Regulatory, Policy & Deployment Issues for Broadband in India

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Introduction

Broadband- Broad Definition

- **Generally, Broadband describes high speed, high capacity data communication making use of DSL, Cable Modem, Ethernet, Fixed Wireless Access, Optical Fiber, W-LAN, V-SAT etc.**
- **There is no specific international definition for the Broadband though there is a common understanding that it should be better than ISDN.**
- **TRAI proposed following definition:**
  - **'Always-On' data connection that is able to support various interactive services including Internet access having the capacity of a minimum download speed of 256 Kbps to an individual subscriber form the Point of Presence of the service provider.**

Broad ICT Statistics-India

(June 2004)

1) Population- 1.08 billion

2) Fixed Teledensity – 4.2 (43.3 million nos.)

3) Mobile Teledensity- 3.22 (37.7 million nos.)

4) Overall Teledensity- 7.42 (81 million nos.)

5) Internet Connections- 5 million (15 million users @ 3 users per connection)

6) No. of PCs- 12 million

7) No. of TVs- 100 million

8) No. of Cable TV Connections-50 million

9) International Connectivity- 180 Gbps/16.7Tbps

10) National connectivity- 1000 Gbps (6.7 Lakh Kms)

11) Broadband Connections- 2,50,000

12) International Gateways by ISPs- 25 (Including 5 on Submarine cables)

Targets for Internet & Broadband Penetration

Year	Internet Subscribers (in million)	Broadband Subscribers (in million)
2004 (existing)	5.0	0.25
2005	6.0	3.0
2007	18.0	9.0
2010	40.0	20.0

Broadband India- Technology Neutrality

- **Service Providers can choose any technology**
- **Over existing infrastructure**
  - ✓DSL/ ADSL over Copper loop
  - ✓Cable Modem over Cable TV network
  - ✓Power Line Broadband Access
- **Over new Cable Infrastructure**
  - ✓Fiber To The Home (FTTH)
  - ✓Hybrid Fiber Coaxial (HFC)
- **Over Wireless Infrastructure**
  - ✓Fixed Wireless Access (FWA), WiMAX (802.16a/ b)
  - ✓Wireless LAN (Wi-Fi) (802.11a/ b/ g)
  - ✓V-SAT, DTH Broadcasting System
  - ✓High speed WLL (GPRS, EDGE, CDMA, CorDect)

Telecom Policy Objectives to support Broadband

- **Establish a unified regulatory framework for the carriage of information in the scenario of convergence.**
- **Facilitate development of national infrastructure for an information based society.**
- **Make available broadband interactive multimedia services to users of the public network.**
- **Provide high speed data and multimedia capability using new technologies to all villages with a population greater than 2,000.**
- **Make available Internet services at panchayat (village) level for access to information to provide product consultancy and marketing advice and e-governance.**

Govt's Role in Promoting Broadband

- Creating the right policy environment by removing entry barriers.
- Creating National Backbone infrastructure.
- Establishing Internet Exchange in the country.
- Permitting Unlimited Competition for Broadband.
- Encouraging International players to setup Gateways in the country.
- Funding community investment in Broadband in uneconomic remote rural areas.
- Leveraging Govts. own demand and setting example by being on-line leader.
- Extending special tax concessions for equipments & access devices used for Broadband.

Enabling Regulation for Broadband

- Promoting facility-based competition by lowering market entry barriers.
- Permitting infrastructure sharing among different service providers for optimum utilization and cost reduction.
- Allowing captive infrastructure of utility companies to be used for public Broadband service.
- Reducing the bottleneck in last-mile access by permitting deployment of alternative technologies like Cable TV network, Wireless, Power Line etc.
- Reducing the cost of bandwidth for domestic and international Internet connectivity.
- De-Licensing of Radio Spectrum used for Broadband services.
- Permitting broadcast infrastructure like DTH to be used for Broadband access.

Liberalized Licensing and Regulation for Broadband Services

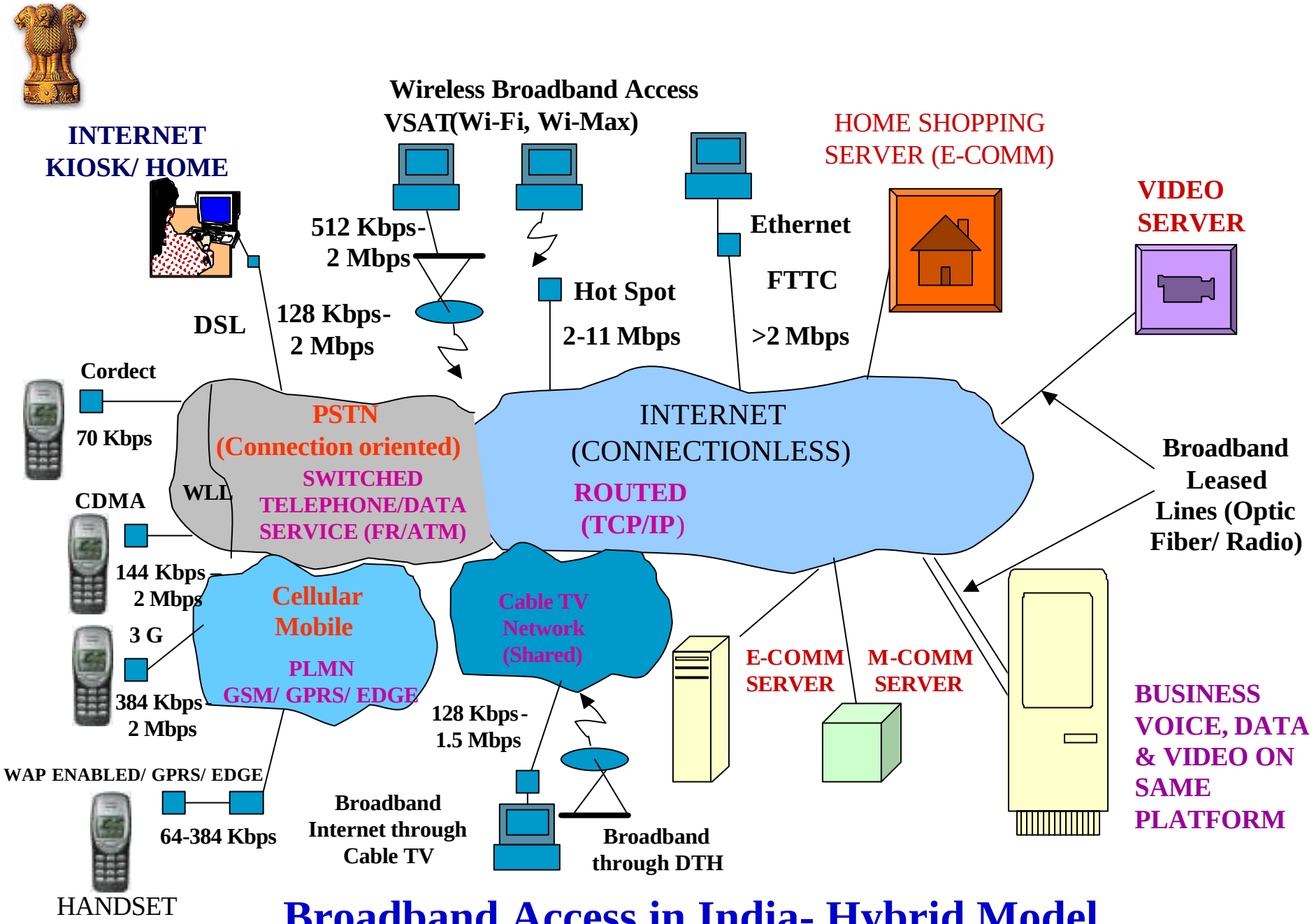
- Same as Internet Service Providers' (ISP) License.
- The most liberal licensing regime.
- Unlimited competition (190 ISPs operational, 388 Licenses signed).
- No entry fee.
- No license fee (revenue share).
- No contribution to Universal Service Fund (USF).
- Permitted to have own international gateway through sub-marine optical fiber cable or satellite.
- FDI limit (100% for non-gateway service provider, 74% for International gateway service provider).
- Permitted to make use of BSO's Dialup Network, Cable TV's Network, own Copper, Fiber, Radio for last-mile connectivity.
- 2.4 Ghz (ISM) band de-licensed for in-building and in-campus usage for broadband W-LAN (under process for outdoor usage).
- High speed WLL permitted for BSOs.
- A liberal V-SAT licensing policy (upto 2Mbps).
- Permission to use DTH setup for Receive-Only Internet under process.

Bandwidth Scenario

1. **ISPs permitted to take bandwidth directly from Foreign Satellites by setting up International Gateway (20 gateways/ 1.5 Gb).**
2. **ISPs permitted to setup Submarine Cable Landing Station for International Gateway (5 landing stations, 180 Gb/ 16.7 Tb designed).**
3. **Unrestricted entry permitted for infrastructure providers:**

   Category 1 (towers, buildings, dark fibers).

   Category 2 (End-to-End National bandwidth).
4. **Utility Companies like Railways, Power Grid's, Gas Authority's telecom infrastructure permitted to be used for broadband connectivity (10Gb/ 70,000 Km).**
5. **Streamlining of 'Right of Way' procedures (including Barter Arrangement with State Authorities).**
6. **Setting up of National Internet Backbone (NIB)- 10 Gb/ 60,000Km.**
7. **Almost all 585 districts of the country provided with Internet nodes, connected through optical fibre (6,00,000 Kms).**
8. **India ranks 45th in the E-Network Readiness as per WEF report.**



Broadband Access in India- Hybrid Model

(making use of existing infrastructure & wireless)

Enabling Wireless Broadband

1. Evolution of Alternate Last Mile Technologies
2. Mobile Technology Developments
3. Broadband using DTH for Receive-only Access
4. V-SAT for Broadband Access
5. Facilitating Radio Spectrum for Broadband Access

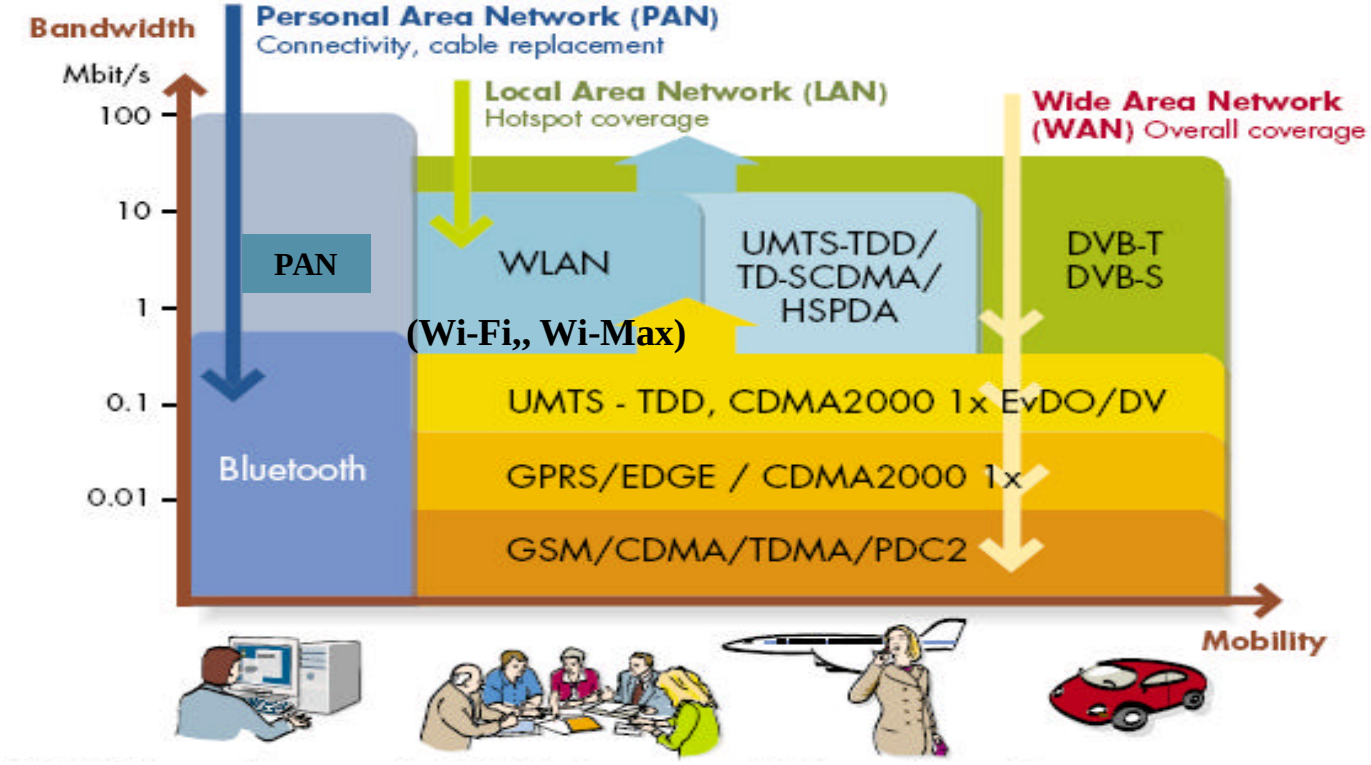
1. Evolution of Alternate Last Mile Technologies

- **Use of Coaxial Cable for Telecom Services (Cable TV Network for Broadband and telephony local loop).**
- **Use of DSL technology on traditional Copper Loops.**
- **Wireless Access Service for Fixed and Mobile communication.**
- **VSAT-based Access in remote areas.**
- **DTH based one-way Broadband Access.**

2. Mobile Technology Developments

- **GSM, GPRS, CDMA1-X, CorDect, 802.11 (WLAN, Wi-Fi), PTT, Bluetooth, UWB- Already Available.**
- **EDGE,3G,B3G, 802.11n, 802.16 (WiMAX), OFDM, 802.20(WWAN, Mobi-Fi, MBWA)- Emerging out.**
- **Personnel Area Network (PAN) associated with body/ clothing-Becoming a possibility.**
- **Fixed Mobile Convergence leading to inter-changeability of handsets for any type of access – Dual Mode Multi Band handsets.**
- **Software Defined Radios (SDR) – Multi-Functional, Multiservice, Multiprotocol, Multiband, Multimode (Universal) Radios.**

Wireless Technology Options for Network Access for Broadband Services



In addition to the easy and cost effective roll-out advantages, wireless access technology provides the "Mobility" as value addition. Nothing has succeeded as Mobile Telephony in recent days in Indian Telecom.

Satellite based DTH Services offer alternate for the Broadband via Receive Only Internet Service (ROIS)

- Deployment of DTH for TV has begun, but internet access through this was not permitted
- While internet data is downloaded from the satellite, the uplink connection to the ISP is through another channel
  - Since DTH (or receive-only VSAT) dish is only receiving, should not require SACFA clearance or NOCC fee for uplink monitoring
- New technology permits DTH to be used for bi-directional internet access, though costs are high because of required hardware

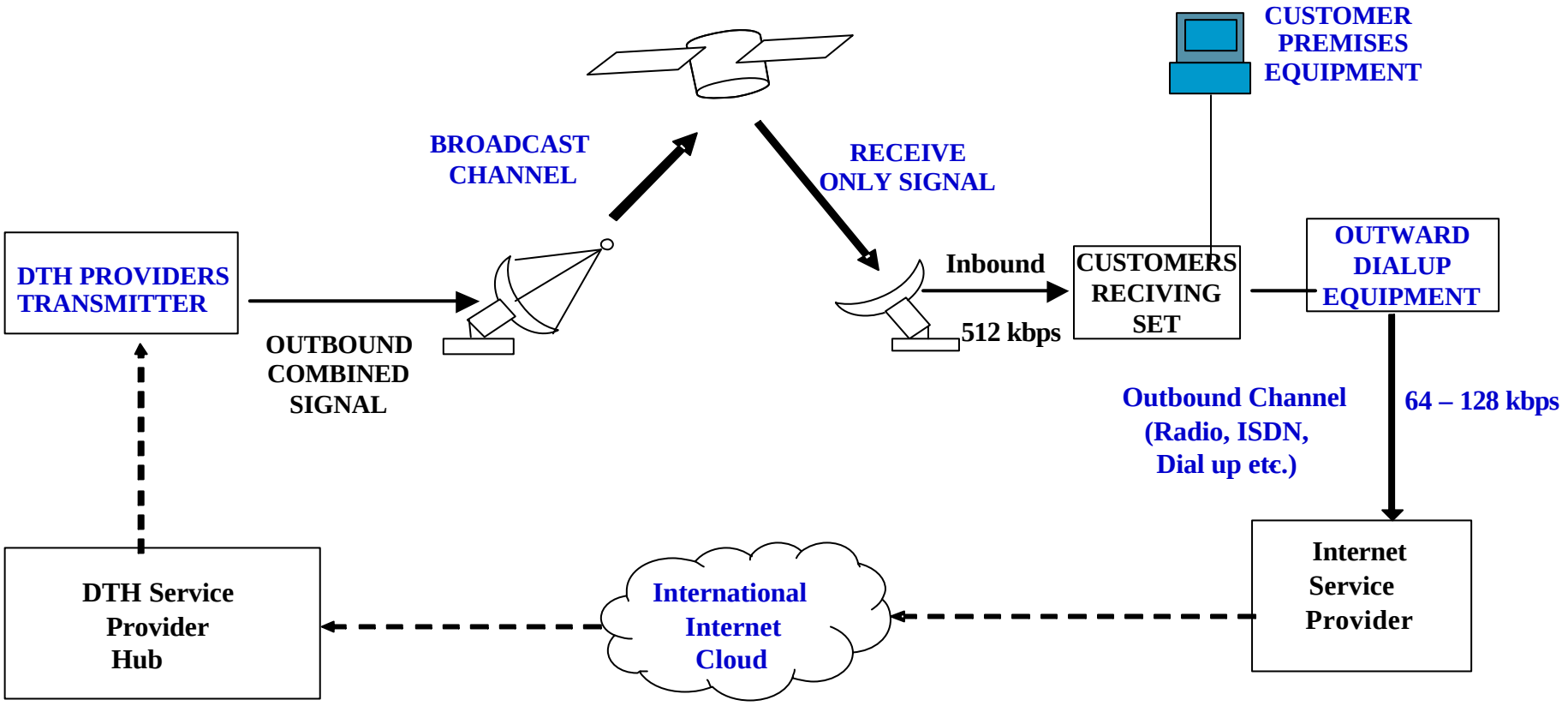
TRAI's Recommendation

a. DTH provider with ISP license should be allowed to offer internet services

b. No further clearance or permissions from WPC or SACFA

c. No NOCC or other fees

3. Broadband using DTH for Receive-only Access



Speed of outbound channel is generally between 10 to 20% of inbound channel

VSAT has the potential for significant impact on Broadband Penetration if artificial cost drivers are removed

- Advantages of VSAT for remote geographies, high reliability, multi-casting and disaster recovery applications are well-known
- VSAT operators face increased costs due to special regulations & restrictions because of its CUG category
- Policy makers have some concerns that can be addressed in changing current rules
- To bridge last mile, VSAT license could be permitted to be used as access media for Broadband

- TRAI's Recommendations

a. Adopt Open Sky policy

b. Minimum dish size restriction to be removed

c. Remove throughput restrictions, for both up-link and downlink

d. No SACFA/WPC clearance for receive-only VSAT's

e. Permit VSAT use for Broadband access (beyond CUG)

4. V-SAT for Broadband Access

- V-SAT started as a CUG service for remote areas in the country with restricted data rate.
- Restriction on data rate increased to 2 Mbps.
- Restriction on antennae size liberalized.
- Interconnection between V-SAT node and ISP network permitted.
- V-SAT will be used for Broadband access by public.

Fixed Wireless Access- Great potential to be a Dominant Access Technology

Unlicensed bands

– 802.11x (Wi-Fi) technologies are widely used international standards. Wi-Max has substantial future potential

  • 5.1 and 5.7 GHz bands (802.11a, Wi-Max) equally important as 2.4 GHz (802.11b/g, Wi-Max)

Alternative spectrum

– IMT 2000 bands have been keenly contested world over for 3G

  • Need to encourage alternative technologies in less congested bands

– Spectrum allocation for fixed use should be unlinked from mobile

  • Certain fixed technologies, e.g., CorDECT, considered WLL and spectrum allocation counted against allocation for mobile services

- **TRAI's Recommendations**

a. De-license, within power restrictions, 2.40 – 2.48 and 5.725 – 5.85 GHz bands. 5.15 – 5.35 GHz band should be considered after vacation by present users

b. Explore alternative spectrum for broadband services

5. Facilitating Radio Spectrum for Broadband Access

- **ISM Spectrum (2.4 to 2.48 GHz, Wi-Fi) de-licensed for in-campus WLAN usage.**
- **De-licensing of this for outdoor usage under consideration.**
- **De-licensing of Wi-Max spectrum (5.1 to 5.3 GHz & 5.7 to 5.8 GHz) under examination.**
- **Earmarking of 20 MHz (1880 to 1900 MHz) for fixed wireless TDD access systems.**
- **Streamlining of frequency allocation & site clearance processes through automation of Spectrum Management System.**

Roadmap - Current Plans for Broadband

- **ISPs are teaming up with Cable TV operators to provide Broadband to the homes using HFC technologies and also making use of radio links for high speed last mile access.**

- **New entrants in Basic Service are using advanced technologies like 'Fiber to the Curb', High Speed WLL, DSL etc. to enable Broadband access in the last mile.**

- **Incumbent operators BSNL & MTNL which have a subscriber base of around 40 million over copper loop are appointing franchisees to offer broadband services by offering existing copper network and co-location facilities to the third parties on mutually agreed revenue share basis.**

- **Public places like Airports, Railway stations, modern business centres, star hotels, cyber cafes, Malls have started having deployment of Hot Spots (Wi-Fi) in 2.4 Ghz band using 802.11b technology.**

- **TRAI have made far-reaching recommendations on 'Accelerating Growth of Internet & Broadband Penetration in the country' which are under active consideration of Govt.**

Conclusions

1. **Lagging behind in broadband deployment is not an option for any nation.**
2. **Governments cannot "leave-it-to-market" to deliver mass broadband services in short term.**
3. **Alternate access technologies specially wireless access to play significant role for Broadband penetration in India.**

Conclusions (Contd…)

4. Governments to support deployment of broadband using some or all of the following options:

- **leveraging Government's own usage**
- **extending tax concessions for Broadband equipments, access devices & service.**
- **funding R&D and Test-beds for Broadband**
- **funding Broadband infrastructure in uneconomical and remote areas**
- **targeted assistance and investment incentives for content and applications development**

Conclusions (Contd…)

5. **Regulator playing pro-active facilitating role in encouraging competition through new service providers and alternate 'last-mile' technologies to promote Broadband.**
6. **Wireless based technologies specially WLL, Wi-Fi, Wi-Max, V-SAT, DTH etc. are enabling cost effective and faster broadband deployment.**
7. **Markets to offer innovative applications and leverage cost-effective technologies to make Broadband attractive and affordable.**

(In India one of the main hindrance to Broadband deployment is the cost to consumer which is of the order of US$ 20 per month against the telephony ARPU of US$ 10 per month and Internet ARPU of US$ 5 per month).

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Thank You

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