percentage charges for microwave access and backbone networks of GSM and CDMA services as follows :

(i) For Microwave Access Network :

Service Area	<u>Existing spectrum charges</u>		Proposed spectrum charges
	<u>Bandwidth</u>	<u>Revenue share</u>	
Metro	<u>Upto 224 MHz</u>	<u>0.25%</u>	0.1% for every 28 MHz or part thereof
	Every additional 56 MHz or part thereof	0.05%	
Circles	<u>Upto 112 MHz</u>	<u>0.25%</u>	0.2% for every 28 MHz or part thereof
	Every additional 28 MHz or part thereof	<u>0.05%</u>	

(ii) For Microwave Backbone Network :

Service Area	<u>Existing spectrum charges</u>		Proposed spectrum charges
	<u>Bandwidth</u>	<u>Revenue share</u>	
Circles	Up to 56 MHz	0.1%	0.3%
	Every additional 28 MHz or part thereof	0.05%	0.15%

21. It is not in dispute that the first petitioner as also the Cellular Operators Association of India were represented before the said Committee.

22. Before us, a letter has been produced being dated 18.9.2006 wherein a statement has been made to the following effect :-

*"4.1 Representative from AUSPI stated that they have signed the UASL licence in 2003 and since then they have been requesting for revenue based charging for their MW networks. He further suggested that the spectrum charging should only cover the administrative cost of managing the spectrum. He also suggested the following revenue share for MW spectrum :*

<i>MW Access</i>	<i>@ 0.1% of AGR</i>	<i>Spectrum up to 224 MHz BW</i>
<i>MW Backbone</i>	<i>@ 0.05% of AGR</i>	<i>Spectrum up to 56 MHz</i>

*AUSPI representative also requested that the revenue share for MW Access and Backbone networks of CDMA based service providers may be implemented from 1.10.2006, besides a single revenue share for the GSM/CDMA Access and MW networks. Responding to this suggestion, Chairman stated that the Access networks are necessarily wireless based, but the Microwave networks could also be engineered on OFC or other media and need not be only through wireless, hence there has to be a different charging principle for Microwave networks."*

23. It, however, appears that by a letter dated 01.12.2006, the petitioner No.1 requested the Chairman of the Telecom Commission and Secretary, Department of Telecommunications stating that there existed an anomaly so far as the amount of royalty payable by the Cellular Operators, on the one hand, and the CDMA operators, on the other, is concerned and, thus, in the interest of level playing field, the said order dated 03.11.2006 be made effective from the date of issue of the UASL guidelines.

24. It furthermore appears that on or about 19.01.2007, another meeting took place wherein, inter-alia, the following decisions were taken :-

*“Effective date for charging on access & backbone networks :*

*AUSPI request : To ensure level playing field, make the Order dated 3.11.2006 effective from at least the date of migration to UASL i.e. Nov., 2003.*

*WPC view : It was clarified in the meeting that the orders take effect prospectively. Hence the revenue share for MW Access and Backbone can not be effective from retrospective date.”*

#### **Proceedings before this Tribunal**

25. The petitioners filed this petition on or about 11<sup>th</sup> May, 2007 praying inter-alia for the following reliefs :-

*"a) Hold and declare that the action of the Respondents in unilaterally altering the basis for payment of royalty charges for access and backbone network from the date of operating license to the date of earmarking is unilateral, arbitrary and impermissible in law;*

*b) Hold and declare that the extra payments made by the Members of the Petitioner Association on this account need to be refunded or adjusted in future payments;*

*c) Hold and declare that the action of the Respondents in not extending the benefit of uniform charging methodology to the CDMA operators at par with the GSM operators from November 2003 onwards is discriminatory, arbitrary, illegal and violative of Article 14 of the Constitution of India;*

*d) Direct the Respondents to refund/grant consequential refund of the excess amounts together with the interest @ 12% per annum from November 2003 or the date of the respective UASL licenses to the date when CDMA UASL Licensees were allowed to pay as per the AGR method (03.11.2006) and adjust the difference between the higher amounts collected on the basis of arbitrary formula and the amounts which it ought to have charged based on the revenue sharing pattern."*

26. Basically, the petitioners in this petition have raised the following issues:-

A. Whether the members of the Petitioner's association providing mobile servicing with CDMA technology should be treated at par with the mobile operators using GSM technology for the purpose of

payment of spectrum charges for microwave from the date when the Petitioners migrated to the UASL i.e. November 2003.

- B. Whether the government can seek payment of spectrum usage charges before giving permission to use spectrum in the form of the operating licence and change the payment methodology without any order, notification, amendment in the existing provisions.
- C. Whether government can seek payment of spectrum usage charges for the entire quarter even when the spectrum allocation is made in the last week of the quarter.

27. It is not in dispute that in the event the first issue is decided in favour of the petitioner, the 2<sup>nd</sup> and 3<sup>rd</sup> issues would become redundant.

28. The matter came up for consideration before this Tribunal on 05.02.2009 when the following order was passed :-

*"Heard the counsels for both the parties. It appears to us that the following will be the appropriate course of action:*

1. *The petitioners who were earlier basic operators and who have migrated to UASL regime, should be treated on par with the cellular operators from the date on which they migrated to UASL.*

2. In so far as the date of charging for Microwave spectrum is concerned, the following would be the arrangement:

a) for the period prior to 31.3.05, it will be from the date of operationalization, and not from the date of earmarking.

b) for the period 1.4.05 till 31.1.09, it will be from the date of expiry of four months from the date of SACFA clearance.

c) From 1.2.09, it will be two month from the date of SACFA clearance provided the party concerned has made a proper application within two months from the date of earmarking. It is further clarified that in the event the party does not make a proper application within two months from the date of earmarking, it will be charged for the earmarked spectrum from the date of earmarking.

It is also further clarified in the event a party which has been earmarked spectrum at any date prior to the date of this order does not apply for SACFA clearance within two months from the date of this order, it will be charged from the date of earmarking irrespective of the above suggestions.

It shall be incumbent upon the WPC Wing of the DoT to inform the applicant within 15 days of the date of application if the said application is not in order, failing which, it will be deemed to be a valid application. If the SACFA clearance is, for any reason declined, the party would be free to apply afresh for SACFA clearance in which case the date of charging will be on expiry of two months from the date of SACFA clearance.

Counsel for respondents submits that he will seek instructions on the above proposed arrangement and revert within four weeks."

29. As for one reason or the other, the respondent did not respond thereto, in terms of the said order dated 05.02.2009, it was directed :-

*"The order dated 5.2.2009 was dictated in presence of counsel for the parties. That was proposed to be the final order in this case. Counsel for the respondent requested for time to seek instructions. On his request, the matter was adjourned to 25.3.09. On 25.3.09 again request was made on behalf of the respondent for adjournment. Nobody present on behalf of the respondent was in a position to assist the Tribunal. Again on request of respondent, the matter was finally adjourned for today. It was made clear that no further adjournment will be granted. Today, Mr. K. Singhal, Advocate is present on behalf of Mr. Vineet Malhotra, Advocate. He wants to make some submissions. However, Mr. Munesh Kumar, the departmental representative who is present, states that he is not aware of what Mr. Singhal wants to submit before the Tribunal and, therefore, he does not want Mr. Singhal to make any submissions. In view of this Mr. Singhal does not want to say anything further.*

*In these circumstances, we make the order proposed as per the proceedings dated 5.2.2009 absolute subject to the following clarification:*

*(a) Learned counsel for the petitioners pointed out that sometimes the spectrum is allocated during the quarter and the liability is raised for the entire quarter. He seeks a direction that*

*spectrum should be charged on pro rata basis depending on the date of allocation. We direct that where spectrum is allotted in the first half of a quarter, the allottee shall be liable to pay for the entire quarter. If, however, spectrum is allotted during the second half of a quarter, the liability will be pro rata.*

*(b) Spectrum for microwave shall include LMDS."*

30. The respondents herein aggrieved by and dissatisfied with the said order, preferred an appeal thereagainst before the Supreme Court of India, which was marked as Civil Appeal No. 8771-8772 of 2010.

31. By an order dated 03.12.2010, the order of this Tribunal was set aside by the Apex Court, stating :-

*"Heard learned counsel on both sides. The impugned orders are perfunctory.*

*They give no adequate reasons. Without going into the merit of these appeals, we set aside the impugned orders. The Telecom Disputes Settlement and Appellate Tribunal (for short, "TDSAT") is directed to decide the matter de novo in accordance with law. All contentions on both sides are expressly kept open. We request the TDSAT to decide the matter as expeditiously as possible preferably within a period of three months.*

*The civil appeals are, accordingly, disposed of."*



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The matter is, thus, before us.

**Submissions :-**

32. Mr. C.S. Vaidyanathan, the learned senior counsel appearing on behalf of the petitioners, would contend :-

- (i) Keeping in view the National Telecom Policy, 1999 and the guidelines issued in respect of UASL licenses providing for neutrality in technology, it was obligatory on the part of the respondents herein to charge royalty both for 'Access Microwave Frequency' and 'Backbone Microwave Frequency' on and from 11.11.2003 and not from 03.11.2006.
- (ii) Keeping in view the fact that date of allocation of frequency cannot be the cut-off date for the purpose of levy of charges of royalty as such allocation does not amount to grant of a license, and as therefor, SACFA clearance is required to be taken and in that view of the matter, the charges levied from the date of issuance of the allocation of spectrum must be held to be wholly unreasonable.
- (iii) Even if any allocation is made on the last date of the quarter, the charges cannot be levied for the entire quarter and in that view of the matter, the respondents should be directed to levy charges

proportionately from the date of grant of the allocation and not for the entire quarter.

33. Mr. Ruchir Mishra, the learned counsel appearing on behalf of the respondents, on the other hand, urged :-

- (i) From the order dated 18.4.2002, it would appear that for the GSM operators, royalty was to be charged on AGR basis and in that view of the matter as CDMA operators did not have full mobility on that day, it cannot be said that they have been discriminated against, as UASL regime came into existence only with effect from 14.11.2003.
- (ii) The corrigendum dated 01.4.2003 being still in force, both for 'Access Microwave Frequency' and 'Backbone Microwave Frequency', the CDMA operators were being charged on the basis of the formula laid down therein. The quantum of the licence fee as also the radio spectrum charges, as provided for in Clause 18.3.1 of the licence, being the same both for cellular operators and CDMA operators, no discrimination can be said to have been made by reason of the impugned order.

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- (iii) As admittedly, the CDMA operators have been getting allocation of spectrum on the basis of a separate government order and the respondent No.2 having a discretion in relation thereto, wherefor policy decisions had to be taken from time to time, which were made applicable to all the allottees of spectrum, it cannot be said that the decision impugned in this petition is arbitrary & discriminatory.
  - (iv) The respondents had to take a policy decision that royalty would be charged from the date of earmarking of the frequency keeping in view the fact that resort was taken to 'frequency holding' by the allottees and after the impugned order was passed, some CDMA operators in fact have surrendered their frequencies.
  - (v) In any event, recommendations having been made by a Committee appointed for the purpose of examining and recommending the quantum of royalty charges and it having filed a report on or about 10.8.2005 wherein representatives of the Petitioner No.1 took part and suggested that the calculation of royalty on the AGR basis be brought about with effect from 01.10.2006, the petitioners cannot be permitted to raise any contention inconsistent therewith or contrary thereto.

- (vi) The levy of the royalty, being on a quarterly basis as per the conditions of licence, no exception thereto can be taken.

### **Retrospectivity Issue**

34. In view of the order dated 03.12.2010 passed by the Supreme Court of India, we have heard the parties de novo and at great length.

35. We may, at the outset, notice that Mr. Vaidyanathan has placed strong reliance upon an order dated 22.9.2005 issued by the first respondent herein, whereby and whereunder the percentage of AGR had been altered with retrospective effect, to contend that it cannot be a policy that under no circumstance, the financial concessions can be granted with retrospective effect. The said order reads as under :

*"The issue of charging royalty and licence fee for cellular mobile telephone service has been reviewed and it has now been decided that the cellular licenses shall pay spectrum charges with effect from 1.8.99, the cut off date of change over to NTP.99 regime. On revenue share basis of 2% Adjusted Gross Revenue (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 and Coordination Wing (WPC). Any additional bandwidth, if allotted subject to availability and justification shall attract*

additional royalty and licence fee as revenue share (typically 1% additional revenue share of bandwidth allocated is upto 6.2 MHz + 6.2 MHz in place of 4.4 MHz + 4.4 MHz).

3. Further, royalty and licence fee for the use of spectrum for point to point links and access links (other than cellular service spectrum) shall be separately payable as per the details and prescription of Wireless Planning and Coordination Wing. The fee/royalty for the use of spectrum/possession of wireless telegraphy equipment depends upon various factors such as frequency, hop and link length, area of operation etc. Authorisation of frequencies for setting up microwave links by cellular operators and issue of licences shall be separately dealt with by WPC Wing as per existing rules."

36. It is, however, not in controversy that the said order does not relate to spectrum. We may, moreover, notice that the charges for allocation of spectrum for MW access and backbone networks of cellular networks was issued for the first time on or about 18.4.2002, the relevant portions whereof read as under :-

"2. Assignment of frequencies for MW access and MW backbone networks for cellular operations, would continue to be considered on the basis of full justification of the requirements and availability of the spectrum, on case-to-case and link-to-link basis, after taking into consideration the interest of the other users with a view to measuring electromagnetic compatibility etc. The complete technical analysis and all related aspects of frequency assignments, including efficient use of spectrum, will apply before assigning frequencies for

various MW access backbone links. There will be no obligation on the part of the Government to assign frequencies for such purposes. Migration to revenue sharing concept is basically to simplify the system for charging of spectrum and in no way it should be linked to the grant of frequency spectrum.

7. The above package of spectrum charging on percentage revenue share will be available to the cellular operators on the premise that it is accepted in its entirety and simultaneously all legal proceedings, with regard to spectrum charging, instituted by them or COAI against the Government in Courts and Tribunals (TDSAT) etc. shall be withdrawn. The cellular operators without prejudice should make payments of all outstanding dues of spectrum charges in accordance with the applicable Government of India orders within a month from the date of issue of this order.

8. This Order will come into force from the date of issue."

37. The said order, thus, was given a prospective effect. We have noticed heretobefore that a corrigendum in regard to calculation of royalty was issued on 01.04.2003.

A policy decision adopted by the Union of India on consideration of the representations made by an Association of operators and/or operators themselves is a matter of policy.

It is, in our opinion, idle to contend that only because in a given case, a policy decision was given retrospective effect, the same procedure must be followed in all other cases.

38. An economic policy, ordinarily, can be adopted by the State while laying down terms & conditions of licence. If a retrospective order is made by the Union of India, it would be exercising its own prerogative. Ordinarily, the order in these types of matters should be given a prospective effect.

The petitioners would contend that they had a legal right. If they had a legal right, they should have approached this Tribunal immediately after denial of the said right by the Union of India before this Tribunal. In stead, they made representations and asked the Union of India to grant some concessions in their favour and/or change the method for calculation of the amount of royalty.

It is one thing to say that the licensees have a constitutional or legal right in the matter of mode and manner of calculation of royalty for use of spectrum but it is another thing to say that they are entitled to force the Central Government to adopt a particular mode of calculation of royalty as a matter of right and that too, with a retrospective effect.

39. It is on the aforementioned backdrop, we may notice the relevant portion of the guidelines for Unified Access (Basic Cellular Services) License, whereupon strong reliance has been placed by the petitioners.

*"In pursuance of this decision, the following shall be the broad Guidelines for the Unified Access Services License.*

- (i) The existing operators shall have an option to continue under the present licensing regime (with present terms & conditions) or migrate to new Unified Access Services Licence (UASL) in the existing service areas, with the existing allocated/contracted spectrum.*
- (ii) The license fee, service area, rollout obligations and performance bank guarantee under the Unified Access Services Licence will be the same as for Fourth Cellular Mobile Service Providers (CMSPs)."*

40. A bare perusal of the said guidelines will demonstrate that the level playing field was to be provided in respect of the matters enumerated therein. It is not in dispute that the quantum of royalty to be charged for grant of access microwave frequency 15/18/23 GHz being for domestic purpose, the same was not a condition of license.

41. It is furthermore evident that the cellular operators stood on a different footing in so far as they were to be charged on a revenue share basis on and from 18.4.2002, on which date the CDMA operators were not permitted to operate on full mobility.



42. The question of any discrimination in this behalf, therefore, in our opinion, does not arise.

43. The equality clause contained in Article 14 of the Constitution of India envisages that persons similarly situated should be treated alike. Article 14 does not contemplate that although a group of persons had been getting certain benefits on the date of coming into force of the policy decision, they will be deprived thereof so as to bring them at par with the new licencees.

44. By reason of the terms & conditions of the licence, some discretionary power has been conferred on the WPC. A policy decision was required to be taken by the competent authority so far as the laying down the terms & conditions of licence and/or quantum of royalty charges are concerned. Such policy decisions, subject to any statutory or constitutional interdict, may also be amended from time to time.

We have noticed heretofore Clause 18.3.2 of the UASL licence granted to the cellular operators and basic operators separately.

The charges for spectrum had been separately dealt with by the WPC Wing as per existing rules. So far as the basic operators are concerned, it was mentioned that WPC Wing of the Respondent shall determine the fees/royalty for use of spectrum/prohibition of 'wireless telegraphic equipments' having regard to the various factors, such as frequency of uplink, area of operation and other related aspects.

Both the categories of operators were to pay royalty and licence fees on MW point to point/access link which was to be levied in terms of the existing rules.

What were the existing rules at the relevant point of time is the question.

45. For the GSM operators, who have migrated to UASL, the rules which were formulated for the purpose of payment of royalty and licence fees on point to point access was as per the WPC Wing's order dated 18.4.2002 providing for payment on AGR basis. However, the exiting rules so far as the CDMA operators, who have migrated to UASL, continued to be the order dated 20.7.1995 providing for royalty and licence fees on point to point access on formula basis.

46. Indisputably, the petitioners herein had been paying royalty/licence fees on formula basis as opposed to the AGR basis, which was applicable to CDMA operators.

It is on that premise that representations were made for change in the existing policy decision. Admittedly, for the purpose of considering the said representation of the petitioner, application of mind was necessary. The Regulator made recommendations in terms of Clause 11(1)(a) of the TRAI Act in July, 2004. The matter was considered by a Committee constituted for the said purpose. It submitted its report on 10.8.2005, pursuant whereeto a Working

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Group was constituted to examine and recommend the quantity of spectrum charges (AGR) under the chairmanship of the Wireless Adviser.

Evidently, therefore, the matter required deeper consideration. Several meetings were held and ultimately the policy decision had to be amended by issuance of a corrigendum on 03.11.2006 in terms whereof the CDMA operators were required to pay royalty and licence fees on MW point to point uplink and access charges on AGR basis.

47. It may be true that the respondents being a State, does not have any unfettered discretion. They cannot act arbitrarily. Their decisions are subject to judicial review. But it is also well settled that although a policy decision is not beyond the pale of a judicial review, it ordinary should be interfered with only on limited grounds and not on the merit thereof.

48. It is not a case where this Tribunal exercises an appellate jurisdiction so as to enable it to enter into the merit of the decision.

49. There cannot, however, be any doubt or dispute that the respondents being 'State' within the meaning of Article 12 of the Constitution of India, are bound to act reasonably and thus, cannot impose wholly unreasonable and discriminatory charges.

50. The petitioners themselves did not question the correctness or otherwise of the financial conditions contained in the UASL licence dated 14.11.2003.

51. Clause 3.2 provides for determination of royalty by the WPC. Such determination was required to be made keeping in view the fact that the spectrum is a scarce commodity. If it has been asking for level playing field, it could have questioned conferment of power in this behalf on WPC. It was also required to take into consideration the events, which might have taken place after UASL regime came into being. We would notice the statements made by the respondent in its reply a little later.

52. Mr. Vaidyanathan, however, would submit that the matter relating to quantum of royalty had not been pending before TRAI. Our attention in this behalf has been drawn to paragraphs 27 to 31 of the rejoinder, wherein it has been contended that TRAI had not made any recommendation but in any event pendency of TRAI's recommendations, cannot be a ground of charging exorbitant rates illegally for microwave spectrum based on technology i.e. those UASL operators using GSM technology should give lower rates than the rates charged from UASL operators using CDMA technology.

53. The fact remains that the matter with regard to the allocation of spectrum and/or charges to be levied therefor by the respondents herein, was

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pending consideration before TRAI. It had given its recommendations from time to time. In fact, with regard to the allocation of 2G and 3G spectrum, some issues are still pending before TRAI.

54. The report of the Committee has been placed before us, from a perusal whereof it would appear that the Petitioner-Association through its General Secretary himself suggested that the Royalty on AGR basis be effected from 01.10.2006. It is true that the report of the Working Group had not been brought on record by way of pleadings or affidavit.

55. Even if we proceed on the basis (although official records are presumed to have been maintained in normal course of business and thus the representation made by the representatives of the Petitioner No.1 Association that UASL regime be made effective from 1<sup>st</sup> October, 2006 should not be doubted) that no concession was made by the representative of AUSPI may be held to be correct, the principal question, which would arise for consideration is whether the decision of the respondents is 'wholly illegal and arbitrary'?. We do not think so.

56. The respondents have given an opportunity of hearing not only to the representatives of the Petitioner No.1 Association but also to the representatives of the Cellular Operators Association of India, a body

representing the Cellular Operators. It had to take into consideration the views of others also. If, for the said purpose, it had been awaiting the recommendations of TRAI and/or took into consideration the relevant factors, it cannot be said that the impugned decision is so arbitrary that it should be struck down as such.

57. There is another aspect of the matter, which cannot also be lost sight of. The cellular operators are not before us. This Tribunal ordinarily should not be oblivious of two different concepts of equality, namely 'Over inclusive concept' and 'under inclusive concept' of equality. Equality can be achieved by either giving a positive direction, which may be mandatory in nature, and another by way of a prohibitory order or by striking down a portion of the order, which is discriminatory in nature.

58. In B. Rajendera Prasad And Anr. Vs. Controller of Examinations, reported in 2004 (1) ALD Pg. 80, it has been held :

*"While dealing with these aspects, the Court, however, has to adopt different situations. In the case of "over inclusion" the Court has no other go to strike down the State action which has included those persons who do not fit into category of classification. However, if it is a case of "under inclusion" as is the case before us, the Court cannot*

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*give a mandamus to the State to include that category of persons, who are left out of the classification for it is axiomatic that it is for the public authority to make law or to make regulations. If the Court comes to the conclusion that "under inclusion" is arbitrary though it may satisfy rationality test and nexus test, the Court has to remit the matter back to public authority to reconsider the whole issue. But, the Court cannot issue any direction to include persons who as a group are left out of defined class."*

This Tribunal directed the Union of India to place the records before us. Having gone through the records, we are satisfied that in the meeting dated 14.7.2006 the representatives of the petitioner suggested that the royalty on MW point to point uplink and access uplink on AGR basis be implemented from 01.10.2006. It is, therefore, evident that the petitioners even did not at that point of time insist that the same should be given retrospective effect from 15.11.2003. Such a conduct on the part of the authorized representative of the petitioner, in our opinion, constitutes an estoppel by conduct.

We are of the opinion that different rules were existing for the GSM operators and CDMA operators with regard to the payment of royalty/licence fees for spectrum charges. *Stricto sensu* the matter was not governed by the conditions of licence. Discretionary power was conferred on the WPC Wing. Royalty/licence fee for use of spectrum was charged for two different categories of operators on different basis. They are situated differently, being governed by different rules and were otherwise covered by Clause 18.3.2 of their respective licences, the question of the purported amendment in the policy was not given

a retrospective effect, the same ipso facto would not attract the wrath of Article 14 of the Constitution of India. Whether the action on the part of the State is unreasonable and otherwise violates the level playing field may have to be considered from different angles, but then in a situation of this nature, in terms of which two different rules were operating keeping in view the sources thereof as also the prerogatives of the WPC to determine the mode of calculating licence fee payable having regard to the various factors which would include the consideration as to whether one side will be benefited keeping in view the nature of the equipments used for operation of their business.

59. Article 14 of the Constitution of India, in a case of this nature, cannot be said to have any application.

Correctness of the order of the earlier Bench being dated 05.02.2009 is in question. The same having been set aside by the Supreme Court of India in exercise of its appellate jurisdiction is, thus, no longer operative.

We are, therefore, to consider the controversy between the parties while exercising our jurisdiction in adversarial System.

The approach of this Tribunal, while passing the said order dated 05.02.2009, was completely different.

60. An opinion was formed with regard to the reasonableness of the impugned order and the Bench considered the same to be a reasonable one. If



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the respondent for one reason or the other did not agree thereto expressly, the matter could have been heard. Moreover, the records of DoT were called for.

The parties, in our view, should have been given an opportunity of hearing by the Tribunal. Reasons were required to be assigned. If the Respondent did not respond to the suggestions of the Bench of this Tribunal, the matter should have been proceeded with upon hearing the counsel of the parties and perusing their records. This Tribunal has now heard the parties and perused the records. It is entitled to take a different view; the former opinion being neither operative nor binding.

It does not create a binding precedent.

61. Reference to charge of royalty on the ground of neutral technology, in our opinion, may not be correct.

Neutrality of technology means an option given to a party to take any of the technologies. The same would not mean same treatment be given to both categories of operators for all purposes. The operators having been in use of two different technologies, therefore, cannot claim equality in all respects; the technology as also the equipments being different. The efficiency of utilizing the same may also be different. In any event, it is not necessary to determine the same.

62. It is in that context only, the members of the Petitioner No.1 Association thought it fit to make a representation, which was ultimately allowed upon due

consideration thereof and upon obtaining the recommendation of the TRAI, but the same would not mean that the same was bound to be allowed with a retrospective effect. Two different sets of rule being operative, it was for the Central Government to consider the same. If for the said purpose, a committee was constituted and the Central Government acted on the basis of the report of the said Committee, the same cannot give rise to invocation of the equality clause.

At the cost of repetition, it must be mentioned that the concept of equality has different shapes. It would only mean that equals should be treated equally if all factors are similar. Here, admittedly all factors were not similar. Different rules having been operating, the amendment in the procedure was necessary to be laid down. If a separate order was required to be passed which has been done in the instant case, no exception thereto can be taken.

63. What is under challenge is the validity of the said order. Whether the said order should have been given a retrospective effect or prospective effect, is the only question.

The question of applicability to the level playing field, therefore, must be considered from a broader perspective i.e. not only as to whether CDMA operators and GSM operators were similarly situated but also the fact that processes were required to be undertaken in arriving at a decision. If the said decision has been implemented with a prospective effect, the role of this Tribunal being limited, it is difficult to expand our jurisdiction in the matter. In

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a case of this nature, it cannot equate its power as akin to the superior Courts of the country, exercising power of judicial review. Even if such a power can be exercised, in the opinion of this Tribunal no such case has been made out.

64. We may in this connection notice two recent decisions of the Supreme Court of India.

In *Bajaj Hindusthan Ltd. Vs. Sir Shadi Lal Enterprises Ltd. and Another* reported in 2011 (1) SCC 640, the Apex Court has held as under :-

*“34. The High Court has held that exemption from licensing can be granted under Section 29-B to small industries but not to large industries. With respect we cannot agree. A perusal of Section 29-B(1), which has been quoted above, shows that a notification under the said provision can be issued in respect to four categories. Smallness of the industry, is only one of such categories. The fourth category viz. “the stage of development of any scheduled industry” is very wide, and thus gives wide power to the Central Government to delicense even large industries.*

*39. We should not be understood to have meant that the judiciary should never interfere with administrative decisions. However, such interference should be only within narrow limits e.g. when there is clear violation of the statute or a constitutional provision, or there is arbitrariness in the Wednesbury sense. It is the administrators and legislators who are entitled to frame policies and take such administrative decisions as they think necessary in the public*

interest. The Court should not ordinarily interfere with policy decisions, unless clearly illegal.

**40.** *Economic and fiscal regulatory measures are a field where Judges should encroach upon very warily as Judges are not experts in these matters. The impugned policy parameters were fixed by experts in the Central Government, and it is not ordinarily open to this Court to sit in appeal over the decisions of these experts. We have not been shown any violation of law in the impugned notification or press note."*

Yet again, recently in *State of H.P. & Ors. Vs. Himachal Pradesh Nizi Vyavsayik Prishikshan Kendra Sangh* reported in 2011 (4) SCALE 801, it has been held :-

*"11) The High Court has lost sight of the fact that education is a dynamic system and courses/subjects have to keep changing with regard to market demand, employability potential, availability of infrastructure, etc. No institute can have a legitimate right or expectation to run a particular course forever and it is the pervasive power and authority vested in the Government to frame policy and guidelines for progressive and legitimate growth of the society and create balances in the arena inclusive of imparting technical education from time to time. Inasmuch as the institutions found fit were allowed to run other courses except the three mentioned above, the doctrine of legitimate expectation was not disregarded by the State. Inasmuch as ultimately it is the responsibility of the State to provide good education, training and employment, it is best suited to frame a policy or either modify/alter a decision depending on the circumstance based on relevant and acceptable materials. The*

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*Courts do not substitute its views in the decision of the State Government with regard to policy matters. In fact, the Court must refuse to sit as appellate authority or super legislature to weigh the wisdom of legislation or policy decision of the Government unless it runs counter to the mandate of the Constitution."*

65. Yet again in Heena Kausar Vs. Competent Authority reporting in 2008 (14) SCC 724 it has been held as under :-

*"23. This Court in State of W.B. v. Anwar Ali Sarkar as also in Ram Krishna Dalmia v. Justice S.R. Tendolkar categorically laid down the twin test of classification. The classification, however, should be based on reasonable and rational differentia and should not be arbitrary."*

66. More significantly, however, as a prospective effect has been given to an economic policy, the Courts ordinarily should not interfere therewith, subject of-course, to arriving the same being not arbitrary, discriminatory or otherwise illegal. We, therefore, are of the opinion that the impugned order dated 3<sup>rd</sup> November, 2006 cannot be struck down, as being discriminatory or violative of the National Telecom Policy.

**Charge of Royalty from the date of earmarking issue**

67. Allocation of frequency is done for the purpose of giving effect to the licenses. It is accepted that after such allocation, the operators are required to take clearance from a large number of Government agencies. They are known as Standing Advisory Committee for Frequency Allocation (SACFA). Upon earmarking of the frequency, an application is required to be filed by the operators pointing out the spot selected by them for SACFA clearance.

68. The respondents in their reply, stated :-

*"It is submitted that it had emerged that in the past that when spectrum charges were being charged from the date of issue of licence or from the date of use of frequency, there were cases where neither the service provider started the service nor the radio spectrum allocated was surrendered by the Operator.*

*It is submitted that keeping in view this fact a decision was taken that for efficient and optimal use of spectrum which is a scarce resource, the Government decided to levy the spectrum charges to the Operator from the date of earmarking of the frequency from March, 2005. This was necessitated due to non use of the earmarked spectrum by the Operators and also due to the fact that demands of radio spectrum were increasing day by day in view of the growth of telecom sector in India.*

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*It is reiterated that Radio Spectrum is a limited scarce natural resource, which has to be used optimally and efficiently by all wireless users. That levy of Spectrum charges from the date of allocation/earmarking is one of the tools to enforce efficient, optimum and effective use of radio spectrum.*

*In this context it may be pointed out that once a particular frequency is earmarked in favour of a particular operator, it cannot be assigned to other operator to whom it has been allotted in that area until and unless the previous operators surrenders it of its own. It becomes unavailable for the respondent, once it is allocated to an Operator.*

*It is also relevant and pertinent to point out that spectrum is required to increase the teledensity in the country and cannot be allocated to be wasted by mere allocation without any use by the Operator. That once a spectrum is allocated to a particular operator it cannot be allowed or earmarked to another operator unless it is surrendered. Therefore, as far as the respondent is concerned, the Spectrum become unavailable to the respondent from the time it is earmarked and therefore the decision taken by the respondent to charge royalty from the date of earmarking is correct and cannot be found to be in any manner unreasonable.*

*In this context it is also pertinent to mention that since the introduction of spectrum charges from the date of earmarking of frequency, many telecom operators, especially, CDMA based operators, have surrendered large number of frequencies unutilized by them.*

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*It is submitted that the decision to levy telecom charges from the date of earmarking have been taken after considering the matter in detail."*

*"49. Para 49 of the petition is wrong and denied. It is denied that the respondents should have made the change in payment methodology for CDMA Operators for microwave from 2002. It is submitted that the CDMA based UASL operators came into existence from November, 2003 after migration from BSOs to UASL. These operators were governed by a separate license agreement issued to BSOs. That there was no change in policy for spectrum charging in respect of Microwave Access/Backbone till November 2006 and CDMA & GSM based UASL were paying spectrum charges as per their respective government order existing then. The order dated 3<sup>rd</sup> November 2006 pertaining to uniform spectrum charging for microwave Access/Backbone networks of GSM as well as CDMA based operators and also rationalization of the spectrum charges is applicable from the date of issue of the order. Further no government order having financial implications is issued retrospectively in general. Therefore, the present order has not been made effective retrospectively."*

69. A statement has been made in the petition that the time for obtaining SACFA clearance used to take 18 to 24 months. Our attention in this behalf has been drawn to para 13 of the petition which is in the following term :-



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*"As a practice, generally it took about 12-18 months, after earmarking of a particular spot till obtaining actual permission for operating a link."*

70. We have noticed heretofore the statement made by the respondent. The petitioners, however, except making a general statement, did not state specifically as to how much time had been taken for grant of SACFA clearance in the cases of the petitioners other than the first petitioner.

71. We may notice that the affidavit in support of the petition has been affirmed by the Secretary General of Petitioner No.1 Association, Mr. Subhash Chandra Khanna. He has not verified the aforementioned statement as true to his knowledge.

72. We may notice para 2 of his affidavit, which reads as under :-

*"That I have read and understood the contents of the accompanying Petition, which has been drafted by our Counsel under my instructions. The contents thereof are true and correct to the best of my knowledge based on official records maintained in usual course of business and information received and believed to be true and correct. Legal submissions are based on the legal advice rendered*

*and verily believed to be true and correct. No part of it is false and nothing material has been concealed therefrom."*

The question before us essentially relates to an order passed by the Central Government with regard to allowing of a private operator to establish telegraphs upon allotment of spectrum, which is a matter of policy decision. Correctness of such policy decision must be considered on the basis of materials brought on record. There is a tabulated statement made by the Union of India in para xx and xxi of the written submissions that other statutory organizations and public sector undertakings have also been brought within the purview of the said policy. We have no doubt about correctness of the said statement. The petitioners also in their written submissions have not controverted the same. If this Tribunal adopts it to be one of the grounds for upholding the policy decision, in our opinion, no exception thereto should be taken.

73. If any operator was aggrieved by any act of in-action on the part of the respondent No.2, it could have approached this Tribunal directly. Nobody has done so. The contention of the respondent that all the allottees of spectrum are to pay the charges from the date of earmarking of the frequency must be accepted as correct.

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74. If even the departments of the Central Government, statutory organizations and Public Sector Undertakings are to pay the royalty from the date of earmarking, no question of discrimination arises.

The question before us may essentially an order passed by the Central Government in regard to allowing of a private operator to establish telegraphs upon allotment of spectrum is a matter of policy decision. Correctness of such policy decision must be considered on the basis of materials brought on record. There is a tabulated statement made by the Union of India in para xx and xxi of the written submissions that other statutory organizations and public sector undertakings have also been brought within the purview of the said policy. We have no doubt about correctness of the said statement. The petitioners also in their written submissions have not controverted the same. If this Tribunal adopts it to be one of the grounds for upholding the policy decision, in my opinion, no exception thereto can be taken.

75. We would, however, direct the respondents to consider any specific case in this regard, if any operator brings the same to its notice.

#### **Quarterly Payment Issue**

76. The date of allocation of spectrum assumes some significance. An operator should not be made to pay for an act, which is not within its control.

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We are, therefore, of the opinion that that part of the earlier orders of this Tribunal appears to have some justification. No person, including a 'State' can unjustly enrich itself. Only because the license provides for payment of royalty on quarterly basis, the same would not mean that irrespective of the date of allocation, said charge must be levied mechanically. Apart from the fact that there existed a condition of license of payment on quarterly basis, as noticed heretobefore, no arguments have been advanced.

### **Epilogue**

77. Before parting with this case, we are of the opinion that unfortunately in the earlier round of litigation, the respondents had not made any submission. There might have been some discussions at the Bar and this Tribunal thought to make a proposal which, it was considered, would be acceptable to the respondents. It was expected of a State that it would come up with one stand or the other. It could have rejected the suggestion of this Tribunal and raise its own contentions. For reasons best known to it, it chose to remain silent.

78. We furthermore fail to understand as to why such important documents, like the report of the Working Group had not been placed before this Tribunal at the first stage. No such contention has also been raised in the pleadings. We have no doubt in our mind that the competent authority of the WPC shall take

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notice of the fact and take such action against the officers concerned or at least see to it that in future, the same is not repeated.

79. For the reasons aforementioned, this petition is allowed in part and to the extent mentioned hereinbefore.

However, in the facts and circumstances of this case, there shall be no order as to costs.

.....J  
(S.B. Sinha)  
Chairperson

.....  
(P.K. Rastogi)  
Member

rkc

## ANNEXURE-I

## Availability status of MW Access carriers

S. No.	Service Area	13 GHz (8 nos)		15 GHz (15 nos)		18 GHz (32 nos)		21 GHz (40 nos)		Total Balance carriers available for allocation in 18 & 21 GHz
		Total allotted Carriers	Available Carriers	Total allotted Carriers	Available Carriers	Total allotted Carriers	Available Carriers	Total allotted Carriers	Available Carriers	
										54
1	Delhi (Metro)	4	4	15	0	14	8	8	32	43
2	Mumbai (Metro)	4	4	15	0	21	1	12	28	50
3	Kolkata (Metro)	0	0	15	0	18	4	4	36	54
4	Tamil Nadu (incl. DM) (A)	3	3	15	0	14	18	7	33	54
5	Karnataka (A)	3	3	15	0	12	20	9	31	54
6	A.P. (A)	3	3	15	0	13	19	8	32	50
7	Madhya Pradesh (A)	3	0	15	0	17	15	5	35	55
8	Gujarat (A)	3	0	15	0	13	19	4	36	60
9	Kerala (B)	3	5	15	0	10	22	7	33	59
10	Punjab (B)	3	5	15	0	12	20	6	34	62
11	Haryana (B)	3	5	15	0	10	22	5	35	58
12	UP (WB) (B)	3	2	15	0	11	21	5	35	58
13	UP (EB) (B)	3	2	15	0	11	21	5	35	58
14	Rajasthan (B)	3	2	15	0	12	20	4	36	64
15	MP (B)	3	5	15	0	9	23	4	36	65
16	WB (B)	3	5	15	0	8	24	4	35	63
17	Assam (C)	3	3	15	0	7	25	5	35	63
18	NE (C)	3	3	15	0	7	25	5	35	64
19	J&K (C)	3	5	15	0	8	24	5	36	61
20	HP (C)	3	0	15	0	7	25	4	35	59
21	Bihar (C)	7	1	15	0	9	23	5	35	65
22	Orissa (C)	3	5	15	0	9	23	3	37	

Note: MW Backbone carriers are being allotted in 600 MHz and these bands are not yet occupied.

### International Practices

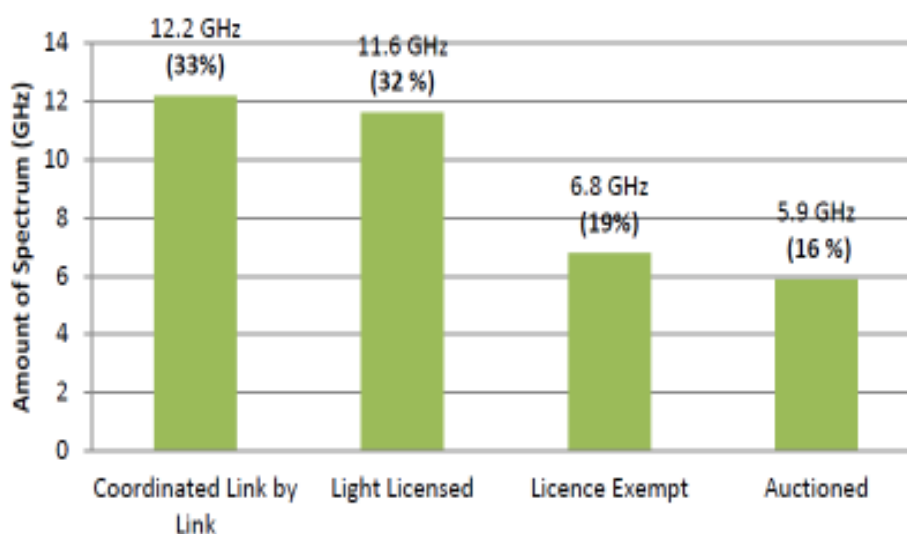
#### UNITED KINGDOM

1. UK regulator, Ofcom assigns and regulates the assignment of spectrum for fixed microwave point-to-point links to Telecom Service Providers (TSP). Approximately 37 GHz of spectrum in the bands ranging from 1.4 GHz to 86 GHz is available in the UK for fixed terrestrial point to point links and the majority of fixed links in the UK is used to provide backhaul for cellular networks. OFCOM has adopted different approach for assignment of spectrum for point to point links. On the basis of assignment, the spectrum available for fixed links can be distinguished into four types: - (i) OFCOM coordinated, (ii) Light Licenced, (iii) Licence exempted and (iv) Auctioned/ Block Licenced Spectrum.

**Chart 1**

#### **Current Management Approach for Spectrum available for fixed links in the UK**

(as a percentage of the total spectrum available for fixed point to point links)



2. Ofcom coordinated spectrum is fully licensed and technically coordinated on a link by link basis by Ofcom. Ofcom sets the technical assignment criteria in consultation with stakeholders and use this to coordinate the links to prevent interference. All of these fixed link bands are assigned on first-come-first-basis and consist of a pair of carriers. The pricing of wireless fixed links is done as per the spectrum pricing

algorithm given in the 2005 Wireless Telegraphy License Fees Regulations<sup>11</sup>. There is around 12 GHz of spectrum in this category spread across fourteen separate bands between 1.4 GHz and 60 GHz.

3. In Auctioned/Block licensed category Ofcom packages the spectrum into blocks (typically, on a regional or UK-wide basis) that are licensed to a single licensee via an auction process. The licensee is then responsible for micro-management of any assignments within its licensed block and can use the spectrum either for its own use (e.g. backhaul for its own mobile network) or for provision of spectrum access services to others (third party band management).<sup>12</sup> There have been two auctions of this type of spectrum: the 28GHz auction in 2000 by the Radio Authority and the 10-40 GHz auction by Ofcom in 2008. The 10-40 GHz auction included frequencies in the 10 GHz, 28 GHz, 32 GHz and 40 GHz bands; and some national as well as some regional licences were issued. Summary of results of “10-40 GHz” auction of 2008 is given below<sup>13</sup>:

**Table 1**

<b>Band</b>	<b>10 GHz National</b>	<b>28 GHz National</b>	<b>28 GHz Sub National 1</b>	<b>28 GHz Sub National 2</b>	<b>28 GHz Sub National 3</b>	<b>32 GHz National</b>	<b>40 GHz National</b>
<b>Number of Lots</b>	10	2	1	1	1	6	6
<b>Size of each lot</b>	2 × 10 MHz	2 × 112 MHz	2 × 112 MHz	2 × 112 MHz	2 × 112 MHz	2 × 126 MHz	2 × 250 MHz
<b>Minimum price per lot</b>	£10,000	£60,000	£20,000	£10,000	£30,000	£60,000	£30,000
<b>Final price per lot</b>	£69,000	£707,000	£97,000	£37,000	£130,000	£594,000	£151,000

4. In Light licensed category, individual link licenses are issued by Ofcom, but the licensees take their own responsibility for coordinating these links. Ofcom does not generally specify the channel arrangements in these bands and licensees have the freedom to choose the channel size.

<sup>11</sup> <http://licensing.ofcom.org.uk/binaries/spectrum/fixed-terrestrial-links/guidance-for-licensees/FeeCalcDoc.pdf>

<sup>12</sup> <http://stakeholders.ofcom.org.uk/binaries/consultations/spectrum-review/update.pdf>

<sup>13</sup> <http://www.cramton.umd.edu/papers2005-2009/cramton-review-of-10-40-ghz-auction.pdf>



Links are registered on Ofcom's wireless telegraphy register and are given priority in the band on a 'date of registration' basis, which can be referred if an interference case arises. There is approximately 12 GHz of spectrum in this category located between 64 GHz and 86 GHz. Ofcom has decided to review the light licensing self coordinated approach and to consider a number of possible options that are likely to deliver the best outcome considering the urgent requirement to establish the way forward with respect to facilitating 4G infrastructure rollout.

5. Unlicensed spectrum can also be used for backhaul purposes. In License Exempt category, users of licence do not need to inform Ofcom of their planned use or coordinate among themselves for operation. However they have to follow general conditions agreed to prevent interference. There is approx. 7 GHz of license exempt spectrum available in 57 - 64 GHz.

## **SINGAPORE**

6. Infocomm Development Authority (IDA) of Singapore assigns frequencies for microwave backhaul links to Facilities Based Operators (FBO) to provide backbone links between major exchanges and also as links for their local access networks. IDA generally assigns frequencies for point-to-point fixed service links on a shared-use basis. Use of exclusive frequency assignment is discouraged. For the request for exclusive frequency assignment, applicant is required to provide justifications and only usage that warrant such assignment is approved by the IDA.
7. IDA encourages the use of hot standby and space diversity for backbone links to improve the service availability. To ensure the efficient usage of frequency, frequency diversity is generally not permitted. To ensure the efficient use of lower frequency band, which have better propagation characteristics, IDA decides the choice of frequency band based on the path length of the fixed service link. As a

general rule, the request for a frequency in any band should satisfy the minimum path length as stipulated in Table below:

**Table 2**

<b>Frequency Range</b>	<b>Channelling Plan</b>	<b>Channel Width (MHz)</b>	<b>Minimum Path Length</b>
5925-6425 MHz	ITU-R F.383-8	29.65	20 Km
6425-7125 MHz	ITU-R F.384-10	20	20 Km
7125-7725 MHz	ITU-R F.385-9	7	20 Km
7725-8500 MHz	ITU-R F.386-8	29.65	20 Km
10.5-10.68 GHz	ITU-R F.747-0	7/14	15 Km
10.7-11.7 GHz	ITU-R F.387-11	20	15 Km
12.2-12.7 GHz	ITU-R F.746-9	20	15 Km
12.75-13.25 GHz	ITU-R F.497-7	28	15 Km
14.4-15.35 GHz	ITU-R F.636-3	7/14/28	10 Km
17.7-19.7 GHz	ITU-R F.595-9	27.5/55	5 Km
21.2-23.6 GHz	ITU-R F.637-3	3.5/7/14/28	2 Km

8. IDA does not guarantee the availability of the frequencies for any length of time. Usage of each frequency is renewed on an annual basis. However, taking into account the need for continued operation of the service and lead time required for migration, IDA endeavours to give notice as early as possible if there is a change in the spectrum plans.
9. Two types of charges are levied on the FBOs for the assignment of microwave backhaul links. One part of the charge is application and processing Fees. It is a one-time charge. Another spectrum charge is frequency management fees, which is charged annually. Application and processing fee and the frequency management fee are given in Table below: <sup>14</sup>

**Table 3**

<b>Radio Frequency Spectrum</b>	<b>Application &amp; Processing Fee Payable Per Frequency</b>
25 KHz or less	\$290
25 KHz < Bandwidth < 500 KHz	\$450
500 KHz <= Bandwidth < 1 MHz	\$ 1,350
1 MHz <= Bandwidth < 20 MHz	\$ 2,700
Bandwidth >= 20 MHz	\$ 4,650

<sup>14</sup> Singapore Management Handbook, 2014 by IDA Singapore (<http://www.ida.gov.sg>.)

**Table 4**

<b>Radio Frequency Spectrum</b>	<b>Fee Payable per frequency per annum</b>
Frequencies for Networks and Systems – (a) Exclusive use – (i) Bandwidth of 1 MHz or more	\$12,000 for the first MHz of occupied bandwidth and \$300 per subsequent MHz of occupied bandwidth or part thereof.
(b) Shared use – (i) Bandwidth of 300 KHz or more but less than 20 MHz. (ii) Bandwidth of 20 MHz or more	\$3,500 \$6,200

**GERMANY**

10. The Federal Network Agency (FNA), as per Telecommunications Act 2004, is the central body for planning, coordinating and assigning frequencies for fixed radio relay links. While assigning spectrum bands, FNA ensures that the spectrum available for fixed links is used as efficiently and effectively as possible and that all interested users have an easy access to such links. Frequency assignment for the operation of microwave backhaul is generally done in spectrum bands of 6, 7, 13, 15, 18, 23, 26, 28, 32 and 38 GHz. However, FNA is also considering opening of frequency bands above 50 GHz for microwave wireless backhaul. For assignment of frequencies for point-to-point backhaul, service providers have to apply at the Federal Network Agency. The calculation of spectrum fees is done by Federal Network Agency on the basis of fixed link algorithm for point-to-point links. Applicants do not have a legal right to a particular transmitting frequencies, but may state their preference. During the assignment procedure the Agency checks whether or not the preferred or other frequencies are available and can be coordinated (compatibility with other fixed links already operated, and coordination with military users, where appropriate). The Federal Network Agency does not do any general technical, radio hop or radio relay system planning work in connection with frequency

assignment. These tasks need to be carried out, or outsourced, by the fixed link operators themselves.

## **AUSTRALIA**

11. Australian Communications and Media Authority (ACMA) takes care of the assignment of the spectrum for fixed point-to-point links under the apparatus license system. Apparatus licences can be issued for any period up to a maximum of five years and may be renewed on expiry. There are two types of fees applicable to apparatus licences: administrative charges to recover the direct costs of spectrum management, and annual taxes to recover the indirect costs of spectrum management.
12. The annual licence tax is applied to each chargeable 'spectrum access' of an assigned licence. The annual licence tax is determined by multiplying the following factors: -
  - (i) Normalisation Factor:** - The constant converts the relative spectrum values provided by the rest of the formula to an actual dollar figure. It is updated by CPI adjustments every year to keep licence taxes constant in real terms.
  - (ii) Bandwidth:** - Taxes also vary depending on the bandwidth within which a service is licensed to operate.
  - (iii) Power:** - The power factor allows a reduced tax for low-power spectrum accesses, which deny spectrum to other users over a small area. Spectrum accesses that are not low power have a power factor of one. However, the low-power factor does not apply to point-to-point link as there is weak correlation between the power level and the area over which spectrum is denied to other users.
  - (iv) Location Weighting:** - There are 65 combinations of spectrum and geographic locations, which have each been assigned a location

weighting. The location combinations reflect the density of services and demand for spectrum at different frequencies and geographic areas. Higher taxes in locations of higher density and demand encourage efficient spectrum use.

**(v) Adjustment Factor:** - Adjustment factors are used to modify the tax levels of some licensing options which introduce the flexibility to vary taxes according to parameters that are not included in the tax formula. E.g. for fixed point-to-point below 960 MHz and above 960 MHz, the adjustment factor is 18.4841 and 0.4369 respectively.

13. Apart from annual charges, there are also administrative charges which are of three kinds: issue, renewal and instalment charges. Charges apply per spectrum access for assigned licences, and per licence for non-assigned licences.

**(i) Issue Charges:** - cover the direct costs incurred by the ACMA in issuing the licence (the major cost of which is the frequency assignment task). The issue charge is also payable when the ACMA carries out the assessment for a spectrum access, but does not issue it. This may occur when there is no suitable frequency available at the site nominated by the applicant. An accredited person may also perform the frequency assignment task and provide a client with a frequency assignment certificate. The ACMA will then issue a licence. This incurs a smaller issue charge.

**(ii) Renewal Charges:** - a renewal charge of \$4.00 is payable for each chargeable spectrum access. If a renewal request for an assigned licence is not received by 60 days after the expiry of the old licence, the frequency assignment and call sign become available for assignment to other services.

**(iii) Instalment Charges:** - Where a licence is taken out for more than a year, a licensee can choose to pay the tax by annual instalment.

14. It is not necessary for licensees to use the tax formula to calculate their annual tax, as the ‘annual licence tax (\$ per kHz)’ tables display the results of the formula for each licence type at every spectrum/geographic location, and include the normalisation factor. This means that licensees only need to refer to the tables in the applicable division, multiply the relevant figure by the bandwidth of their spectrum access (per kHz) and apply the low-power discount if necessary. E.g. License Charges (\$ per KHz) for Fixed Point-to-Point Licences<sup>15</sup> for (a) >8.5 to 14.5 GHz and (b) >14.5 to 31.3 GHz frequency range are given below:

**Table 5**

<b>Spectrum Location</b>	<b>Geographic Location</b>				
	<b>Australia-wide</b>	<b>High Density</b>	<b>Medium Density</b>	<b>Low Density</b>	<b>Remote Density</b>
>8.5 to 14.5 GHz	0.3999	0.1439	0.0340	0.0025	0.0011
>14.5 to 31.3 GHz	0.3999	0.1064	0.0234	0.0025	0.0011

This is subject to a minimum tax of \$36.17. In addition, the licensee shall have to pay (a) Issue Charges - \$493 and (b) Renewal/ Instalment Charges - \$4 as administrative charges.

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<sup>15</sup> Apparatus License Fee Schedule dated 15<sup>th</sup> August, 2012

## Annexure 3.2

### Pricing Formula applicable for Point to Point Fixed RF links

Countries	Pricing Formula	Factors
UK <sup>16</sup>	<p><b>As = Sp x Bwf x Bf x Plf x Avf (x CCDP Discount x Directional Discount)</b></p> <p>Where –</p> <ul style="list-style-type: none"> <li>- 'As' means the sum to be calculated.</li> <li>- 'Sp' is the spectrum price, being a sum set at £88 per 2 x 1 MHz for each bidirectional link.</li> <li>- 'Bwf' means the value of actual system bandwidth (MHz).</li> <li>- 'Bf' means the band factor which is determined by the actual frequency band.</li> <li>- 'Plf' is the path length factor which is determined from the actual path length and the minimum path length which is specified in Interface.</li> <li>- 'Avf' means the availability factor which is determined from the required system availability.</li> </ul>	<p><b>Element Range:</b> Spectrum Price: Set at £88 per 2 x 1 MHz.</p> <p>Bandwidth Factor: Minimum = 1 MHz but any actual value above this with an observed maximum of 135 MHz.</p> <p>Band Factor: Any value between 0.00 and 1.00 is possible. However the current active range is 1.0 to 0.17 (decreasing with frequency band).</p> <p>Path Length Factor: 1 or the minimum between <math>\sqrt{\text{Minimum Path Length / Actual Link Path}}</math></p> <p>Availability Factor: Between 0.7 and 1.45.</p> <p>CCDP Discount: For 2nd link operating co-channel cross polar to the 1st link along a common path the value is 0.5 otherwise it equals 1.</p> <p>Directional Discount: For uni-directional links the value is 0.75 otherwise it equals 1.</p>
Australia <sup>17</sup>	<b>At = K x B x P x Adj x LW</b>	<p>'At' is the annual spectrum fees.</p> <p>'K': Every year all apparatus licence taxes are increased by CPI. This is to ensure that the desired outcomes of the tax, efficient use of spectrum and indirect cost recovery, are not eroded by the effects of inflation.</p> <p>'B' is Bandwidth (in KHz).</p> <p>'P' is the power factor which allows a reduced tax for low-power spectrum accesses which deny spectrum to other users over a small area. Spectrum accesses that are not low power have a power factor of one.</p> <p>'Adj' is the adjustment factors for particular sets of licensing options such as premium to reflect the higher demand for mobile spectrum or a discount to reflect the frequency reuse possible with fixed links. This gives flexibility to adjust values according to parameters not included in the formula and to make adjustments to correct historic anomalies.</p> <p>'LW' is a weight related to the spectrum location and the geographic location (Australia wide, high density, medium density, low density and remote density) of the license.</p>

<sup>16</sup> Fixed Link Licence Fee Algorithm (Ofcom) - <http://licensing.ofcom.org.uk/binaries/spectrum/fixed-terrestrial-links/guidance-for-licensees/FeeCalcDoc.pdf>

<sup>17</sup> [http://www.acma.gov.au/webwr/\\_assets/main/lib410241/apparatus\\_licence\\_fee\\_schedule-27aug2012.pdf](http://www.acma.gov.au/webwr/_assets/main/lib410241/apparatus_licence_fee_schedule-27aug2012.pdf)

Kenya <sup>18</sup>	<b>F (in Kenyan Shilling) per transmitter = (RFBW/ 8.5 kHz) × K1 x Unit fee x FZ</b>	Where, Unit fee = 574.10, as Kenyan Shilling for an 8.5 kHz band. K1 is the band factor, = 0.9 for frequency band ≤ 1GHz = 0.3 for frequency band > 1 GHz and ≤ 10 GHz = 0.21 for frequency band > 10 GHz and ≤ 20 GHz = 0.15 for frequency band > 20 GHz and ≤ 30 GHz = 0.1 for frequency band > 30GHz RFBW is RF bandwidth in KHz or 500KHz, whichever is higher FZ Frequency Zone Factor = 1 for Zone A (High Congestion Zone) = 0.5 for Zone B (Low Congestion Zone)																				
UAE <sup>19</sup>	Annual Spectrum Fee for each fixed point to point link above 2 GHz shall be calculated as follows: <b>Spectrum Fee = F x 2000 + BW x 1000</b> Where: F = Frequency range factor BW = Bandwidth Factor	<table><tr><td>Frequency Range</td><td>F factor</td></tr><tr><td>2GHz - 3GHz</td><td>4</td></tr><tr><td>&gt;3 GHz - 14 GHz</td><td>3</td></tr><tr><td>&gt; 14 GHz - 40 GHz</td><td>2</td></tr><tr><td>Above 40 GHz</td><td>1</td></tr></table> <table><tr><td>Bandwidth</td><td>BW factor</td></tr><tr><td>7 MHz or less</td><td>1</td></tr><tr><td>&gt; 7MHz - 28 MHz</td><td>2</td></tr><tr><td>&gt; 28 MHz - 56 MHz</td><td>3</td></tr><tr><td>More than 56 MHz</td><td>4</td></tr></table>	Frequency Range	F factor	2GHz - 3GHz	4	>3 GHz - 14 GHz	3	> 14 GHz - 40 GHz	2	Above 40 GHz	1	Bandwidth	BW factor	7 MHz or less	1	> 7MHz - 28 MHz	2	> 28 MHz - 56 MHz	3	More than 56 MHz	4
Frequency Range	F factor																					
2GHz - 3GHz	4																					
>3 GHz - 14 GHz	3																					
> 14 GHz - 40 GHz	2																					
Above 40 GHz	1																					
Bandwidth	BW factor																					
7 MHz or less	1																					
> 7MHz - 28 MHz	2																					
> 28 MHz - 56 MHz	3																					
More than 56 MHz	4																					
South Africa <sup>20</sup>	<b>Spectrum fees = Unit×BW×FREQ×CG×GEO×SHR×HOPMINI×UNIBI</b> Where: UNIT - Cost per MHz BW - Bandwidth FREQ - Frequency Band CG - Congestion GEO - Geographical Factor SHR - Sharing HOPMINI - Minimum Hop Length ASTER - Area Sterilisation UNIBI - Uni- or bi-directional	Factors: UNIT – Annual Basic price per MHz. BW - The Bandwidth used (BW) is the number of MHz assigned. FREQ - Different frequencies have different propagation characteristics. Higher frequency Bands are assigned lower factors. CG - The Congestion Factor indicates if the band is congested or not. For Congested Band this factor is 1.50 and for Not Congested Band it is 1.00. GEO - The Geographical factor depends on where in the country the spectrum is to be used. For High Density Area it is 1 & for low density area it is 0.1. SHR - Spectrum can be assigned in 'Exclusive' and 'Shared' use. When exclusive use of spectrum is assigned then, the regulator (ICASA) is responsible for making sure, as far as possible, that no interference occurs. When spectrum is shared, then sharing parties are responsible for coordinating amongst themselves to avoid interference. It is '1' for exclusive use or '0.5' for shared use. UNIBI - The Unidirectional factor (UNIBI) takes into account inefficiencies inherent in only making unidirectional use of spectrum. For Point-to-Point uses it is '0.75' for unidirectional use and '1.00' for Bidirectional use. ASTER - Only applies to Point to Multipoint uses of spectrum. HOPMINI = √ (MINIMUM PATH LENGTH / ACTUAL PATH LENGTH). This factor takes in to account the optimal use of the frequency band.																				

<sup>18</sup> [http://www.cck.go.ke/licensing/spectrum/downloads/Frequency\\_fee\\_schedule\\_-\\_effective\\_1st\\_July\\_2012.pdf](http://www.cck.go.ke/licensing/spectrum/downloads/Frequency_fee_schedule_-_effective_1st_July_2012.pdf)

<sup>19</sup> <http://www.tra.gov.ae/spectrum-policies-regulations.php>

<sup>20</sup> <http://www.ellipsis.co.za/wp-content/uploads/2012/02/5-Spectrum-Fees-20120305a.pdf>