

Regulatory issues and its impact on Indian scenario

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Broadband Access

- Broadband access is widely recognized as one of the catalyst for economic development.
- It leads to increased productivity and efficiency
- Multiplier effect arising out of increased investment also lead to positive impact on GDP.

Broadband Access

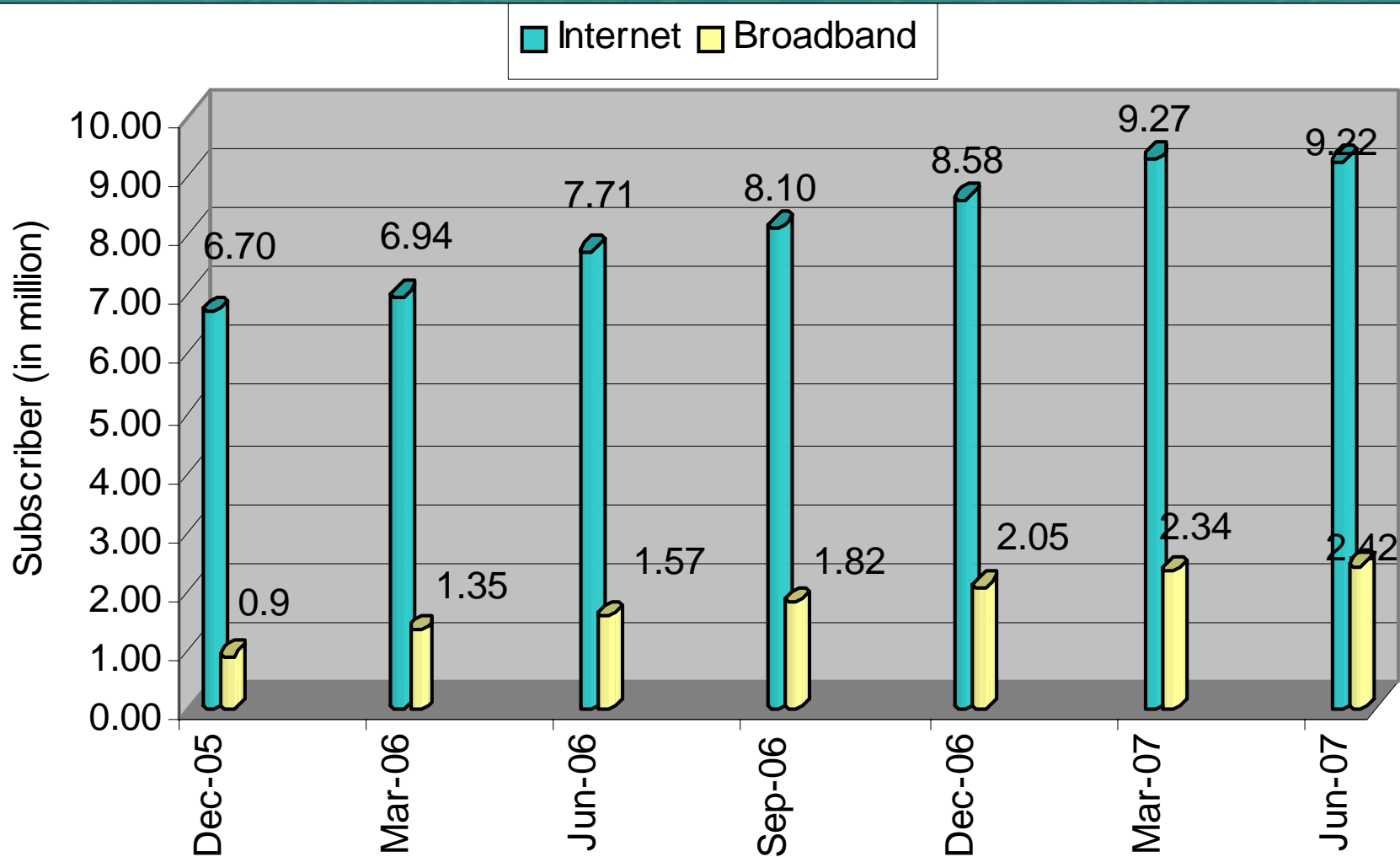
Various method of provision of Broadband

- Copper cable and xDSL
- Fiber in the Loop (FLL)
- Fiber to the Curb (FTC)
- Broad Wireless Access (BWA)

Broadband Access

- BWA technologies facilitates faster diffusion of broadband services
 - Better coverage
 - Quicker roll out
 - High scalability
 - Lower maintenance and up gradation costs
 - Phased Investment to match market growth

Internet and Broadband subscriber growth in India



Broadband adoption in OECD countries versus India as % of Population



Broadband targets

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

DoT has also set a target for Broadband coverage for all secondary & higher secondary schools, all public health care centers by the year 2007 and coverage of all Grampanchayats by the year 2010

• **Broadband Penetration has not been as per the expectations.
Targets appear to be too ambitious**

New Developments: IMT-2000 Standards

- ITU has approved WiMAX technology as new IMT-2000 Standard.
- IMT-2000 family of standards will now support four different access technologies: FDMA, TDMA, CDMA and OFDMA.

Broadband growth

- Main growth will be wireless centric.
- Suitable and sufficient spectrum availability
- Licensing regime

TRAI's recommendations dated
September 27, 2006

TRAI's Recommendations

- Major focus of the recommendations
- Identifying the spectrum bands
- Price determination
- Method of allotment
- Technology neutrality and level playing field

BWA spectrum bands

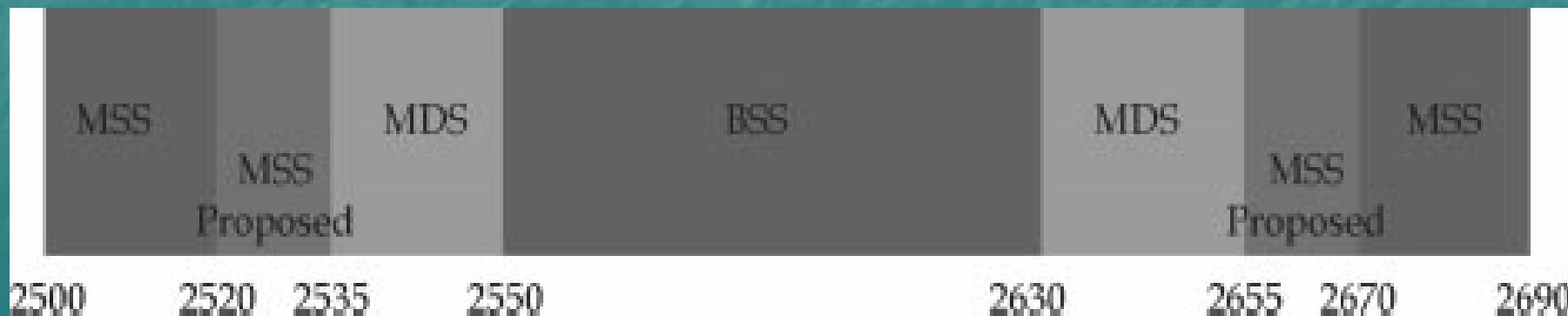
- 700 MHz
- 2.3 – 2.4 GHz
- 2.5 – 2.69 GHz
- 3.3 – 3.4 GHz
- 3.4 – 3.6 GHz
- 5.15 GHz – 5.35 GHz
- 5.725 GHz – 5.875 GHz

BWA spectrum

- 700 MHz
 - Doordarshan uses this band for connecting outdoor broadcast vans to their studios.
 - Other users have deployed both fixed and mobile networks
- 2.3-2.4 GHz
 - Captive users like State electricity boards, power utilities, oil companies, the railways, and security organizations have deployed microwave links in this band.

BWA spectrum

- 2.5-2.69 GHz
 - 2.500-2.520 GHz paired with 2.670-2.690 GHz is being used for mobile satellite service (MSS),
 - 2.520-2.535 GHz paired with 2.655-2.670 GHz is proposed for MSS,
 - 2.535-2.550 GHz and 2.630-2.655 GHz are being used for Local Multichannel Distribution system (LMDS) and Microwave multichannel Distribution System (MMDS) applications, and
 - 2.550-2.630 GHz is being used for broadcasting satellite service (BSS) in India by DoS.



BWA spectrum

- 3.3-3.4 GHz
 - Already assigned to seven ISPs in FDD mode.
- 3.4-3.6 GHz
 - Lower extended C band from 3.4 to 3.7 GHz is being used for INSAT satellite for television reception.
 - Use of these bands for terrestrial application has to be technically coordinated

BWA spectrum

- 5.15-5.35 GHz and 5.725-5.875 GHz bands
 - India has also de-licensed the 5.15-5.35 GHz and 5.725-5.875 GHz bands for indoor use and the Authority has already recommended de-licensing of these bands for outdoor usage also.
 - Recently the Govt. de-licensed 5.825-5.875 GHz for outdoor use of wireless equipment.

Spectrum for BWA technologies – TRAI's recommendations

- At least 200 MHz of spectrum should be made available for BWA to accommodate growth requirement until 2007, and an additional 100 MHz of spectrum should be coordinated by 2010.
- Operators with current spectrum assignments in the 3.3-3.4 GHz band should be given the option to migrate to circle-wide operations by December 2006
- DoT should coordinate with DoS to get 100 MHz for broadband wireless applications in the 3.4 – 3.6 GHz band immediately.

Spectrum for BWA technologies

- Use of the 5.15-5.35 GHz and 5.725-5.875 GHz bands may be allowed on a technology neutral, non-protected, non-exclusive basis as delicensed bands in also the outdoor deployments of terrestrial wireless technologies
- DoT should coordinate some part of 700 MHz spectrum for making it available for rural wireless networks in the near future.
- Also keeping in mind the suitability of 2.3-2.4 GHz band for BWA applications and the need for additional spectrum later, DoT should plan to vacate/re-farm this 100 MHz band from the existing users by end-2007 and allocate it for BWA services.

Spectrum for BWA technologies

- DoT should initiate the process to vacate portions of the 2.5 – 2.69 GHz band that might not be in use at this time, or which have marginal uses limited in nature.
- 200 MHz of spectrum in the 3.3-3.4 GHz and 3.4-3.6 GHz bands may be allocated to 13 operators in contiguous blocks of 15 MHz each.
- The Authority will make recommendations about future allocations of spectrum in bands such as 2.3 GHz, 2.5 GHz, or 700 MHz, as and when these bands are made available.

Spectrum for BWA technologies

- Twelve blocks of BWA spectrum as identified should be allocated among UASLs, CMSPs, or Category A and B ISPs and for circle level deployments.
- One block of spectrum should be allocated to Category A, B, and C ISP licenses in cities or SSAs with population less than one million.
- DoT may use a first-come first-serve allocation mechanism for this one block of spectrum if needed.
- DoT should organize a one-stage sealed bid auction for every circle to allocate BWA spectrum for circle-wide licensees.

BWA Spectrum Pricing

- Reserve price for 15 MHz of BWA spectrum in different circles will be as follows:

Circle	Reserve price (Rs. Crores for 15 MHz)	Performance bank guarantee (Rs. Crores)
Metros & A	10	5
B	5	2.5
C	2	1

BWA Roll-out

	License area	Metros	Category A, B & C circles	Local operators/captive networks
Timeline				
2 years		-	25% rural SDCAs area coverage	-
5 years		90% area coverage	50% rural SDCAs area coverage	90% area coverage

Wireless Broadband technology

- Wireless subscribers in the world are approaching 3 billion milestone.
- This is the addressable market for mobile broadband, if:
 - Availability
 - Accessibility
 - Affordability
 - Throughput
 - Wider choice of devices

Market trends

- Converged platforms
- Integrated and Intelligent CPE
- Quadruple play services
- Bundling of services
- IP network deployments
- Multiple operators
- Low tariffs
- New applications and services

BWA technologies

- BWA technologies can complement 3G and facilitate in achieving higher penetration levels.
 - Timing
 - Economies
 - Costs
 - Tariffs
 - Handsets

Way Forward

- Light handed regulation
- Flexible regulatory regime
- Technology and service neutrality in the licensing regime
- Availability of adequate spectrum for wireless services
- Market based approach