

Response to TRAI Consultation Paper  
(No. 17/2008, Dated 31<sup>st</sup> December 2008)

## **Mobile Termination Charge**

9<sup>th</sup> January 2009

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# 1 Background

As part of the ongoing review of Interconnection Usage Charges (IUC) in India by Telecom Regulatory Authority of India (TRAI), Spectrum Value Partners (SVP) has been engaged by the Cellular Operators Association of India (COAI) to assess the current IUS regulation in India and develop a model in line with international best practices to estimate the Mobile Termination Charges (MTC).

SVP developed a Hybrid LRIC model using standard LRIC principles in accordance with the international best practices i.e. use of a scorched node approach, a tilted annuity method of depreciation, use of a routing table. A consensus building approach was adopted which focussed on industry interactions. SVP had discussions on key assumptions with all the COAI members. In addition, discussions were held with TRAI representatives to explain the methodology, approach, assumptions and the results of the model. These details were also submitted to TRAI in form of a White Paper.

TRAI in its consultation paper titled "Review of Interconnection Usage Charge (IUC), dated 31<sup>st</sup> December 2008 (No. 17/2008) has commented on various aspects of this Hybrid LRIC model developed by SVP. This document aims to provide SVP's response to these comments (chapter 2 of this document). In addition, the document also includes SVP's opinion on certain issues for consultation (chapter 3 of this document), as listed in chapter 6 of the TRAI's consultation paper.

## 2 Response to TRAI comments on Hybrid FLRIC model developed by SVP

### 2.1 Higher MTC estimates from Hybrid FLRIC model than FAC model

TRAI comment on the outcome of the model developed by SVP was:

*“Cellular Operators Association of India(COAI) has also provided a study report on the basis of hybrid FLRIC model wherein they have shown a path with the MTC figures as: Year 2009- Rs 0.36, Year 2010 – Rs 0.38, Year 2011 – Rs 0.36, Year 2012 – Rs 0.35. It can be seen that the estimates for Mobile Termination Charge is much above the existing termination charge of Rs. 0.30 per minute. It is noted that cost model which is said to capture efficiencies of the network and the benefits of future technological progress is yielding an estimate of cost which is much above the estimates of cost arrived at using Fully Allocated Cost methodology. This aspect was also raised during the discussions with the consultants to the industry associations but no satisfactory explanation was forthcoming from them for such a contradictory results in the estimation of cost using Hybrid FLRIC.”*

In its consultation paper, TRAI has noted that the MTC estimates arrived at, through the Hybrid FLRIC model developed by SVP, are higher than the estimates arrived at by the Regulator using Fully Allocated Cost (FAC) model developed using BSNL data for FY 2002-03. In countries where operators are expanding their network coverage, it is generally noted that a LRIC based model provides an MTC estimate lower than a similar FAC model.

**TRAI has provided very little information on the approach adopted in developing the FAC model. In addition to the underlying differences in the two approaches (FAC and Hybrid FLRIC), there might be some modelling related factors that may have resulted in different MTC estimates from these two models.** On TRAI's request, SVP is developing a FAC model using the same key assumptions as used in the Hybrid FLRIC model. This would enable a better comparison between the results from FAC model and Hybrid FLRIC model.

To ascertain the reasons for arriving at lower MTC estimates using FAC model compared to Hybrid FLRIC model, the approach and assumptions used by TRAI will need to be studied in greater detail. Some of the specific elements that need to be analysed are:

- Choice of operator for developing the model
- Network architecture assumed
- Cost elements included in the model
- Service portfolio modelled
- Allocation of costs
- Method of depreciation
- Treatment of common costs

These elements have been discussed below in detail.

### 2.1.1 Choice of the operator for developing the model

TRAI had used BSNL's data for FY 2002-03 as basis for developing the FAC model in 2003. No specific rationale for this choice, and moreover, its applicability to the current market situation is provided by TRAI. **Using a single operator for developing an MTC model will result in inclusion of profile characteristics (in terms of network cost structure, spectrum allocation, etc.) specific to the profile of that particular operator.** For example, developing a model based on cost data of an incumbent operator (like BSNL) would result in MTC estimation based on cost structure of a well depreciated network. This approach will not be representative of the cost structure of a typical operator in the market.

In the approach adopted by SVP in its model, estimates of MTC are based on the cost estimates for a hypothetical operator. The efficient operator approach is most consistent with the objective of price regulation. Moreover, **the profile of a hypothetical operator is based on the cost structures of many operators at different stages of evolution which are currently operating in the market. This approach ensures that the cost data used in the model is not biased towards any one operator, either an incumbent or a new entrant.** Thus, it affords greater flexibility and can be applied to all actual market operators even though there may be fundamental cost differences between them. Countries like South Korea and Netherlands have adopted this approach of using a hypothetical operator to estimate MTC. In some countries like Sweden and Israel, the results from bottom-up network design for a hypothetical operator are calibrated with actual networks of existing operators. This ensures that the model produces realistic network costs that are in line with costs being achieved by actual operators in the country.

The approach followed by SVP in building a theoretical efficient operator is further detailed in section 3.1.1 of the document titled "White paper on Model Assumptions" submitted to TRAI on 17<sup>th</sup> November 2008.

### 2.1.2 Network design

There is no information available on network design for BSNL, as used by TRAI in the MTC model. The SVP model gives detailed information of the planned geographic and population coverage for the hypothetical operator, which is based on the information obtained from a sample of operators. However, there is no information on the coverage achieved by BSNL. In absence of this information, it is difficult to compare BSNL's CAPEX spend for capacity/coverage with the competition.

### 2.1.3 Cost elements included in the model

Typically, only those network elements of the network architecture which are used for terminating a call are included for determining the cost (CAPEX and OPEX) relevant for developing the MTC model. A complete list of network elements included in the Hybrid LRIC model developed by SVP has been provided in the document titled "White paper on Model Assumptions" submitted to TRAI on 17<sup>th</sup> November 2008 (section 2.1). These cost elements included in the model are in line with the approach adopted by regulators in other markets like Malaysia, UK and Israel. A difference in the cost elements included in the model could lead to significant variation in MTC estimates. There is inadequate information available from TRAI on this aspect and thus, it is difficult to compare if the difference in MTC estimates is due to difference in cost elements included in developing the MTC model.

### 2.1.4 Service portfolio modeled

For the purpose of the model, the following services have been defined in the model developed by SVP:

- Inbound/outbound off-net voice

- On-net voice
- SMS
- Data

The usage split of these services is also estimated for the subscribers for the defined hypothetical operator. This information is not provided by TRAI in the published documents (for BSNL data used in its FAC model).

### 2.1.5 Allocation of costs using routing table

The usage (in voice minutes or number of SMS or data kilobytes downloaded per subscriber per month) of the above mentioned services is converted to a common unit of number of minutes using standard conversion factors and allocated to different network elements. For the purpose of allocation of the costs to the different services SVP has used a routing table, with appropriate routing factors based on the network design. Routing factors allow the network costs to be allocated according to both the level of demand for a service and the extent to which the service uses the cost element in question. The approach used by SVP in constructing the routing table has been described in section 3.5.5 of the document titled "White paper on Model Assumptions" submitted to TRAI on 17<sup>th</sup> November 2008.

Limited information is available on the allocation of relevant network costs (CAPEX and OPEX) to different services for the FAC model developed by TRAI.

### 2.1.6 Treatment of common costs

Common costs are costs that are common to both the retail and the wholesale business. These are not directly attributable to the services modeled but are never the less incurred. Normally head office costs (land and building, utilities, personnel), Corporate office costs (HR, Legal, regulatory) are included as part of the common costs. There is no information on the common costs included by TRAI in its FAC model and the method used to allocate these costs to various services. The treatment of common costs in the SVP model has been highlighted in section 3.9 of the document titled "White paper on Model Assumptions" submitted to TRAI on 17<sup>th</sup> November 2008. Further, in allocating the common costs to termination, we have used an Equi-Proportional Mark-Up (EPMU) basis, which is consistent with international practices.

## 2.2 Modelling assumptions used in the Hybrid LRIC model

TRAI has made following comments on the assumptions used in the model developed by SVP:

*"5.3.1.2 Hybrid FLRIC submitted by COAI was carefully examined in the TRAI. This model is based on hypothetical efficient operator and depends on a number of assumptions i.e. likely cost of network going forward, traffic pattern, presence of service providers in a given service area, coverage areas, towers, capacity requirement, market share of critical operators, assumption of converting SMS and data to minute of usage, estimation of CAPEX, depreciation, cost of debt, beta estimation, effective corporate tax and various design parameters."*

*"Discussions prima facie revealed that the model being proposed has a number of assumptions and subjective decisions compared to the advantages it presumably bestows vis-à-vis the model that has already been used by TRAI in various IUC Regulations. It seems to be difficult for all the service providers to agree on the efficient operator model and assumptions that are vital for implementation of FLRIC, as is evident from the responses received. There are apprehensions that any methodology that is based more on assumptions and projections may give uncertainty to the market and may not assure sustainability and fast*

*pace of growth that the sector is currently witnessing in India. Arriving at an efficient model, collecting the network cost data and rationalizing it to reflect average element cost and then fitting it to all kinds of operators big and small, pan India and in a few circles, having CDMA 800 MHz and GSM 900 MHz or 1800 MHz spectrum, incumbents and new operators would be a Herculean task with low prospects of agreement among service providers.”*

As mentioned earlier, SVP has determined the Mobile Termination Charge using a Forward Looking LRIC model. The endeavour has been to construct a “theoretical efficient operator” in accordance with Standard LRIC principles which have been accepted by regulators in other countries which have deployed this model. The World Bank has endorsed the use of the LRIC model for calculating interconnection rates for both fixed and mobile services. The US Federal Communications Commission (FCC) in the US, the Australian Competition and Consumer Commission (ACCC) in Australia, the EC in Europe, the UK Competition Commission (CC) in the UK), the EC and the IRG have all concluded that LRIC is the most appropriate method to employ.

The determination of MTC based on a theoretical efficient operator eliminates biases due to individual differences between existing operators and possible new entrants with regard to network design and the costs associated with the same.

- The operator is a pan-India GSM operator: The pan-India assumption is more reflective of the Indian market reality since most Indian operators already are or aspire to be Pan-India operators. Most of the new operators have been awarded a pan-India license as well. We have considered the hypothetical operator to be a GSM operator and not a dual-technology (both CDMA and GSM) operator since GSM technology is seen to be more prevalent in the market today and would see an increasing trend going forward.
- The operator has been allocated spectrum in the 1800 MHz frequency band: Although many existing operators have spectrum allocated to them in both 900 MHz and 1800 MHz frequency band, all future spectrum allocation would happen in the 1800 MHz band in India. Given this scenario we believe that most likely case for incremental CAPEX investment in the long run would be based only in 1800MHz frequency band.

In addition, data was also obtained from 4 operators (Bharti, Vodafone, Idea and Aircel) across 4 circles (Delhi, Maharashtra, Kerala and Orissa). This data was used to build the network of the efficient operator using a “hybrid” approach i.e. while the network design has been built bottom-up, we have also performed a reconciliation step to account for the prevalent prices of network equipment and the year on year changes in prices faced by operators.

The model is developed using standard LRIC principles in accordance with the international best practices i.e. use of a scorched node approach, a tilted annuity method of depreciation, use of a routing table. Further, the cost elements considered for the purpose of the model are in line with other countries which have deployed the LRIC model. The model uses theoretical efficient principles for network planning and roll out which includes:

- Dimensioning of cell sites for coverage is done by taking cell radii that are based on global benchmarks adapted where relevant to the Indian scenario.
- Dimensioning of sites for capacity is based purely on incremental traffic that needs to be served (over and above the capacity that could be served by coverage sites). And this dimensioning is based on

international benchmarks for capacity and utilization parameters for the network elements (for e.g. throughput of a TRX).

- It is assumed that the operator will increasingly adopt passive network sharing. Active sharing has not been considered since it is uncertainty as to the nature of sharing arrangements in India. Currently no country has adopted active sharing for 2G although there are examples of active sharing in 3G (e.g. Sweden).
- The operator will plan for redundancy mainly for network elements which are sensitive to traffic. For example it would have a minimum of two switches (MSC, BSC etc.) in each circle. To this extent the model adopts a conservative assumption on redundancy planning.

The above mentioned approach ensures that while the model developed is in line with the international best practices, it is also in line with the current market trends in India. **We believe that the assumptions used in SVP's Hybrid LRIC model are realistic and conservative and reflect the overall environment within the telecom sector going forward**

However, as noted by TRAI in its consultation paper, LRIC is based on estimates of the future, which can be a source of contention. To overcome this issue, regulators typically limit the duration of the forward looking period to around three years. Moreover, regulators use a transparent process which is well defined at the outset in developing the LRIC model. **A consultative approach with regular industry interface at each stage is a key to the success of this process. This would ensure that the operators have clarity on the process and the conceptual model adopted. It is likely that such regular industry engagement would result in greater buy-in from the operators for the results of the model, even though the operators may not necessarily agree entirely with the approach followed. It must be noted that in developing the model, SVP has gone through a consensus building approach focussed on industry interactions. We had discussions on key assumptions with all the COAI members.**

### 2.3 Additional revenue generated by the operator from VAS

TRAI's comment on non-inclusion of Value Added Services (VAS) revenues in MTC estimation by SVP:

*"The method does not take into account the additional revenue generated by the service provider in the form of value added services, rentals etc. Transferring all costs to MTC makes MTC high and could be detrimental to the interests of the interconnecting new entrants and consumers."*

In its earlier notification (No. 409-5/2003/FN, dated 29<sup>th</sup> October 2003), TRAI had opined that only a portion of value added revenues should be allocated against the costs relevant for call termination:

*"Value added revenues have been deducted from the relevant cost base, because these are an important revenue source for recovering costs. This would also give an incentive for the service providers to earn more from the value added services in comparison to the estimated costs that have been recovered from these revenues. Over time, with the reduction in costs due to falling equipment prices, and its higher capacity, as well as due to rapid subscriber growth, the Authority may in future consider allocating only a portion of the value added revenues against the costs relevant for call termination."*

TRAI, in its FAC model, has deducted the revenues generated from value added services from the relevant OPEX. Following is the excerpt from its consultation paper (dated 31<sup>st</sup> December 2008):

*"5.3.1.11 Another exercise was carried out where the revenue generated from value added services was deducted from the relevant OPEX, as done in October 2003. Based on the data available the estimated*



revenue of VAS is about 10 % of total revenue. These estimates suggest a cost based mobile termination charge from Rs 0.09 to Rs 0.22 per minute.

5.3.1.12 Apart from the above two methods, it also possible to consider the fact the actual calculations would involve taking into account the cost as well as revenue from value added services for calculating MTC. In the absence of actual data a good approximation can be deduction of 10% of relevant OPEX for calculating MTC.”

In the Hybrid model developed by SVP, revenue generated from VAS has not been deducted from MTC calculations. **While calculating the MTC in the model developed by SVP, only those network OPEX costs are considered which are directly applicable to the service being modeled. The routing table captures SMS and data usage accurately only to the extent of the network elements that are considered in the model.** For example, even though data might use a GSN, SGSN, PCU and other core GPRS network elements it is not included in the table, since they are not involved during voice termination, and are not part of the network elements considered in the model. Further, based on the routing table, we have determined the allocation factors for each network element with regard to the termination service. Details pertaining to the routing table and allocation factors used are provided in section 3.5.5 of the document titled “White paper on Model Assumptions” submitted to TRAI on 17<sup>th</sup> November 2008.

Revenues emanating from other value added services like ringtones, caller ringback tones, etc. have not been considered, as **the model does not consider revenues generated from different services provided by the operator; the model is purely based on the cost associated with providing mobile termination. Moreover, provision of these value added services have costs associated with them, which have not been considered while developing the total cost of termination.** For example, provision of value added services like ringtones involve costs in form of revenue share with the content provider. Further, the CAPEX costs associated with VAS platform have not been considered in the model. **In order to maintain the “matching principle”, revenues emanating from providing a value added service should not be reduced from the MTC, as the associated cost is also not considered in the MTC model.**

Moreover, if VAS revenues are reduced from MTC, operators may increase the retail tariffs of value added services to make up for the reduced margins. This may not in the best interest of consumer welfare, especially in case of India, where the VAS uptake is already lower than comparable international benchmarks like Indonesia, Philippines, China, Malaysia, etc.

## 2.4 Network calibration

TRAI has mentioned in the consultation paper that SVP has undertaken a network calibration exercise:

*“During the discussions it was also mentioned that the hybrid FLRIC model involves reconciliation of the results obtained by Bottom up approach with the results of the Top-down approach using accounting data. COAI/SVP also mentioned that in case there are differences then the Top-down results are taken to be correct and bottom-up results are adjusted accordingly.”*

It appears that there has been some miscommunication on this aspect. **SVP has not undertaken the network reconciliation exercise due to time constraints** and the same was clearly stated in our document titled “White paper on Model Assumptions”, submitted to TRAI on 17<sup>th</sup> November 2008 (section 4.4).

Network design parameters are used to dimension the network and to determine the total incremental CAPEX to be incurred on an annual basis. **The SVP model uses appropriate global benchmarks (which**

are based on theoretical first principles) in consonance with the efficient operator hypothesis. However, it is recognized that there could be practical difficulties faced by Indian operators in achieving these benchmarks. Hence, **we have suitably adjusted the global benchmark to take into account India specific conditions and realities**. However, a complete and more accurate estimation of such adjustments would need a further detailed analysis to determine the actual limitations faced by operators in rolling out sites, which would give a more accurate estimate of the amount of calibration to be done. Moreover, as noted in other international markets, a calibration step usually further increases the MTC.

## 3 Response to issues for consultation

### 3.1 Q2. Methodology for determination of MTC

*“Q2. In view of the details provided in the paper, please give your opinion whether TRAI should continue with the existing methodology of fully allocated cost with appropriate assignments for termination charge or changeover to LRIC or its variant. Please provide full justification.”*

As mentioned in section 2.2 above and in section 4 of document titled “White Paper on MTC by Spectrum Value Partners” submitted to TRAI on 23<sup>rd</sup> October 2008, **SVP is of the opinion that a forward looking LRIC model should be adopted for determining MTC in India.** The justification for a change in approach and migration to this new methodology has also been detailed out in the above mentioned sections.

**Moreover, even TRAI had recognised in its notification (No. 409-5/2003/FN, dated 29<sup>th</sup> October 2003) that there is a need to eventually move to LRIC based MTC estimation model.** An extract from TRAI’s notification of 2003 is given below:

*“23. The Authority considered the framework used for calculating the IUC under the previous exercise, and noted that the cost basis used had been historical average costs from audited accounts of BSNL. It noted that for costing purposes, several countries had used Forward Looking Long Run Incremental Costs (FLLRIC), i.e. a methodology under which only a portion of stranded costs (or costs arising due to past high equipment prices or old technologies) is included in the calculation of costs.”*

*“24. The Authority noted that the difference between historical costs and forward looking costs would be large, and relying on costs based only on modern and forward looking technologies would imply a large burden from the stranded costs for BSNL. While **the Authority feels that change over to FLLRIC model is imperative**, it examined the implications of a sudden changeover against a gradual changeover.”*

### 3.2 Q3. ‘Cost-based’ approach

*“Q3. Should termination charge be strictly ‘cost-based’ or should the principle of ‘cost-oriented’ be applied taking into account other affecting factors? Give reasons in support of your answer.”*

SVP has discussed this aspect in detail in section 4.2 of document titled “White Paper on MTC by Spectrum Value Partners” submitted to TRAI on 23<sup>rd</sup> October 2008. SVP is of the opinion that cost-based pricing methodologies are argued to be more economically efficient because they more accurately reflect the true underlying cost of providing interconnection services compared to retail price based methodologies for reasons discussed above. Thus, they are more conducive to promoting market entry and competition. Consequently, most countries have moved or are moving towards cost-based determination of interconnection charges. This has been reinforced by the recommendation to adopt such approaches by the WTO, EC and IRG.

### 3.3 Q4. Revenues from value added services

*“Q4. In the absence of cost data for value added services, how should the revenue of such services be taken into account for determination of termination charge?”*

This question has already been addressed in section 2.3 of this document.

### 3.4 Q5. Asymmetric termination charges

*“Q5. Are asymmetric termination charges justified? If yes, which of the following should be the basis*

(i) Existing service providers vs. new entrant

Give justifications for your answer.”

It has been observed globally that asymmetrical MTC pricing has been introduced in some markets when new operators enter the market (SVP has detailed out experiences of other international markets that have introduced asymmetric MTC in its document titled “White Paper on Asymmetric Termination Rates”, submitted to TRAI on 2<sup>nd</sup> December 2008). The main argument for this approach has been on the grounds that the late entrants need to be subsidised to enable them to overcome competitive disadvantages arising due to lower economies of scale and less efficient spectrum allocations. Regulators justify this intervention as a tool to promote competition in the market.

In the Indian context, several operators have been awarded GSM license in 2008 on a pan-India basis or select circles, and are expected to launch operations in the near term. In the light of the changed market dynamics with the entry of these operators, it could be argued that an asymmetrical MTC pricing needs to be considered in India as well. The following are the arguments in favor of introducing an asymmetrical MTC pricing in the current market scenario:

- Monopolistic/oligopolistic situation in the market in which operators use this dominance to inhibit competition
- Exogenous cost differences arising from spectrum allocations

An analysis of these factors in the Indian context reveals the following:

- **Absence of a Monopolistic/oligopolistic situation in the market**

The Indian mobile market is the fastest growing market in the world. However, penetration level is still very low indicating sufficient growth potential for late entrants to tap into. The Indian market is also characterized by low switching costs resulting in relatively high churn which enable new entrants to compete more effectively with established operators. Hence, an asymmetric MTC regime to compensate new entrants for late entry may not be justified.

- **Possible existence of exogenous cost differences beyond the control of the late entrant**

Since late entrant operators receive spectrum in only the 1800 MHz band as opposed to existing operators who have already been allotted spectrum in both the bands, **SVP is of the opinion that cost differences due to spectrum would exist at least in the short term. These cost differences could diminish over time.** There is possibly a need to recognize these cost differences and to assess the time frame that such cost differences are likely to persist.

**In the event that the cost differences are found to be substantial and to persist beyond a reasonable time frame, the possibility of introducing an asymmetrical MTC may be considered.** However, for considering an asymmetrical MTC regime in India, there are several factors which need to be addressed:

- **Selecting a suitable methodology for determination of MTC differential:** Either international benchmarking or a cost based approach could be adopted
- **Defining the approach to determination of MTC differential:** Significant differences exist in the proportion of 900 MHz versus 1800 MHz allocation, not only for different operators in a circle but also for the same operator across different circles. The complexity is further accentuated due to

allotment of spectrum to operators in other bands (800 MHz and 1800 MHz), as in the case of CDMA operators. This could present severe operational challenges in introducing an equitable MTC.

- **Determination of a suitable glide path towards symmetry:** Depending on the approach to determination of the MTC differential there could be several glide paths.
- **Impact of welfare loss arising out of differential MTC (the “waterbed effect”):** Due to the interrelated nature of tariffs in the wholesale and retail markets an asymmetrical MTC could lead to higher retail tariffs for calls terminating on the new entrants network. This could be counter-productive as it could hamper the growth of the new entrants.

**At the outset, the implementation of an asymmetrical MTC in India appears to present some key operational challenges.** While some of these challenges can be surmounted, it is necessary for the regulator to keep in mind the interests of all key stakeholders in evaluating whether an asymmetrical MTC would achieve the desired impact of increasing competition and promoting the overall development of the sector. Further, an assessment is needed as to whether the consumer interest would be better served by a uniform rate or by multiple rates for what is perceived as essentially the same service by the customer.