BROADBAND POLICY 2004

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Broadband Policy 2004

Preamble

Recognising the potential of ubiquitous Broadband service in growth of GDP and enhancement in quality of life through societal applications including tele-education, tele-medicine, e-governance, entertainment as well as employment generation by way of high speed access to information and web-based communication, Government have finalised a policy to accelerate the growth of Broadband services.

Demand for Broadband is primarily conditioned and driven by Internet and PC penetration. It is recognised that the current level of Internet and Broadband access in the country is low as compared to many Asian countries. Penetration of Broadband, Internet and Personal Computer (PC) in the country was 0.02%, 0.4% and 0.8% respectively at the end of December, 2003. Currently, high speed Internet access is available at various speeds from 64 kilobits per second (kbps) onwards and presently an always-on high speed Internet access at 128 kbps is considered as 'Broadband'. There are no uniform standards for Broadband connectivity and various countries follow various standards.

Government envision an accelerated growth in Internet penetration and PC, as the success of Broadband would largely be dependent on their spread. It has been decided that following shall be the framework of the policy.

1.0   Broadband connectivity:

Keeping in view the present status, Broadband connectivity is defined at present as

 "An 'always-on' data connection that is able to support interactive services including Internet access and has the capability of the minimum download speed of 256 kilo bits per second (kbps) to an individual subscriber from the Point Of Presence (POP) of the service provider intending to provide Broadband service where multiple such individual Broadband connections are aggregated and the subscriber is able to access these interactive services including the Internet through this POP. The interactive services will exclude any services for which a separate licence is specifically required, for example, real-time voice transmission, except to the extent that it is presently permitted under ISP licence with Internet Telephony."

2.0 The estimated growth for Broadband and Internet subscribers in the country envisaged through various technologies is as follows:

Year Ending	Internet Subscribers	Broadband Subscribers
2005	6 million	3 million
2007	18 million	9 million
2010	40 million	20 million

3.0   Technology Options for Broadband Services

The Broadband Policy Framework visualises creation of infrastructure through various access technologies which can contribute to growth and can mutually coexist. Spread of infrastructure is a must for healthy competition and therefore it would be the endeavour of the Government that the telecommunication infrastructure growth in the country is not compromised in any manner.

3.1   Various access technologies, inter-alia, are:

(a) Optical Fibre Technologies

The fibre optics technology can provide nearly unlimited bandwidth potential and is steadily replacing copper network specially in intra-city backbone networks. This is being deployed in commercial buildings and complexes and some metros / big cities having high-density potential broadband subscribers. Hybrid Fibre Coaxial (HFC), Fibre to the Curb (FTTC) and Fibre to the Home (FTTH) networks make use of fibre cabling into the last mile. The fibre based models are future proof as they are able to provide huge amounts of

bandwidth in the last mile as well as provide a true IP and converged network that can deliver high quality voice, data and video.

There are more than 4.5 lakh route km of optical fibre laid by BSNL / MTNL and more than 1 lakh route km laid by private operators. The spread of the networks of private service providers have to play an important role in bringing the fibre to homes as well as the rural areas and they are expected to focus on it.

With the increase in commercial availability of fibre technologies, the cost of fibre rollout is approaching the cost of other wired networks. Spread of optical fibre networks shall be emphasised keeping in view the long-term perspective.

(b) Digital Subscriber Lines(DSL) on copper loop :

DSL has proved to be an important technology for provisioning of Broadband services through the copper loop. The owners of copper loop have to be given a high priority because their role is critical as key drivers in the Broadband service market using DSL.

Bharat Sanchar Nigam Limited (BSNL) and Mahanagar Telephone Nigam Limited (MTNL) as well as other access providers are expected to aggressively use their copper loop infrastructure for providing Broadband servicesthrough this technology.

Recognising that last mile copper loop is not a 'bottleneck facility' for broadband services, access providers shall be free to enter into mutually agreed commercial arrangements for utilization of available copper loop for expansion of broadband services. The owner of local loop shall be free to decide the areas in which investment is to be made to upgrade the infrastructure for Broadband services. The information regarding the areas in which Broadband services are being offered by a service provider shall be available in the public domain.

Further, use of brand-name being treated as a part of the value shall be permitted in such commercial arrangements.

There are more than 40 million copper loops in the country available with BSNL and MTNL out of which 14 million loops are in rural areas. Copper cable network of these operators is a combination of old and new cable and this makes provisioning of Broadband on all the available copper loop technically unfit. Therefore, around 25-30% of the remaining 26 million loops, i.e. approximately 7 million loops can be leveraged for broadband service by BSNL and MTNL taking into account the condition / life of copper cable and demand potential.

Mobile/Fixed Wireless

Satellite

Modem/Set-top box

Customer Premises

Optical Fibre Cable

Copper telephone line

Coaxial Cable

Broadband Services

Broadband Services refer to the new generation of high-speed information services, which allow users to access the Internet-related services such as browsing, downloading, gaming, instant messaging, email etc. (supported by traditional dial-up services) at significantly higher speeds. In addition, new services are being developed specifically for users with broadband connections such as viewing good quality live video or downloading large MP3 files. Some of these services are given below :

- High-speed Internet Access
- Video-on-demand
- Interactive games
- Share market dealing and personal banking
- Online shopping and browsing
- News, travel and leisure information
- Music downloads and movie downloads
- Chatrooms and newsgroups
- E-Mail and instant messaging
- Personal websites and online magazines
- Educational materials and research resources
- Tele-medicine
- Work at home
- Internet radio and webcast concerts

Note: contents in this box are not part of 'Broadband Policy -2004'

Management of BSNL and MTNL has decided to provide 1.5 million connections by the end of 2005. The corporate / work plan of these PSUs have been drawn up for this purpose. Thereafter, annual plan for expansion of Broadband services by BSNL and MTNL will be determined in consultation with them. A quarterly review of their performance by the Government in the Department of Telecommunications (DoT) shall be undertaken to evaluate the achievement and redefine the future roadmap, if necessary.

It is hoped that other access service providers would also provide broadband connections using their copper in a targeted manner. A constructive review of their performance shall also be undertaken.

(c) Cable TV Network

It is noted that cable TV connection as last mile infrastructure reaches more people than even the telephone copper infrastructure and can be leveraged in providing cable operators a new business model while giving a stimulus to Broadband penetration. Therefore, Cable TV network can be used as franchisee network of the service provider for provisioning Broadband services. However, all responsibilities for ensuring compliance of terms & conditions of the licence shall vest with the Licensee. The terms of franchise agreement between Licensee and his franchisee shall be settled mutually by negotiation between the two parties involved.

(d) Satellite Media

Very Small Aperture Terminals (VSAT) and Direct-to-Home (DTH) services would be encouraged for penetration of Broadband and Internet services with the added advantage to serve remote and inaccessible areas.

It is the intention of the Government to make available transponder capacity for VSAT services at competitive rates after taking into consideration the security requirements. Department of Space is already interacting with VSAT service providers. Department of Telecommunications, in consultation with the concerned Ministries, will soon propose measures in the direction of Open Sky Policy for VSAT operators. The role of Department of Space is critical in such an endeavour.

VSAT service providers are permitted to transmit data upto 2 Mbps instead of earlier limit of 512 kbps in a Closed User Group domestic VSAT network. The increased data rate allows new applications like bulk data transfer for software industry, high-speed backhaul links, in-house training using audio-visual etc. Reduction in antenna size enables easy installation, lower space occupancy, lower cost of hardware etc. Accordingly, the antenna size has been reduced to 1.2 metres and 2.4 metres for star network and mesh network

respectively in extended C-band. In Ku-band also, 1 metre diameter antenna in star network has been permitted. To keep pace with technological advances, this shall be periodically reviewed.

Commercial VSAT service providers having ISP licence shall be permitted use of same hub station and remote station to provide Internet service directly to the subscribers. Further, this remote station shall be permitted to be used as a distribution point to provide Internet services to multiple independent subscribers. Necessary amendments in the licence agreement shall be carried out immediately.

DTH service providers shall be permitted to provide Receive Only Internet Service after obtaining ISP licence from Department of Telecommunications. Further, ISP licensees shall be permitted to allow customers for downloading data through DTH after obtaining necessary permission from the competent authority. DTH Service providers will also be permitted to provide bidirectional Internet services after obtaining VSAT and ISP licence from DoT.

(e) Terrestrial Wireless

Recognising that terrestrial wireless is another upcoming technology platform for Broadband, it has been decided in principle to de-licence 2.40 - 2.48 GHz band for low-power outdoor use on non-protection, non-interference and non-exclusive basis. Necessary notification shall be issued. Further, notification regarding delicensing 2.40 - 2.4835 MHz band for low power indoor applications permitting use of all technologies, which inter-alia include those based on IEEE 802.11b and 802.11g standards, has been issued.

To accelerate penetration of Broadband and Internet, the 5.15 - 5.35 GHz band shall be de-licensed for the indoor use of low power Wi-Fi systems. For outdoor use, the band 5.25 - 5.35 GHz shall be de-licensed in consultation with DoS and delicensing in the band 5.15 - 5.25 GHz would be considered after the process of vacation. Alternative spectrum bands which are not in high usage and could be deployed for Broadband

services, shall also be explored and identified.

(f) Future Technologies

In the changing technology scenario, there is a possibility of new options being used for provisioning of Broadband services. These technologies can also be utilised for provisioning of such services within the licensing framework of the service provider and the spectrum management policy of DoT.

3.2 Quality of Service (QoS)

As per TRAI Act, 1997, TRAI has to prescribe QoS parameters. Government recognises that QoS parameters are extremely important and have an impact on investment and roll-out decisions of operators. TRAI would be requested to prescribe QoS parameters for provisioning of broadband service using various access technologies at an early date.

3.3 Simplification of SACFA/WPC clearance

The VSAT operators shall be allowed to start the installation process for VSAT terminals after a period of one month of submitting all relevant documents to WPC for SACFA / WPC clearance wherever the total height of such

Broadband News

- There are about 100 million Broadband subscribers worldwide and this is increasing by about 2,00,000 every month.

- Around 45% broadband subscribers are based in the Asia Pacific Region.

- USA accounted for about 30% and Europe, Middle East & Africa together contributed nearly 25%.

- Broadband penetration is 0.02 per 100 persons in India, 0.4 in Malaysia, 1.4 in China and 25 in Korea.

- Worldwide 3G Broadband Subscriber base is 8.79 million for WCDMA and 8.69 million for CDMA 1x EvDO.

Source : Internet

installation is less than 5 metres above the rooftop of an authorised building.

In the case of Receive Only VSAT terminals and DTH with Receive Only Internet, no SACFA / WPC clearance will be required wherever the total height of such installation is less than 5 metres above the rooftop of an authorised building.

Government have decided that the reference to WLL in IND49 of NFAP-2002 shall be deleted to promote use of indigenously developed technologies. This would enable service providers, other than basic service operators, to use the 1880-1900 MHz band for provision of various services under their licence.

A transparent scheme is being outlined separately for time-bound frequency allocation, siting clearance and wireless licensing by removing the cumbersome procedures, computerisation and by setting predetermined standards.

4.0 Other Issues

4.1 Bandwidth availability including international bandwidth is a major driver for broadband services. In a competitive environment, service providers are expected to take appropriate steps for making required bandwidth available in a time bound manner within their licence framework. Cost of bandwidth constitutes a major cost component for Broadband services. Government and TRAI would address this issue on priority. TRAI has already issued a consultation paper for international bandwidth leased line cost and is expected to address the issue shortly.

Government have recently decided to reduce the licence fee for Infrastructure Provider category-II (who provides end to end bandwidth) to 6% of Adjusted Gross Revenue (AGR). Further, the amount of bank guarantee for such service

provider has also been reduced to Rs.5 crores from Rs.100 crores.

4.2 National Internet Exchange of India (NIXI) has been set up by DIT, Government of India to ensure that Internet traffic, originating and destined for India, should be routed within India. It is expected that NIXI will take appropriate steps for increasing the utilisation of such facilities.

4.3 Role of other Agencies

PCs, content and applications are important constituents for overall growth of Internet and Broadband services. Broadband services will accelerate decentralised governance at Panchayat level.

The role of other facilitators such as electricity authorities, Departments of ITs of various State Governments, Departments of Local Self Governments, Panchayats, Department of Health and Family Welfare, Department of Education is very important to carry the advantage of Broadband services to the users particularly in rural areas.

4.4 Fiscal Issues

The Department of Telecommunications assigns a very high priority to indigenous manufacture of Broadband related equipments. It shall endeavour to work closely with the concerned Ministries and Manufacturers' Associations so that the equipments are available at an affordable price. The department is conscious of the fact that Broadband services can reach the urban and rural consumers only if services are offered at affordable and easy terms. Department of Telecommunications will work out a package in consultation with Ministry of Finance and related Departments as well as concerned service providers to achieve this.

Approvals issued by TEC during the period July 2004 to September 2004	
Type Approvals………………….............	160
Interface Approvals……………..............	56
Service Test Certificates...…....…..........	25
Total ………………........................	**241**

Approvals issued by TEC upto 30.09.2004	
Type Approvals………………….............	6906
Interface Approvals……………..............	4015
Service Test Certificates...…....…..........	1677
Grand Total ………………..............	**12598**

Broadband Wireless Technologies

Different Broadband wireless technologies are outlined below. Each technology has niche market applications.

3G Mobile

3G (Third Generation) Mobile Networks based on WCDMA and CDMA 2000 support data rates at a minimum of 144 kbps for outdoor mobile environments; 384 Kbps in low mobility environment and 2 Mbps in indoor environments. 3G could be the preferred broadband technology in the days to come. 3G systems support wide area coverage with high mobility. However Inter-operability, licensing of spectrum, cost of the customer equipment are some of the issues concerning 3G.

Wi-Fi (Wireless Fidelity)

Wireless LAN (WLAN) technology is another Wireless Broadband option. The most widely used Wireless LAN standard IEEE 802.11b (also known as Wi-Fi) uses 2.4 GHz band and delivers 11 Mbps of data over distances of around 100 meters. Wi-Fi `hotspots' or access points are located at various locations such as Malls, restaurants, hotels, airports etc. These access points provide wireless Internet access. Users with Wi-Fi compatible devices such as laptops and Personal Data Assistants (PDA) can connect to the Internet wirelessly within the range of these hotspots. WLANs provide higher data rates with low mobility and cover small areas with high density demand for data centric applications. Security and interference are major technological challenges.

Wireless LAN Standards at a glance

Standard	Data Rate (Max.)	Distance	Frequency
IEEE 802.11 a	54 Mbps	50 mts	5 GHz
IEEE 802.11 b (Wi-Fi)	11 Mbps	100 mts	2.4 GHz
IEEE 802.11 g (backward compatible with 802.11 b)	54 Mbps	100 mts	2.4 GHz
HiperLAN 2 (ETSI standard)	54 Mbps	50 mts	5 GHz

WiMAX

IEEE 802.16 standard defines the WirelessMAN air interface specification for wireless Metropolitan Area Networks (MANs), promoted by WiMAX (Worldwide Interoperability for Micowave Access)

alliance. IEEE 802.16 complements Wi-Fi by providing wireless broadband backhaul to 802.11 hotspots and last mile broadband connectivity to homes that may have wireless LAN (IEEE 802.11) networks. It provides for up to 50 km service area range, allows users to get broadband connectivity without requiring direct line of sight with the base station; and provides shared data rates up to 70 Mbps in 2 - 11GHz band.

LMDS & MMDS

Broadband fixed wireless access technologies such as Local Multipoint Distribution System (LMDS) and Multichannel Multipoint Distribution System (MMDS) are beginning to surface as alternate options. They provide point-to-multipoint, two-way broadband services. LMDS operates in various bands such as 10.5 GHz, 26 GHz, 28 GHz and typically covers a range of 8 km at 10.5 GHz and 3 km for 26 & 28 GHz. LMDS provides various interfaces at user end such as E1, 4xE1, 10/100 Base T Ethernet etc. MMDS normally operates in 2-3 GHz band and provides high-speed data rates upto 10 Mbps over a 20 - 40 km radius.

Free Space Optics (FSO) Technologies

Free Space Optics (FSO), also called Free Space Photonics (FSP) or Optical Wireless, enables optical transmission of data, voice and video through open space (without fibre). Like Fibre, Free Space Optics (FSO) uses lasers to transmit light at near infrared wavelengths (Tera Hz) within line-of-sight ranges. Commercially available systems offer capacities in the range of 10 Mbps to 2 Gbps over distances upto a few kilometers, and demonstration systems report data rates as high as 160 Gbps.

Satellite

Satellite based broadband services can be accessed using Very Small Aperture Terminals (VSAT), Direct-to-Home (DTH) terminals etc. Satellite based network can reach otherwise inaccessible areas also. C, Ku & Ka frequency bands are normally used for services involving fixed terminals, and 'L'-band for the mobile services. Satellite can have either a large foot print covering the entire geographical area or spot-beam for a much smaller area allowing frequency reuse. Data rates vary according to the type and size of the terminal starting from 9.6 kbps for a handheld terminal to 60 Mbps for a fixed VSAT terminal. Satellite networks, in near future, are envisaged to support bit rates upto 155 Mbps, which is equivalent to fibre optic access in space.

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Broadband Wireline Technologies

DSL

DSL (Digital Subscriber Line) is a technology for bringing high-bandwidth information to homes and small businesses over   ordinary copper telephone lines. xDSL refers to different variations of DSL, such as ADSL, HDSL etc. Achievable data rates depend on the distance and cable impairments.

Optical Fibre Technologies

Optical fibre, with its unmatched capacity to carry enormous amount of information over unlimited distances and deployed heavily in backbone networks and metropolitan networks is suitable for fixed broadband access using technologies such as Passive Optical Network (PON), Fibre-To-The-Home (FTTH), Fibre-To-The-Curb (FTTC), Hybrid-Fibre Coaxial (HFC) etc.

DSL Technologies at a glance

Acronym	Technology	ITU-T Standard	Downstream Data rate (Max.)	Upstream Data rate (Max.)	Reach
ADSL	Asymmetric Digital Subscriber Line	G.992.1	8 Mbps	640 Kbps	3.5 km
ADSL	Splitterless ADSL	G.992.2	1.5 Mbps	512 Kbps	4 km
ADSL2+	ADSL - Extended bandwidth	G.992.5	16 Mbps	800 Kbps	1.5 km
SHDSL- 2w	Single pair High-speed DSL	G.991.2	2312 Kbps	2312 Kbps	3 km
SHDSL- 4w	SHDSL four-wire	G.991.2	4624 kbps	4624 Kbps	3 km
VDSL (asymmetric)	Very high-speed DSL	G.993.1	52 Mbps	6-26 Mbps	300 m
VDSL (symmetric)	Very high-speed DSL	G.993.1	26 Mbps	26 Mbps	700 m

Cable Modem

Cable modems are devices that allow high-speed access to the Internet via a cable television network. The existing Cable TV subscriber base in India is over 40 million. A cable TV subscriber can be provided Broadband access using the Cable Modem technology through the use of Set-Top-Boxes at the customer premises.   Cable Modems can offer speeds as high as 10 Mbps. The cable TV infrastructure needs to be upgraded to support two-way communications.

Power Line Communications (PLC)

Also referred to as Broadband over Power Lines (BPL), it can provide broadband Internet access through ordinary power lines. User needs to plug a BPL modem into any outlet in an equipped building to have high speed Internet access. Since power lines form one of the most extensive networks in the world, surpassing the phone network as well as the cable network in size and coverage, PLC is considered as a viable option in some parts of the world. However, there are several technological challenges due to interference with noise, radio, television etc.

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