



Spectrum For Mobility : The Challenges & Opportunities

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Indian Cellular Sector – An Overview



Networks & Investments

70 Networks on Air ; Over Rs 25,000 crores invested by March'03

Subscribers

More than 17 million subscribers by end-August 2003

Subscriber adds now, at around 8-10 lakh subscribers per month.

Subscribers have grown at a CAGR of 80% since 1997

Contribute over 1.7% to national Tele Density

Tariffs

Have dropped by 80% since 96

Presently amongst the lowest tariffs in the world

Coverage

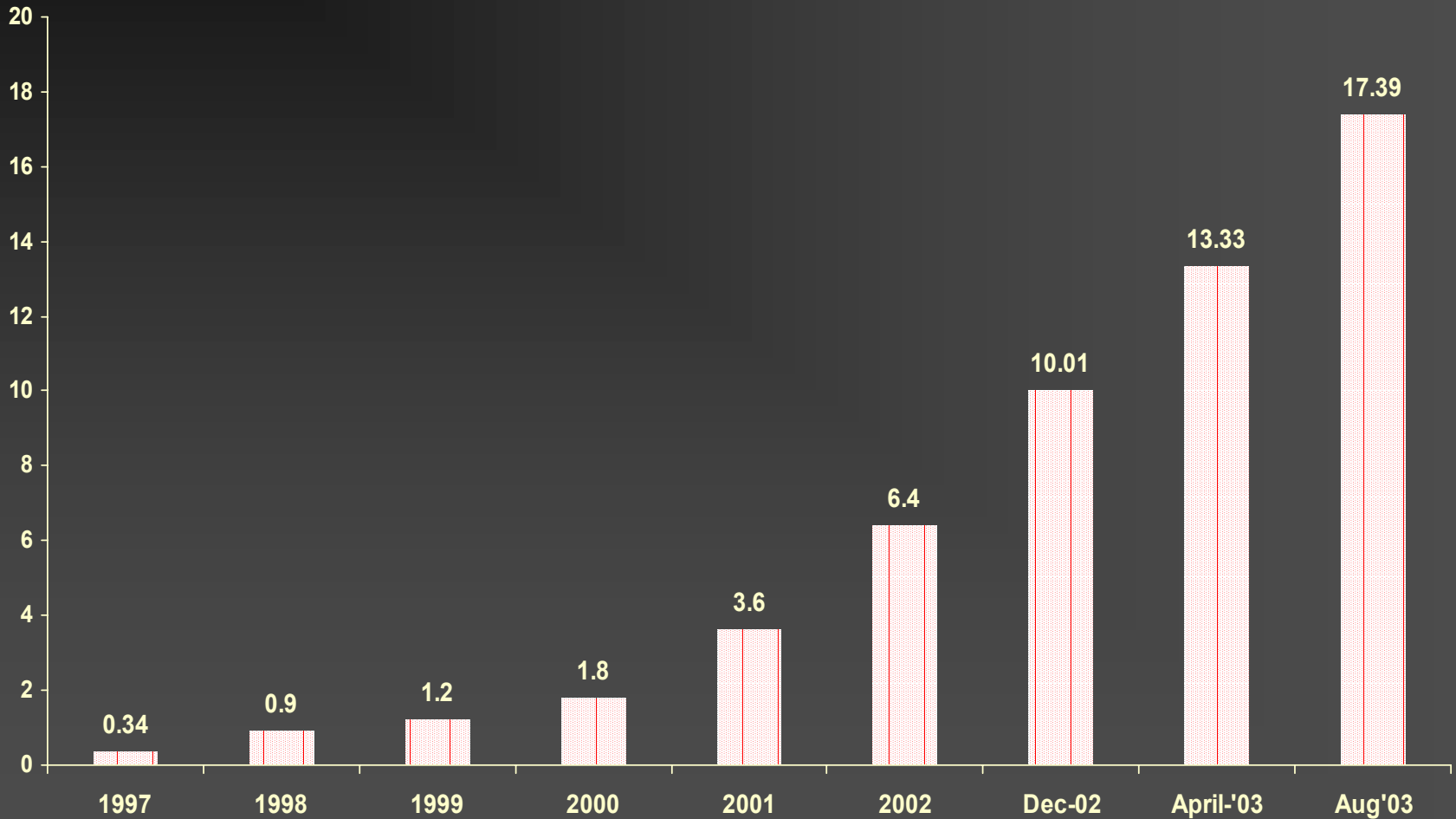
Services in over 1700 cities & towns – Aug 2003

Cellular coverage over thousands of villages

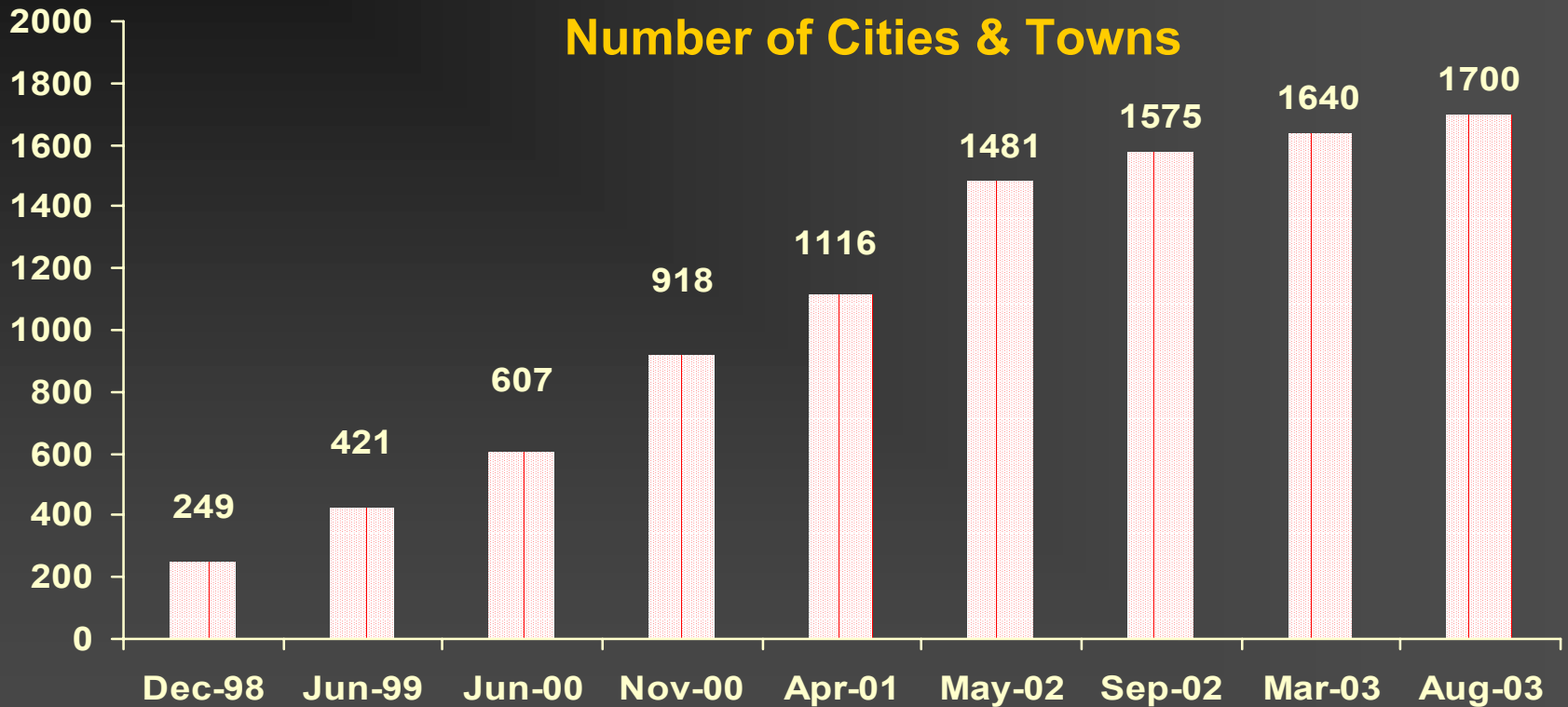
Have fulfilled all roll-out obligations



Growth in subscribers



Increase in Coverage



Operators are increasingly venturing into smaller cities & towns.

- 25% of the subscribers will be from smaller towns & rural areas.
- Approx. more than 66 MSCs , 214 BSCs , 6215 BTSs installed by CMSPs

Spectrum – An Essential Resource



1. RF Spectrum is the Precious Lifeblood of Mobile Telecommunications
2. However it is also a finite natural resource that is extremely valuable.
3. Demand for Spectrum for Mobility increasing enormously due to
 - steep fall in tariffs leading to more usage/subscriber and
 - aggressive spread of service
 - ever increasing QoS requirements.

Increased availability and optimal utilization of spectrum therefore is of paramount importance in India today

The Economic Importance of Spectrum



- In UK, the Radiocommunications Agency has been estimated that GSM Spectrum adds about £8 billion p.a. (ie. Rs 60000 crores pa) to the economy.
- In India, if spectrum managed right, the economic benefits could be several fold the UK value.
- If we don't get it right, the Indian economy will lose out on huge potential gains as well as deny consumers the opportunity to avail of state-of-the-art digital mobile telecommunication services.

Spectrum a key factor for increasing teledensity & GDP growth

The Importance of Spectrum Management : ITU's Recommendations



The ITU recommendations on Regulatory Functions regarding Management of scarce resources provide that :

“management of scarce resources (e.g. frequencies, numbers and orbital positions) is an important permanent element of the national regulatory framework.

Allocation and use of scarce resources must be

- objective
- timely
- transparent
- non-discriminatory

To have a mutual understanding, a common economic definition should be elaborated for scarce resources.”



Spectrum Allocation - International Norms

	No. of Countries	Average GSM frequency per Country	No. of Operators	Average GSM frequency per operator
World	31	2 x 63.19 MHz	114	2 x 17.18 MHz

A study of 114 operators in 31 countries reveals that average spectrum allocated per operator is around 2x17 MHz.

Spectrum Allocation - International Norms



Country	No. of GSM Operators	**Total Frequency	Av. GSM frequency per Operator
United Kingdom	4	2 x 105 MHz	2 x 26.3 MHz
Switzerland	3	2 x 79.6 MHz	2 x 26.5 MHz
Sweden	3	2 x 75.0 MHz	2 x 25.0 MHz
France	3	2 x 74.4 MHz	2 x 24.8 MHz
Belgium	3	2 x 81.0 MHz	2 x 27.0 MHz
China	2	2 X 45.0 MHz	2 x 22.5 MHz
Italy	4	2 X 71.6 MHz	2 x 17.9 MHz
Thailand	3	2 x 57.1 MHz	2 x 19.0 MHz
Estonia	3	2 x 51.6 MHz	2 x 17.2 MHz
Denmark	4	2 x 109.6 MHz	2 x 27.4 MHz
Germany	4	2 X 80.0 MHz	2 x 20.0 MHz
Hungary	3	2 x 68.6 MHz	2 x 22.9 MHz
Ireland	3	2 x 62.4 MHz	2 x 20.8 MHz
Netherlands	5	2 x 105.8 MHz	2 x 21.2 MHz
Spain	3	2 x 64.2 MHz	2 x 21.4 MHz
Malaysia	5	2 x 90.0 MHz	2 x 18.0 MHz

** Includes frequencies in 900 MHz, 1800 MHz & E-GSM Bands



International Practices

Internationally the practice is that Cellular Operators are indicated / allotted the total spectrum that would be made available to them right at the time of issuing the cellular licenses. This gives the Operators the flexibility to design their networks in the most optimal manner so as to maximize the efficiency of this scarce source. One-time upfront allocation of spectrum also ensures tremendous CAPEX saving resulting in increased affordability of service for the consumers.

China - spectrum availability & Charges



- ◆ China Mobile has perpetual right to 2x29 MHz of spectrum
- ◆ Spectrum Usage charges for China Mobile are 15 MN Rmb for operating revenues of 64 BN Rmb – i.e. 0.02% of revenues
- ◆ Indian Operators are charged between 100 – 200 times more than their Chinese counterpart for the right to use one third of the same resource

Spectrum availability has direct exponential impact on capital expenditure in a country like India where capital funds are scarce. Also the perpetual usage permits an operator proper network planning at the outset to the graded spectrum approval in India, which leads to roll out on the assumption that additional spectrum may not be available and has very significant capital expenditure and operating expense implications



India - Current Spectrum assigned to CMSP's

- All licensed CMSPs in 900 MHz initially allotted 4.4 + 4.4 MHz
- Subsequently an additional 1.8 + 1.8 MHz in 900 MHz band allotted to CMSPs in Metro's & few circles
- An additional spectrum of 1.8 + 1.8 MHz allotted to Delhi & Mumbai CMSP's making it to a total of 8 MHz for CMSP's in Delhi & Mumbai
- 4th Cellular Operators allotted 6.2 + 6.2 MHz in 1800 MHz band.
- Additional spectrum of 2MHz allocated to CMSP in Delhi besides the 8 MHz already available with them.



Spectrum for Cellular

- The Challenges in India

1. Spectrum allocation far below international norms,- 6.2 MHz vs 17.1 MHz
2. Piecemeal release in small chunks detracts from optimum RF design of networks and increases capex.
3. Results in capacity & QoS problems and increased service costs/tariffs.
4. QoS Problems compounded by interference from CDMA.
5. Problem also accentuated by CDMA using E-GSM band
6. Spectrum usage charges also extremely high,- 2 to 4% Revenue Share
- in China it is \sim .02% Revenue Share !!!



Spectrum for Cellular

- The Opportunities before us

1. Defence and other users helpful and supportive
 - Appreciative of the public mobile telecommunication needs
 - Effective coordination should help achieve 20 MHz per operator
2. Thus, tremendous opportunity for explosive growth of mobile services
 - consequent sharp increase in teledensity at earliest
 - result : accelerated GDP growth.
3. Reduce spectrum usage charge to cover just the cost of administration and regulation of Radio Spectrum
 - will help achieve further reduction in mobile tariffs
4. Re-align cellular mobility spectrum bands with international practice

Spectrum for Cellular

- The Way Forward



1. Confirm entitlement of 2x20 MHz per operator.
2. Provide Roadmap for actual assignment after coordinating with present users.
3. Stipulate usage charges to cover costs of administration & regulation of Radio Spectrum.
4. Increased monitoring & enforcement of filters to prevent interference from CDMA.



Conclusion

**Acting in Unison, Industry, Government, Defence & other users
can deliver stupendous economic benefits to nation through
improved allocation and utilization of Radio Spectrum**

Together , we can make it happen

Thank You!