

Executive Summary

Cellular Operators Association of India

Determination of Mobile termination charges

February 2007

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1 Introduction

Interconnection and retail price regulation are viewed as two of the most important aspects of telecommunication regulations in a liberalised environment and remain a high priority for telecoms regulators worldwide. Appropriate interconnection regimes are fundamental to the development of competition in liberalised markets.

This has led to more than 100 countries establishing some form of interconnection regulatory framework. The commercial terms of interconnection arrangements are increasingly regulated, and much of the recent focus of regulators worldwide has been to ensure interconnection rates are set fairly and more closely reflect underlying costs.

In general, in developed regulatory regimes, there is an increasing standardisation around accepted 'best practice' in setting interconnection charges. This includes:

1. Increasing tendency to use cost-based rather than retail price based methods to determine appropriate interconnection charges; and
2. Increasing public provision of information on interconnection charges
3. Increasing use of incremental cost methodologies to determination interconnection charges.

The proposed project relates to an ongoing debate between COAI and TRAI on low mobile termination charges in India. India has one of the lowest fixed and mobile interconnection charges in the world. Current termination charges for fixed and mobile operators are set at Rs0.30 per minute and many commentators believe that the existing call termination charge of mobile operators is below cost.

Spectrum Strategy Consultants ("Spectrum") was engaged by the COAI in order to conduct an independent study to determine the long-run incremental cost (LRIC) of terminating a minute of voice telephony on a mobile network in India.

In order to fully understanding the cost involved building and operating a mobile network in India, Spectrum has collected data from a range of GSM operators, this includes Aircel, Bharti, Hutch, IDEA, and Spice, and where possible we have cross checked the cost components with those of other regional operators from comparable Asian countries like Malaysia, Thailand, Philippines and Indonesia. Spectrum has used the existing network data of all the GSM service providers as of December 2005 and 2006. In addition, Spectrum has also considered data from the PWC benchmarking study and the TRAI PMR reports so as to make the model more robust.

2 Overview of Methodology

2.1 Introduction

Cost-based pricing methodologies more accurately reflect the true underlying cost of providing interconnection services compared to retail price based. Therefore, in line with international best practices, Spectrum has adopted cost-based modeling methodologies for the purposes of this exercise. In particular we have used:

- **Fully allocated costs (“FAC”)** – to assess the historical costs incurred in provision of interconnection services; and
- **Forward looking long run incremental costs (“FL-LRIC”)** – to determine credible charges that reflect real economic costs of interconnection provision, promote efficient investment and avoid inclusion of historical inefficiencies

It should be recognized that whilst the above methodologies reflect generic approaches, the precise nature of the methodology used varies substantially according to requirements and circumstances. An introduction to the two adopted methodologies is provided in the following sections.

2.2 Fully Allocated Costs (FAC)

Calculation of a Fully Allocated Costs (“FAC”) involves the allocation of all historical costs incurred to date in the provision of specific individual services, e.g. mobile termination, based on a set of allocation criteria such as relative capacity utilisation, minutes of use or proportionate revenues generated.

2.3 Forward looking long run incremental costs (FL-LRIC)

A FL-LRIC model is constructed by determining the costs associated with mobile termination, i.e. the costs of building a mobile network, to existing and future specifications (i.e. in terms of coverage and capacity) at current network unit prices whilst assessing forward looking requirements, e.g. over the next 6 years.

For the purposes of this analysis, the FL-LRIC model has been constructed on the following best practice principles:

- The FL-LRIC model is primarily based on a “bottom-up” assessment of a theoretical operator’s cost of providing interconnection services;
- Historical data, for 2005, as provided by the operators has been used.
- Forward looking information has been estimated for 2006, 2007 and 2008 in terms of projected traffic volumes and required capital expenditures for capacity and coverage;

3 Modelling assumptions

The following is a high-level explanation of the methodology adopted in the calculation of the MTC

3.1 Introduction

The model determines the cost of provision of mobile termination services **on a national all India basis** and **on a per circle basis**. To determine the mobile termination costs for each type of circle, a region has been chosen under circle category i.e. Delhi under the Metro Circle, Maharashtra under Circle A, Kerala under Circle B and Orissa under Circle C. It should be noted that the mobile termination charge will not be exactly same in regions classified under a circle but the values are likely to be very similar across categories.

3.2 Categorisation of cells by population density

To accurately determine the number of cell sites required, the data of 550 districts of India has been used. The 550 districts of India have been classified into Dense-Urban, Urban, Sub-urban, Rural topology based on population density data from the Indian Census. A similar approach has been used for the circle-wise model.

3.3 Calculation of Base stations

The coverage assumptions that are sourced from the operators along with the engineering ratios are used to determine the base station requirement for each region. **We have used the existing 40% geographic coverage as a starting point** and the coverage forecast for future years have been obtained from the operators. Subsequently, we have used standard network equipment ratios to estimate the number of coverage and capacity site required.

The total number of required base stations is calculated as a sum of BTS required for coverage and additional BTS requirement for capacity. Finally, the number of BTS required going forward is determined using the coverage forecasts assumptions and subscriber projections.

3.4 Capital expenditure assumptions

The unit costs for all network components have been obtained from the Indian operators for 2005. The current capex is calculated based on unit costs of network equipment obtained, while the projected capex is determined using the operator's coverage forecasts and estimated decline in price of network equipment.

3.5 Depreciation schedules

For the purposes of annualising incurred and projected capex, we have used straight-line financial accounting depreciation.

3.6 Operating expenditure assumptions

Each opex component directly or indirectly related to provision of interconnection services is calculated. The following opex items have been considered in the calculation of MTC:

- Repair and maintenance
- IT
- Site maintenance
- Staff costs
- General and admin

3.7 Return on capital approach

Both FAC and LRIC approaches acknowledge that the reviewed operator should be allowed to claim an appropriate rate of return on the costs incurred in the provision of interconnection services. The return on capital can be calculated using two best practice approaches, namely (a) annuity approach or (b) straight line depreciation+return on capital approach.

The annuity approach basically assumes that the operator will require a discounted cash flow return over the lifetime of the equipment which is equal to the upfront capex being deployed. The discount factor to be used in this case is the weighted average cost of capital ("WACC").

The straight line depreciation+return approach provides the operator a return through costing the depreciation of the asset and a return on capital which is equivalent to the WACC multiplied by the initial outlay (or upfront capex).

Both treatments have been used by regulators and operators throughout the world. We have used the annuity approach in our analysis as we believe this is better aligned to the concept of WACC. To have flexibility, we have built a switch in the model to present the impact of alternative approaches.

3.7.1 Cost of capital

WACC measures an operator's cost of equity and debt financing, weighted by the ratio of debt and ratio of equity of the operator's capital structure and is required to calculate the return on capital portion for interconnection costing. Generally, incumbent operators prefer to have a higher WACC used in interconnection calculations as this will imply higher interconnection rates.

However for operators to fully recover the costs, the return rate needs to be pre-tax. Hence we have used a pre-tax WACC of 13.93%.

3.8 Traffic volume

We have used historical minutes of use ("MoU") for 2005 and 2006 and studied the past growth rates in usage to determine the appropriate levels of usage going forward. The MoU projections and subscriber forecasts obtained earlier are used to determine the traffic volume.

4 Output assessment

4.1 Introduction

To test the hypothesis that the current mobile termination charges are currently below costs incurred by operators in that termination, Spectrum calculated the per minute costs incurred by a theoretical mobile operator in the termination of mobile traffic using two methodologies– fully allocated costs (FAC) and forward looking long run incremental costs (LRIC). The results of the bottom-up model created are summarised in the following section for both methodologies adopted.

4.2 FAC outputs

The table below summarises the FAC based charges for an operator providing services on a National All India basis.

Exhibit 1: National All INDIA model - FAC based charges, 2005

Rs/min	2005
FAC	0.81

Note: Based on estimated historical costs

Source: Spectrum

The table below summarise the FAC charges for an operator providing mobile termination services on a per circle basis i.e. Metro or Circle A or Circle B or Circle C.

Exhibit 2: Circlewise FAC based charges, 2005

Rs/min	2005
Metro	0.48
Circle A	0.76
Circle B	0.75
Circle C	0.77
Blended	0.65

Note: Based on estimated historical costs

Source: Spectrum

4.3 LRIC outputs

The table below summarises the LRIC based charges for a operators providing services on a National All India basis.

Exhibit 3: National All INDIA model - LRIC based charges, 2006-2010

Rs/min	2006	2007	2008	2009	2010
LRIC	0.59	0.55	0.53	0.47	0.47
3 year look ahead average	0.55				

Source: Spectrum

The table below summarise the LRIC charges for an operator providing mobile termination services on a per circle basis i.e. Metro or Circle A or Circle B or Circle C.

Exhibit 4: Circlewise LRIC based charges, 2006-2010

Rs/min	2006	2007	2008	2009	2010
Metro	0.41	0.41	0.41	0.40	0.39
Circle A	0.50	0.51	0.51	0.46	0.45
Circle B	0.54	0.55	0.56	0.55	0.53
Circle C	0.61	0.61	0.66	0.60	0.55
Blended	0.49	0.50	0.51	0.47	0.46
3 year look ahead average	0.50				

Source: Spectrum

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