TELECOM REGULATORY AUTHORITY OF INDIA

CONSULTATION PAPER ON MTNL'S TARIFF PROPOSAL FOR CELLULAR MOBILE SERVICES USING C.D.M.A. TECHNOLOGY AND RELATED ISSUES

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Consultation Paper on MTNL's Tariff Proposal For Cellular Mobile Services Using CDMA Technology, And Related Issues

1. A major policy change was introduced by the Government on 13th September, 1999, when it allowed Cellular Mobile Telecom Services (CMTS) to be provided with any digital technology, including Code Division Multiple Access (CDMA) technology. Till that date, CMTS had to be provided using *Group Speciale Mobile* (GSM) technology that is based on Time Division Multiple Access.
2. The Government's decision to allow such technology neutrality was preceded by Mahanagar Telephone Nigam Limited (MTNL) submitting a tariff request to TRAI for `CMTS with CDMA WILL technology with limited mobility`. TRAI had to examine this report for a number of reasons to ascertain the appropriateness of tariffs that had been submitted. These include:

   - a need to clarify the scope of the service characterised by `limited mobility`, which in turn is linked to the question whether the service was a cellular mobile service or some other service;
   - whether MTNL had a license to provide the service using CDMA WILL technology;
   - to fulfil the customer's right to know whether and which tele, bearer and supplementary services were available with CDMA technology in comparison to GSM technology;
   - to ensure that the customer is fully informed about the quality of service in comparison to GSM system;
   - to ensure proper information to the customer about the roll-out of the service in the service area;
   - to address the regulatory problems arising due to likely cross-subsidy when a major incumbent (such as MTNL) provides more than one important service using overlapping networks and accounts;
   - the above implies a need to consider the cost base for the service being provided;
   - an assessment of costs was required also to ascertain whether the introduction of the new technology had in any fundamental manner altered the underlying cost based tariffs that had been specified by TRAI for CMTS in general; and,
   - to point out errors made in the tariff report that had been submitted.

1. Additional information was thus sought by TRAI to conduct its examination of the tariff request (see Annex I for a sequence of events in this regard).
2. It was only on 15th September, 1999 that MTNL received a license to provide the service

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for which it requested tariff approval, whose definition had subsequently been changed by MTNL to `CMTS using CDMA technology`. Subsequently, in a letter dated 17th September, 1999, the Department of Telecommunications (DOT) clarified to TRAI that under the National Telecom Policy (NTP) 1999, there was no service such as cellular mobile service with limited mobility.

3. The cost detail and some other information provided by MTNL required further clarification. Certain deficiencies still remain in the information that has been provided to TRAI. Nonetheless, TRAI has prepared this consultation paper to inform the users about the main issues that have been addressed with regard to the reported tariffs, and in the process to seek information that could improve decision-making on the matter. The detailed terms and conditions will be subject of a consultation process to be held later on the basis of a more detailed paper. This paper addresses the limited scope of certain questions that arise with respect to the request by MTNL for tariffs for its CDMA based system with 9,000 subscribers.
4. A useful background in this regard is the recent press note issued by the Government (F. No. 842-304/99-VAS dated 1st October, 1999), which states, inter alia, that:

   `Reports have appeared in certain section of media expressing concern that the license granted by the Government to MTNL for Cellular Mobile Telephone Service does not provide level playing field to other licensees. In this behalf it is clarified that in terms of NTP-99, there is going to be the same licensing regime for all operators;

   As regards the payment of license fee by MTNL, percentage of revenue would be the same as for any other CMSP;

   Interconnect revenue sharing arrangements for cellular services for payment of access charges between DOT and MTNL for STD and ISD traffic will be the same as applicable to the other private operators;

   If any company is a basic service provider as also a CMSP, then maintenance of accounts and furnishing of returns etc. would have to be separate as there are separate licenses for different services. MTNL has further assured the Government that they would be maintaining separate accounts for the operation of cellular services.`

5. Keeping in mind the above-mentioned clarification and directive by the Government, Section I of the paper addresses tariffs. First, a cost based standard tariff package is derived on the basis of the cost data submitted by MTNL for CMTS with CDMA technology, with certain modifications made to this data. Then, the alternative tariff package proposed by MTNL is examined to assess whether the revenues from this tariff package would be able to cover costs. This examination has taken account of the Government's stipulation that MTNL's CMTS service has to operate with `same license conditions` and payment of interconnection charges/revenue as other CMTS operators. MTNL's own tariff request had not reflected this aspect. The regulator needs to clarify these issues because they have important implications for the customers.
6. In the above context, it is important to note that MTNL has responded to TRAI that it would retain the revenue share that has be given to the basic service network when calls are from its CMTS network to its basic service network. This would be inconsistent with the interconnection revenue sharing regime that applies to other CMTS providers, as well as to the above-mentioned directive of the Government. Under its proposed tariffs, when calls are made to another (private) basic service network (e.g. in Mumbai), MTNL would charge a different tariff compared to calls made to MTNL's basic service subscriber. This would be discriminatory treatment, in addition to violating the condition regarding interconnection revenue share (and the Government's directive).
7. The above points and the various replies of MTNL to TRAI's queries also show that MTNL's tariff report is not completely specified, including for the situation when calls will be made from MTNL's CMTS to another CMTS network. For calls made to any CMTS network, a mobile termination charge (MTC) has to be paid to the terminating network. **If Rs. 1.40 includes MTC (i.e. if MTC is not charged separately), then tariffs will not cover costs**. Further, in its advertisement to launch the service, MTNL has specified a charge of Rs. 1.40 per call. It is not clear what this charge is, and the customer as well as the regulator must be properly informed of such matters.
8. Section II of this paper addresses certain other issues in the context of tariffs that are the right of customer to know, and that of the regulator to enforce. These include in particular the quality of service and supplementary services that will be provided with CDMA in comparison to those provided with GSM technology. **Prima facie it would seem that CDMA based CMTS will not provide a number of tele, bearer and supplementary services.** The issue is discussed at length in Section II.
9. The process of discussion and clarification with respect to the information provided by

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MTNL was underway when MTNL announced the commencement of its CMTS service with `provisional` tariffs. This was, inter alia, on the basis that TRAI was unduly delaying the launch of the service. Annex I gives a summary of the sequence of events to show that there is no basis for the allegation that TRAI was unduly delaying approval. Annex I is complemented by material in Annexes II and III which summarize the main points regarding use of CDMA technology by MTNL, attempts to seek a definition of (and whether there is a cellular mobile service with) limited mobility, and the policy stipulation applicable till about mid-September, 1999 that CMTS could be offered in India only with GSM technology.

10. TRAI's view is that we should not, indeed cannot, hold back the application of new technology. New technology offers better services to customers, and the protection of customer interest is a primary task of TRAI. The new technology offers immediate benefits to consumers in the short run, and TRAI would like to aid any such process. Further, regulatory steps might be needed to ensure that the new technology continues to improve the situation for customers in the medium term. Thus an examination and clarification of certain regulatory issues is required prior to any decision on the matter. In this context, it is worth emphasising that TRAI has <u>not</u> raised any questions about the use of WILL for providing basic services, because it is in conformity with the National Telecom Policy 1999 as well as the license conditions for basic services. MTNL's tariff request for fixed services with WILL was cleared by TRAI within a day of receiving the appropriate request.
11. The main results regarding tariffs (Section I) are as follows.

   - **The standard tariff package that we derive for the present case is broadly similar to that specified for CMTS in general.**
   - **For the alternative tariff package, the tariff reported by MTNL is likely to cover costs only if the tariff for CMTS calls includes an additional element for the revenue shares to be paid to basic or another CMTS network for local or STD/ISD calls made to (or carried by) these networks.**
   - **On the other hand, if such interconnection revenue shares are not charged separately and are to be paid out of the per unit charge of Rs. 1.40 itself, MTNL's alternate tariff will not cover costs**.

Section I. Cost Based Tariffs For MTNL's CMTS Using CDMA Technology And Viability Of The Alternative Tariff Package

1. Till about mid-September, 1999, CMTS was provided with GSM technology. The cost based tariffs that were specified for CMTS by TRAI were based on costs submitted by service providers using the GSM system. With a change in policy that now allows the provision of CMTS using CDMA technology, there is a need to re-examine the cost basis to consider whether there is a major difference with respect to the previous situation. The first part of this Section estimates cost based tariffs on the basis of costs provided by MTNL for its CDMA based cellular mobile service. The methodology for this calculation is similar to that used earlier by the Authority for determining a standard tariff package for CMTS. This exercise shows that the general standard tariff package would be applicable to the CDMA based CMTS also. An important point in this regard is that the determination of tariffs based on the specific request made by MTNL for its 9,000 line system, and thus has a narrow scope. Over time, there will be an expansion in the system together with changes in the underlying technology and market situation for CMTS. That situation would be the subject of a more comprehensive assessment at a later date.
2. The second part of this Section considers whether MTNL's alternative tariff package will provide adequate revenues to cover the costs of providing the service. The main result of this examination is that the revenues will not cover costs of the service unless, in addition to air time charge, the customer is also charged (as is done by other CMTS providers) for the interconnection revenue share that has to be paid to other networks when calls are made from CMTS to other CMTS network or to basic service network.

1. Application of the Existing Standard Tariff Package

a. **<u>Rental</u>**

1. The capital cost for the CDMA system is taken on the basis of the cumulated amount that is submitted by MTNL, i.e. Rs. 4 crores for the first 1,000 lines and Rs. 12 crores for the next 9,000 lines. The number of subscribers in the system is based on MTNL's report that the system will have a capacity utilization of 90 per cent capacity. Thus an amount of Rs. 16 crores is taken as the capital cost for 9,000 subscribers.
2. This implies a weighted average CAPEX of Rs. 17,780 per subscriber. For cellular mobile subscribers using GSM technology, an annual recurring expenditure (ARE) of about 30 per cent was used to determine the cost based rental, and the same is done in this case also.

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An ARE of 30 per cent applied to Rs. 17,780 implies a monthly amount of Rs. 445.

3. In the case of the second Consultation Paper on tariffs, half of the total license fee was added to this amount, the other half being added to the operational cost base that was used to derive call charge. In this case too, therefore, we will add half the license fee paid by MTNL to the cost based monthly rental.

a. **License fee revenue share**

1. License fee would be paid by MTNL in the form of revenue share. This has been prescribed provisionally at 15 per cent of revenues. In order to calculate this license fee, one needs to first assess the amount of revenue. We do this calculation for a specified range of standard rental and outgoing call charge, as shown Table 1. The revenue is calculated for the calling party pays (CPP) regime, which will be applicable from 1st November, 1999. In the CPP regime, the service provider gets a mobile termination charge (MTC) for incoming calls. TRAI has specified an MTC of Rs. 1.60 for the first minute and Rs. 0.80 per 60 second pulse thereafter. In addition to this, revenue is earned from rental and outgoing call charge.
2. We work with an average holding time of 90 seconds for incoming calls. This is based on the information available with TRAI. With this holding time, Rs. 2.40 (i.e. Rs. 1.60 plus Rs. 0.80) is obtained by the service provider for each average incoming call. This translates into Rs. 1.60 per minute of incoming calls. This amount has to be further corrected because MTC is not received on incoming calls from the same network. It is being assumed that own network calls account for 10 per cent of the calls; this is also based on the information available with TRAI on cellular mobile call patterns. It is worth noting that if the call holding time is less than 90 seconds, the per minute revenue from incoming calls will be higher, except for just below 60 seconds duration (for which the revenue will be the same as for 90 seconds). However, as shown later in the paper, this increase in revenue will not cause a major change in the results if the additional license fee cost has to be added to the overall cost.
3. The total revenue from incoming calls also requires an estimate of the incoming call minutes per month per subscriber. With CPP, total monthly usage per subscriber is expected to be above 200 minutes in Delhi and about 300 minutes in Bombay. We will consider 250 minutes per month of usage, 60:40 as the ratio of incoming minutes to outgoing minutes. This implies 150 minutes of incoming call minutes. This implies that revenues from incoming calls will be Rs. 216 per month.
4. On the above basis, we have 100 outgoing minutes per month per subscriber. We take two tariffs for outgoing calls, i.e. Rs. 3.50 or Rs. 4 per minute. Taking an average call holding time of one minute, the resultant monthly revenues are given in Table 1. For illustrative purposes, Table 1 also provides the corresponding estimates with 200 minutes of usage per month per subscriber.
5. For determining the amount of revenue on which a 15 per cent license fee is to be calculated, we first take the standard tariff package for the calling party pays (CPP) regime, i.e. Rs. 475 as monthly rental and Rs. 4 as outgoing call charge per minute. This provides us with a license fee of about Rs. 165 per month.
6. In addition to the standard tariff package for the CPP regime, we could take a higher rental together with a lower call charge for outgoing calls. In this tariff package, we consider a monthly rental of Rs. 600, a charge for outgoing calls of Rs. 3.50 per minute, and average call holding time of 90 seconds for incoming calls (this tariff package is based on the cost based tariff package that is derived below for MTNL's CDMA service). In this situation, license fee amounts to Rs. 175 per month.
7. For our purpose, we will take an average of the two above and take a license fee of Rs. 170 per month. This implies that Rs. 85 has to be added to the rental component, and an equal amount to the cost base used to determine operating costs.

a. **Entry fee as license fee**

1. The National Telecom Policy 1999 has specified that an entry fee will be charged as license fee for newcomers; this has not been explicitly specified for MTNL. However, for costing purposes, it would be appropriate to take a notional entry fee into account. An entry fee is important to determine a level playing field with respect to those who have developed the market and have already paid some license fee.
2. The entry fee for MTNL has been calculated on the basis of the per subscriber licence fee amount that has to be paid by cellular mobile service providers in Mumbai and Delhi. Table 2 shows that we could work with an amount of Rs. 170 per month for this item. Once again, Rs. 85 of this will be allocated to capital cost and Rs. 85 to the operating cost base.
3. **Adding half the license fee (revenue share and entry fee) to cost based rental derived above gives us a total amount of Rs. 615 per month for rental (i.e. Rs. 85 for revenue share license fee, plus Rs. 85 for entry fee license fee, and Rs. 445 of**

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cost based rental with ARE of 30 per cent).

a. **Handset cost**

1. There is another item whose cost has to be considered in the cost base, namely cost of handsets.
2. In the CDMA based CMTS, it is mandatory for the subscribers to use the handset that is provided by the service provider. The handset is purchased by MTNL and provided to its subscribers taking a security deposit of Rs. 10,000. Since this is a capital cost item, it could be taken together with rentals. However, given the fungibility of money, this item could also be taken as being recovered from call charge revenues. We will consider both these possibilities below.
3. In two different submissions, MTNL has given two different estimates for handset cost, namely, Rs. 10,000 and Rs. 15,000 per handset.
4. MTNL has insured its handsets, and the insurance premium is given as Rs. 15 lakhs per annum. The handsets will be returned by the subscriber when the connection to the service is to be terminated, and the deposit will be returned to the subscriber at that time. Handsets thus remain the property of MTNL.
5. Costs for handset have been calculated on the basis of an ARE of 30 per cent applied to the capital required to procure handsets, minus a return of 12 per cent interest available on Rs. 10,000 deposit on the handset. The relevant cost estimates are given in Table 3, which have been calculated, inter alia, with two estimates of handset costs, Rs. 10,000 per set and Rs. 15,000 per set. These two estimates, together with a deposit of Rs. 10,000 paid by the subscriber, gives us a net addition to cost base of Rs. 150 per month or Rs. 275 per month.
6. Handset costs are coming down. An independent estimate of handset cost is lower than Rs. 15,000; it suggest that these sets could be procured for Rs. 13,000 per handset. With this amount, the upper limit of monthly cost reduces from Rs. 275 to Rs. 225. We will work with the estimate of Rs. 225 per month, i.e. the amount corresponding to Rs. 13,000 per handset.
7. If Rs. 150 to Rs. 225 per month are added to rentals then they will range between Rs. 765 to Rs. 840 per month. These are high rental amounts and would imply a reduction in the participation of the subscribers in the network. Thus, cost based rentals could be determined without taking handset costs into consideration, and handset costs could be covered by call charge revenue.

a. **Call charges**

1. The cost components given by MTNL were as follows:

    - Rs. 70 lakhs per annum as operating cost;
    - Rs. 15 lakhs per annum as insurance cost for handsets;
    - Rs. 30 lakhs per annum as rental for space for MSC, power-plant, and six BTS.

1. Subsequent to its initial estimates for operational cost, MTNL provided revised estimates. These estimates were lower than those supplied earlier. TRAI has done its own calculations for these estimates. The cost estimates provided by MTNL and those determined by TRAI are given in Table 4.
2. On the basis of the costs shown in Table 4, operational costs are estimated at Rs. 188 lakhs to Rs. 201 lakhs per annum. In per subscriber terms, this amounts to about Rs. 175 per month (corresponding to Rs. 188 lakhs per annum for 9,000 subscribers) or Rs. 186 per month (corresponding to Rs. 200 lakhs per annum for 9,000 subscribers).
3. To this amount, we have to add half of the license fee (revenue share and entry fee) and the handset costs. The total amount of costs to be covered through call charge revenues are:

    - Rs. 495 per month (taking Rs. 150 per month for handset cost; lower estimate of operational cost (i.e. Rs. 175 per month); half the license fee (i.e. Rs. 170 per month);
    - Rs. 506 per month (taking Rs. 150 per month for handset cost; higher estimate of operational cost (i.e. Rs. 186 per month); half the license fee (i.e. Rs. 170 per month);
    - Rs. 581 per month (taking Rs. 225 per month for handset cost; higher estimate of operational cost (i.e. Rs. 186 per month); half the license fee (i.e. Rs. 170 per month).

1. Call charge has to be determined on the basis that revenue from these charges just covers

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the above-mentioned cost estimates. It should be noted that with the implementation of CPP, MTNL will receive revenues not only from its outgoing calls but also from incoming calls. The revenue from incoming calls is the mobile termination charge (MTC) that is linked to the number of minutes of these calls.

2. To derive the revenue from incoming calls, we will work with the same estimates for incoming call minutes and average holding time as used for calculating the revenue share license fee, i.e. 60 per cent of 250 minutes per month, an average holding time of 90 seconds, 90 per cent of incoming calls providing MTC, and an MTC of Rs. 1.60 for the first minute and Rs. 0.80 per 60 seconds pulse thereafter. As mentioned earlier, under these conditions, revenues from incoming calls are Rs. 216 per month. The rest of the amount has to be recovered by revenue from outgoing calls. For the estimates of monthly cost base determined above, this amounts to:

    - Rs. 290 per subscriber per month (taking Rs. 150 per month for handset cost; higher estimate of operational cost, and half of license fee);
    - Rs. 365 per subscriber per month (taking Rs. 225 per month for handset cost; higher estimate of operational cost, and half of license fee).

1. We have used above an estimate of 100 minutes per month per subscriber for outgoing calls. For the amounts of costs to be recovered through outgoing calls, this implies an outgoing call charge of Rs. 2.90 or Rs. 3.65 per minute.
2. Table 5 shows the cost based tariffs derived for cellular mobile in the second Consultation Paper on tariffs. The estimates in that Table show that the rental fixed by the Authority corresponds to the estimate for the year 2000-2001, and that the call charge fixed by the Authority was slightly lower than the amount calculated in the paper. **On a similar basis, for CDMA technology, the standard cost based rental and outgoing call charge could, respectively, be determined to be Rs. 600 per month and Rs. 3.50 per minute**.
3. Recent experience in certain places (e.g. Calcutta) where CPP has been introduced as part of alternative tariff package suggests that the number of incoming call minutes might be more than is taken in the calculation above. Thus, as explained in the sub-section below, if there are about seven incoming calls per day, the outgoing call charge in the standard tariff package would amount to about Rs. 2.50 per minute. A standard tariff package with monthly rental of Rs. 600 and outgoing call charge of Rs. 2.50 per month is broadly similar in its revenue effect to a standard package with monthly rental of Rs. 475 and outgoing call charge of Rs. 4 per minute. Hence, **the standard tariff package for MTNL's CDMA based cellular mobile services is similar to that specified for CMTS in general when CPP becomes operational in November, 1999**.

(2) A comparison of the cost with revenue generated by an alternative tariff package with rental of Rs. 600 per month and Rs. 1.40 per three minute pulse as outgoing call charge

4. Table 6 shows the total cost to be recovered by revenues generated by the cellular mobile service using CDMA technology. The range of costs is from Rs. 1,100 to about Rs. 1,200.
5. Revenue per call depends on the call charge per pulse, average holding time for the call, and total minutes of usage. In the absence of information on average holding time for outgoing calls, it is easier to calculate revenue from outgoing calls on the basis of call charge per metered call than on the basis of number of minutes of usage. The number of metered calls per day for the PSTN system could be used as a surrogate for the number of metered calls for another regime (such as for MTNL's alternative tariff regime) that is similar to the PSTN tariff.
6. It is likely that subscribers with CDMA based cellular mobile service would be relatively large callers, because they are more likely to benefit from the difference in call charge. We work with the assumption that these callers make at least the same number of local calls as are made in Delhi/Mumbai, and use some additional airtime for making STD/ISD calls.
7. In Delhi/Mumbai, the PSTN system has on average about 20 metered outgoing calls per day. Of these, 40 per cent of the metered calls are local calls. This implies 8 metered calls as local calls per day. The other calls (i.e. STD/ISD) would involve airtime usage each time such calls are made from a CMTS system. Suppose these account for two additional calls per day. The total of outgoing metered calls would then be 10 per day, or 300 per month. At Rs. 1.40 per metered call of 180 seconds, this would give a monthly revenue of Rs. 420.
8. It is possible that the above-mentioned calls involve a very high usage in terms of minutes of use, and this uasage may not be supported by the CDMA system. Discussions on this matter show that the system has been configurated for an average usage of 60 minutes per day per subscriber. This capacity is large enough to accommodate the usage pattern considered here.
9. For incoming calls, we first work with the same estimate of usage as in the case of

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calculation of the license fee above, i.e. 150 minutes with average holding time of 90 seconds. The revenue from these calls would amount to Rs. 216 per month.

(a) Monthly revenue with rental of Rs. 600 per month and outgoing call charge of Rs. 1.40 per 180 seconds

10. **In the situation mentioned above, call charge revenue would be Rs. 636 per month (i.e. Rs. 216 per month from MTC earned for incoming calls and Rs. 420 per month for 10 outgoing metered calls per day at Rs. 1.40 each). Adding monthly rental of Rs. 600 gives a total revenue of Rs. 1,236 per month.**
11. This suggests that with a rental of Rs. 600 per month, revenues are likely to recover costs, provided that outgoing call charge is Rs. 1.40 per call of 180 seconds and for calls made to (or transiting) through another network, the interconnection revenue share is additionally collected and paid to the other network. If this is not done, then a charge of Rs. 1.40 per 180 seconds for outgoing calls would not recover costs. Take for instance the situation where a call is made by the cellular mobile subscriber to the basic service network.
12. According to the revenue sharing specified by TRAI's Interconnection Regulation, a call from cellular mobile to basic network would imply an amount of Rs. 1.20 per 180 seconds to be paid to the latter for usage of that network. **If the cellular mobile segment of MTNL collects only Rs. 1.40 per 180 seconds for such calls, the actual tariff revenue to be retained by the CMTS segment would be Rs. 0.20 per 180 seconds. With this low tariff, the CMTS service of MTNL would not recover costs. The same situation arises also for calls made to other CMTS network, for which MTNL CMTS would have to pay a mobile termination charge (or MTC) of Rs. 1.60 for the first minute and Rs. 0.80 per minute thereafter.**
13. It is important to bear in mind that if MTNL's CMTS segment retains the MTC or the Rs. 1.20 that has to be given to the basic service provider for carriage/termination of a call, this would be a violation of the Interconnection Regulation. Such a situation would amount to the basic service segment of MTNL subsidizing the below-cost CMTS tariffs of MTNL. This is evident from the response of MTNL itself to a query raised by TRAI, where MTNL states that when another basic service provider enters the market in Delhi, it will provide the Rs. 1.20 per metered call as revenue share to it. Also, when MTNL begins its CMTS service in Bombay, it would provide the above-mentioned revenue share for CMTS calls made to the second basic service provider.
14. **For the tariff to be above cost, therefore, in addition to Rs. 1.40 per 180 seconds, MTNL must charge the revenue share that has to be paid to the other network when calls are made to that network. And the customer and the regulator must be clearly informed of this pricing. As yet, MTNL's tariff report has not provided such information, and the reported tariff is hence incomplete. This is particularly relevant because in its letter of 21st September, 1999 and at a meeting with TRAI on 27th September, 1999, MTNL insisted that it was proper for it to retain Rs. 1.20 per 180 seconds when calls were made by MTNL's CMTS subscribers to MTNL's basic service subscribers.**

(b) Monthly revenue with rental of Rs. 475 per month and outgoing call charge of Rs. 1.40 per 180 seconds

15. Let us now consider a situation with monthly rental of Rs. 475, i.e. the rental in the standard tariff package that will apply from 1st November, 1999. Though the alternative tariff package need not have this rental, calculations are made with this amount on the basis of certain news reports that MTNL's alternative tariff package rental might also be Rs. 475 per month.
16. With Rs. 475 as monthly rental, under the assumptions made above for outgoing and incoming call revenues, total monthly revenue would be about Rs. 1,110. This is below the cost estimates calculated above, and would require a higher call revenue to recover costs. In this context, it would be useful to consider whether incoming calls might be more than those assumed above. To the extent that more incoming calls will be made to cellular mobile, a higher revenue will be generated.
17. With average holding time of 90 seconds, and 150 minutes per month of incoming calls, we obtain on average 100 calls per month made to cellular mobile. This is about 3 to 4 incoming calls per day, significantly below the average number of local calls made from PSTN in Delhi/Mumbai. In this context, we should remember that incoming calls are received also from STD/ISD, as well as from other cellular mobile networks. Therefore, one could consider a higher number of incoming calls as a reasonable estimate for calculating revenues.
18. For monthly revenues to become Rs. 1,200 per month, with rental of Rs. 475 and outgoing call monthly revenue of Rs. 420, an average of 6.5 incoming calls are required per day. **In view of the fact that on average eight metered local calls are made per day in**

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Delhi/Mumbai, and that incoming calls are likely to come also from cellular mobile networks, it is possible that 6.5 to 7 incoming calls might be received per day. This would provide for the revenue to recover costs.

3. **<u>Tariff Related Regulatory Issues</u>**

1. With respect to the determination of cost based tariffs, the discussion has been based on certain specified assumptions. These need to be examined in order to assess their appropriateness. Allocation of common costs and accounting separation are also important considerations in this context, so as to properly ascertain the relevant costs and to determine whether or not certain tariff regimes are viable. Further, there is an uncertainty introduced on account of certain cost components such as a notional entry fee. **For a proper examination of the relevant cost based tariff regime, these and a number of other questions arise, including details of the terms and conditions of the license. The latter issues will be discussed in greater detail in a paper that will be subject of consultation at a later date. For this paper, the relevant issues include**:

   a. What measures to take for addressing the issue of cross-subsidization and to maintain a `level playing field`.
   b. Whether MTN's accounting separation will be sufficient to deal with the regulatory issues that arise with their entry into CMTS.
   c. The extent of entry fee that should be determined as license fee and how this will likely affect cost based tariffs.
   d. Accuracy of the cost data provided by MTNL, and that used by us in this paper.
   e. Likelihood of the call revenue being the amount that has been estimated in this paper.

<u>Section II. Certain Other Important Regulatory Issues, Including Quality of Service</u>

1. A number of issues arise when there is a major change in policy allowing the use of a hitherto prohibited technology, in particular if there is any situation where an incumbent basic service provider might be seen as apparently providing certain services under greater flexibility than others service providers. These issues include, inter alia, quality of service in comparison to other service providers, conformance of the new technology network to the OR/QR specifications applicable to existing service providers, the types of services that are to be offered with a new technology, roll-out plan and hence the areas which will be provided the service with a new technology, how to ensure that the service is eventually available in a specified time period within the entire service area, whether there is any likelihood of conflict of spectrum use with other services/service providers, use of `98` numbering scheme, and an examination of the underlying costs to ascertain that tariffs are not used to unfairly erode the market base for others and thus affect the supply of a service in the medium term.
2. Quality of service and the types of tele/bearer/supplementary services provided are extremely important features of any service offered, and the customer must be made aware of these aspects. The existing CMTS license specifies a number of tele-services, bearer services, and supplementary services. The Authority would like the customers to know whether the CMTS based on CDMA would provide any/all of these services, because there is a cost implication for the customers if they could obtain certain services within a specified amount of expenditure.
3. **For <u>GSM technology</u>, the cellular system engineering has to be designed so as to provide at least 90 per cent coverage per cell as per GSM recommendation. The ultimate objective is to provide hand-held portable service inside a building within the whole of the service area. Additionally, in the first instance, the system has to be capable of providing the following services:**

   a. **Tele-services**

   - **Speech (telephone; emergency calls);**
   - **Data (message handling system; 300 bps access; 1200 bps acces);**
   - **Short text (communication of short alphanumeric messages);**
   - **Graphics (Group 3 fascimile).**

   b. Bearer Services

   - **Data transmission in asynchronous duplex circuit mode with PSTN (300 bps (V21)); 1200 bps (V22));**

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- **Data transmission in synchronous duplex circuit mode with PSTN (1200 bps; 2400 bps);**
- **Mobile access in the asynchronous mode to the packet assembler/dissembler of packet switching network (300 bps; 1200 bps);**
- **Mobile access in the synchronous mode to the packet assembler/dissembler of packet switching network (2400 bps; 4800 bps);**

c. **The following supplementary services may be provided in the first instance:**

- **calling number identification presentation;**
- **calling number identification restriction;**
- **connected number identification presentation;**
- **connected number identification restriction;**
- **malicious call identification;**
- **call forwarding unconditional;**
- **call forwarding on mobile subscriber busy;**
- **call forwarding no reply;**
- **call forwarding on no reply;**
- **call forwarding on mobile subscriber not rea....;**
- **call transfer;**
- **mobile access hunting;**
- **call waiting;**
- **call hold;**
- **completion of call to busy subscriber;**
- **three party service;**
- **conference calling;**
- **closed user group;**
- **advice of charge;**
- **freephone service;**
- **reverse charging (called or calling MS);**
- **barring of all outgoing calls;**
- **barring of outgoing international calls;**
- **barring of outgoing international calls except directed to the PLMN country;**
- **barring of all incoming calls;**
- **barring of incoming calls when roaming outside home country PLMN country.**

1. **<u>For CDMA technology</u>, as per the information provided by MTNL, testing of the technology has been done as per CDMA standard, and coverage of 90 % of total area for 90 % of time as applicable to each Base Station is available; Grade of service is 1 %; average frame error rate is 2% with 96% RF reliability.**
2. **According to MTNL, no bearer or supplementary services are proposed to be provided at present for its CDMA based CMTS. The customer has a right to know about the provision (or absence) of such services.**
3. Customer welfare is also affected by whether the numbering scheme will under the `98` category. Without a `98` number, implementing the CPP regime may not be feasible, as would the provision of related benefits to customers. Also, uniform numbering scheme for cellular services irrespective of technology is important. Another information that should be available to the customers is whether they can transit easily from one system to another. This is especially significant in view of the fact that MTNL itself is planning to extend its cellular mobile service using GSM technology.
4. **Thus, the important points on which customers need to be informed include**:

    a. Whether there is a difference in the type and quality of service provided with GSM technology and CDMA technology.
    b. If so, operational and quality standards/requirements of the service based on CDMA technology in comparison to those based on GSM technology (the latter technology is being currently used by service providers to give cellular mobile services).
    c. Whether the CDMA system can support calls indoors and in crossing from one cell's coverage to another in a manner similar to the GSM specification.
    d. Whether the licensor should specify a minimum set of tele/bearer/supplementary services.
    e. Whether facility of roaming would be available CDMA technology.
    f. In the above context, whether the plan of MTNL to later provide cellular mobile services using GSM technology will cause any problems of inter-face and transition for subscribers.

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g. Whether the numbering scheme will be under `98` category`, and whether a change in the numbering scheme will create any problems for those presently using the system that was earlier purchased for non-commercial trial.
h. Would the use of CDMA technology for cellular mobile result in any problems in the allocation of frequency to various services/service providers, and thus affect the service that is being provided?

1. Some of the above features, i.e. the `98` numbering, may have been partially addressed through an initial advertisement. These issues must, however, be given prominence in any additional information material that is provided to the customer together or separately with the application form.

Comments should be provided latest by 25th October, 1999, to Dr. H. V. Singh or Dr. R. Kathuria, TRAI, 16th Floor, Jawahar Vyapar Bhawan, Tolstoy Marg, New Delhi – 110001. (Tel: 335 7813 or 37372727; Fax: 3738708; E-Mail: trai@del2.vsnl.net.in).

Annex I

Sequence of Events Relating to MTNL's Tariff Submission to TRAI

for its CMTS Service

2. MTNL approached TRAI for approving its tariff for the provision of `*Cellular Mobile Telecom Service (i.e. CMTS) using CDMA WILL Technology with limited mobility*` for the first time vide its letter No.MTNL/R&L/WILL/99, dated 23rd August, 1999. It was necessary to seek a number of clarifications on this tariff request from both MTNL (as service provider) and DOT (as licensor and policy maker), because major regulatory issues were involved.
3. Till about mid-September, 1999, cellular services were obliged to be based on GSM technology (See Annex III). Use of any other technology, such as CDMA for CMTS, was permitted by the Government only recently, when a major policy directive was issued in this regard on 13.9.99. Further, the expression `*CMTS with limited mobility*` used by MTNL to describe the service does not find a place in the National Telecom Policy of 1999 (NTP 1999), a point which was confirmed by the DOT in its letter dated 17.9.99 in response to correspondence by TRAI. An additional aspect of MTNL's request was that WILL is an access technique used for connecting a fixed telephone with an exchange. The NTP 1999 supports this view as WILL is mentioned in the section dealing with `Fixed Service Providers`.
4. TRAI's queries addressed a number of issues including the definition of service for which MTNL had submitted its tariffs request, whether MTNL had a license for providing the service, whether the equipment had been approved in regard to quality standards, costing details for the proposed tariff, certain inaccuracies/contradictions in the tariff proposal sent, and non-submission of tariff in the format specified. It will be relevant to note that since Government had permitted the use of only GSM technology hitherto, the cost based tariff exercise done earlier by TRAI was based on information provided for that technology.
5. MTNL's reply, dated 1st September, 1999, revised its earlier tariff proposal and changed the specification of the service to `CMTS using CDMA technology`. The reference to WILL was omitted, and the expression `limited mobility` was deleted from the description of the CMTS service. The definition of `limited mobility` was made to mean limited coverage of a service area, a process that is inherent in any roll out of a network for providing full coverage of the area licenced.
6. MTNL's letter of 1.9.99 was much before the Government of India's Order of 15.9.99, permitting MTNL to employ a technology other than GSM through DoT's letter No.842-304/99-VAS, dated 15.9.99. This Order amended MTNL's Cellular licence and allowed it to use any digital technology, including CDMA. MTNL was thus legally in a position to offer CMTS with CDMA only after 15.9.99.
7. MTNL's reply of 1.9.99 did not provide any information on the cost basis for the proposed tariff, and this fact was brought to MTNL's notice in the initial phase of the five working day period itself (i.e. on 6th September, 1999), so as to give MTNL adequate time to collect and submit the relevant cost details. This was followed by a TRAI's letter of 9th September, 1999, which again listed out clarifications/information required, including important points such as whether the Government had provided the relevant license to MTNL for providing CMTS with CDMA technology, the proposed area of coverage for the service, quality of service parameters, and the compatibility of MTNL's proposed initiatives with it plan to subsequently use GSM technology for providing CMTS.

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8. MTNL responded only on 15th September, 1999 after the Government had announced its policy decision permitting technology neutrality for cellular services and had amended MTNL's licence to permit the use of, inter alia, CDMA technology. It also responded, though only partially in particular with respect to queries regarding costs for calculating the tariff.
9. In the meanwhile, TRAI was completing its exercise on revised tariffs for calling party pays (CPP) regime, which it notified on 17th September, 1999 (This revised tariff becomes effective from 1st November, 1999). These tariffs incorporate the new revenue sharing arrangement in regard to licence fees, as also the calling party pays regime. The amended license granted to MTNL on 15th September, 1999 stipulates that the revenue sharing license fee regime would apply to MTNL also. TRAI, therefore, vide its letter of 20th September, 1999, sought to know as to whether MTNL had taken into account these changes, and if so, whether it wanted to alter its tariff report in any manner.
10. TRAI's letter of 20.9.1999 also raised other important regulatory issues including, for instance, quality of service, the specific frequency spectrum used, whether separate accounts will be maintained by MTNL for basic and cellular mobile services, and the tele-, bearer- and supplementary services that were proposed to be provided through CDMA technology, and whether these were at par with those provided with GSM based systems. In addition, more detailed cost information was sought, and MTNL was informed that since the introduction of a new technology involved a major policy change, TRAI would have to go through a consultation process to address the relevant issues.
11. MTNL's response, dated 21.9.99, indicates that the reported tariff included an element of cross-subsidy from basic to cellular service (MTNL proposed that the latter keep the revenue share that should be given to the former). The cost estimates submitted were still aggregate in certain instances (e.g. for operational costs), and in certain cases, were inconsistent with estimate provided in an earlier letter (e.g., MTNL's letter of 15.9.99 shows handset cost at Rs.10,000 while this letter showed it at Rs.15,000).
12. In its letter of 21.9.99, MTNL also contended that TRAI was delaying clearance of the proposed tariff. A detailed response to this contention was sent by TRAI on 27.9.1999. And since MTNL's response was coming in a piece-meal manner, and in certain instances was inconsistent, to expedite matters TRAI suggested that a meeting could be held with MTNL to clarify the relevant details.
13. A meeting was held on 27.9.1999 with MTNL, when TRAI sought details of cost estimates and their basis. In this meeting, MTNL disagreed that there would be any cross-subsidy if the revenue share for basic service network was not passed on to that network by the cellular mobile network. It was pointed out to MTNL that such an action was a cross-subsidy as the `Interconnection Regulation` required in these cases that the revenue be paid by cellular mobile to basic service network. MTNL did not agree on this point, but agreed to provide the detailed cost estimates and their basis, as well as a business plan under which its proposed tariff showed a viable business case.
14. On 28.9.1999, MTNL submitted some details of its operational costs which indicated that with respect to WPC charges, MTNL was operating with a cross subsidy from basic to its cellular mobile operations. Further, some of the cost items required further clarification in view of the low amounts that were reported. In fact, these estimates were much lower than the aggregate estimates that had been provided by MTNL for corresponding item in its letter of 21.9.1999. MTNL was informed on phone that explicit cost estimates had to be provided for WPC charges; a basis to calculate these costs was submitted through a letter dated 30.9.1999.
15. On 1.10.1999, MTNL was requested to come for another meeting to clarify the basis of the cost estimates that had been submitted on 28.9.1999. A meeting was fixed in the late afternoon that day, but was later cancelled by MTNL. This was followed by a letter delivered late night on 1.10.1999 to the Secretary, TRAI, stating that since TRAI had not approved a tariff request that was made on 23.8.1999 and subsequently clarified on a number of occasions, MTNL was introducing the service with provisional tariff.

Annex II
Background On Use Of CDMA Technology In India And Its Link With `Limited Mobility`

1. CDMA technology was introduced in India for wireless in local loop (WILL) application when MTNL's field-trials using this technology began in 1996. This technology can be used for both fixed line services and for providing mobile services. On 16th September, 1999, MTNL had requested TRAI's approval for tariffs for this service. Approval was granted the day after the appropriate request was received by the TRAI.
2. The extent of mobility allowed by CDMA technology is over a radius of about 30 kilometers, with newer versions of the technology having a much wider coverage.
3. Till a policy change was announced on 13th September, 1999, cellular mobile service could not be provided using a technology such as CDMA. Till that date, only GSM technology was the approved technology for providing cellular mobile services.
4. In April 1999, DOT reported to TRAI tariffs for services (with limited mobility) using CDMA

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technology in metro cities. TRAI sought certain clarifications on this matter. Subsequently, the Cellular Mobile Operators Association (COAI) sought the Authority's intervention in this regard.

5. The TRAI wrote to DOT on 9 June, 1999 to seek certain clarifications, and raised the following points:

   - The matter of providing limited mobility services through WILL was a long pending issue between COAI and DOT, with ongoing discussions on this issue;
   - The Telecommunication Tariff Order (TTO) 1999 issued by TRAI on 9 March, 1999, provides tariffs for basic (i.e. fixed line) services using WILL, but it does not make reference to any form of limited mobility service through WILL;
   - NTP 1999 too does not mention of any permission for providing limited mobility through WILL;
   - COAI had suggested that there was no basis for provision of limited mobility services through WILL by DOT and MTNL;
   - DOT/MTNL had not approached the TRAI for fixing tariffs for this service (i.e. limited mobility) after the issue of TTO 1999, nor was this issue raised during the consultation process leading to the finalization of TTO 1999;
   - The issues raised by COAI were substantive and had far-reaching implications relating to the scope of basic services and cellular mobile services; and
   - Therefore, DOT's comments were sought on the basis for providing these services through WILL.

1. The issue of `limited mobility` also arose when MTNL submitted on 23rd August, 1999, a tariff report to TRAI for cellular mobile telecom service. TRAI raised a query on this matter with MTNL and once again sought the opinion of DOT in this regard; the DOT had not till then replied on this matter to TRAI.
2. The issue was settled with a response from DOT, dated 17 September, 1999. In relevant part, the DOT stated that:

   `NTP-99 does not provide for any service known as Cellular Mobile Service with Limited Mobility.`

Annex III
License Conditions For Supplying Cellular Mobile Services

1. Till recently, the Government had licensed two service providers per service area for providing cellular mobile services in metros and circles. The license specified that the cellular mobile service providers (CMSP) should use GSM technology to provide these services. For example, the terms and conditions of the license Agreement for cellular mobile telephone services in the city of Delhi require of the licensee that:

   `For the purpose of providing the SERVICES, he may install equipment confirming to the GSM standards and to meet the Technical Specifications of Tender Document No. 44-24/91-MMC and clarifications thereof. …`

2. The technical specifications in the above-mentioned tender document relate to GSM technology. In specific, Tender Document for Cellular Mobile Telephone Service No. 44-24/91-MMC states in the section `Notice Inviting Tenders` that:

   `Offers should conform to Groupe Speciale Mobile (GSM) standards in the 900 MHz band.`

3. In the case of circles, the requirement is similar, namely:

   `For the purpose of providing the SERVICES, he shall install equipment confirming to the GSM standards and to meet the Technical Specifications of Tender Document No. 11-28/94-MMT(TM) and clarifications thereof. …`

National Telecom Policy 1999

4. The National Telecom Policy (NTP) 1999 specifies policies, inter alia, for Cellular Mobile Service Providers (CMSP) and Fixed Service Providers (FSP). In the section on CMSP, the NTP 1999 does not mention any specific technology. The technology to be used by CMSP is therefore that specified together with license conditions. For CMSP, this was GSM

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technology prior to 13 September, 1999.

5. NTP 1999 mentions wireless in local loop (WILL or WLL) in the section on Fixed Service Providers (FSP). It states that:

   `As in the case for cellular, for WLL also, availability of appropriate frequency spectrum as required is essential not only for providing optimal bandwidth to every operator but also for entry of additional operators.`

6. Regarding entry of other CMSP in the service areas, NTP 1999 states that:

   `Based on the immediately available frequency spectrum band, apart from the two private operators already licensed, DOT/MTNL would be licensed to be the third operator in each service area in case they want to enter, in a time bound manner. In order to ensure level playing field between different service providers in similar situations, license fee would be payable by DOT also.`

Recent events leading to MTNL's license to provide cellular mobile service with a technology other than GSM

7. According to a press release of the Telecom Commission, dated 13 September, 1999, some significant changes were made in the policy for providing cellular mobile services. These include, inter alia:

   - *all new cellular mobile service providers will be technology wise neutral. However, the technology must be digital. The existing licensees of cellular services on their migration to the NTP 1999 regime in terms of migration package already offered to them, will also be permitted to expand their networks using any other technology or the GSM technology to which they have been bound so far as per the existing licenses;*
   - *the DOT/MTNL would operate cellular services under the same terms and conditions of license as would be applicable to private operators. In view of the objectives of NTP 1999, till the terms and conditions of new licenses are finalised for which recommendations of TRAI have already been sought, DOT/MTNL would be permitted to operate cellular mobile services under provisional license;*
   - *the terms and conditions as finalised would be applicable to all licensees under NTP 1999 including MTNL and DOT. In terms of NTP 1999, the license fee thus received would be re-imbursed to DOT to provide resources for meeting immense rural and social obligations.*

8. On 15th September, 1999 the DOT gave MTNL with an amended license (circular number 842-304/99-VAS) for providing cellular mobile service with technology neutrality, i.e. MTNL received a license to use a technology other than GSM to provide cellular mobile service.

Table 1. Monthly Revenue Earned By Cellular Mobile Service Provider Under Specified Situations (Rs.)

(Ratio of incoming to outgoing calls is taken as 60:40; assumed that 90 per cent of the incoming calls pay termination charge (MTC) to the cellular mobile network (MTC is Rs. 1.60 per minute for first minute and Rs. 0.80 per 60 second pulse thereafter); revenue for outgoing call has been calculated without reference to average holding time (or alternatively, an average holding time of just less than one minute is taken for this purpose); figure in parenthesis shows 15 per cent of the revenue estimate)

	Monthly rental of Rs. 475 and call charge for outgoing call Rs. 3.50 per minute	**Monthly rental of Rs. 475 and call charge for outgoing call Rs. 4 per minute**	**Monthly rental of Rs. 600 and call charge for outgoing call Rs. 3.50 per minute**	**Monthly rental of Rs. 600 and call charge for outgoing call Rs. 4 per minute**
250 minutes of total	987	1,037	1,112	1,162

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usage per subscriber; average call holding time for incoming calls is <u>just below two minutes</u>	(148)	(156)	(167)	(174)
<u>250 minutes</u> of total usage per subscriber; average call holding time for incoming calls is <u>90 seconds</u>	1,041 (156)	1,091 (164)	1,166 (175)	1,216 (182)
<u>200 minutes</u> of total usage per subscriber; average call holding time for incoming calls is <u>just below two minutes</u>	885 (133)	925 (139)	1,010 (151)	1,050 (158)
<u>200 minutes</u> of total usage per subscriber; average call holding time for incoming calls is <u>90 seconds</u>	928 (139)	968 (145)	1,053 (158)	1,093 (164)

<u>Table 2. Per Subscriber Cumulative License Fee Paid By Cellular Mobile Service Providers in Delhi and Mumbai Prior to Migration To Revenue Share License Fee</u>

	Service Provider A	**Service Provider B**	**Service Provider C**	**Service Provider D**
Cumulative License Fee to Be Paid Prior To Migration To Revenue Share (Rs. Crore)	78.36	65.41	85.87	85.87
Annual Recurring Expenditure (ARE) of 30 % Applied To Above Amount (Rs. Crore)	23.51	19.62	25.76	25.76

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Monthly Per Subscriber Entry Fee As License Fee (Taking subscribers for June 1999; Rs.)	157	188	151	171

Source: Department of Telecommunications

Note: Provisional for fifth year beginning 1.4.99 based on subscriber numbers as on 31.3.99. The amount does not include interest on delayed payments.

Table 3. Monthly Cost Incurred For Procurement Of Handsets

Procurement cost of Rs. 10,000 and security deposit of Rs. 10,000 (Cost is ARE 30 % and earning is interest on deposit of 12 %)	Rs. 150
Procurement cost of Rs. 13,000 and security deposit of Rs. 10,000 (Cost is ARE 30 % and earning is interest on deposit of 12 %)	Rs. 225
Procurement cost of Rs. 15,000 and security deposit of Rs. 10,000 (Cost is ARE 30 % and earning is interest on deposit of 12 %)	Rs. 275

Table 4. Comparison of Annual Operational Costs Provided by MTNL And Those Determined With Independent Estimates

Item	Estimate Provided By MTNL (Rs. Lakhs)	Independent Estimate (Rs. Lakhs)
Salaries and wages (1 DE + 2 SDE + 4 JTOs)	8	8
Personnel Overheads	2	2
WPC charge	19*	19
Interconnection charge	20	16
Network repairs and maintenance charge	2	80 (67)***
Sales and marketing expense	2	25

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Cost of insurance of handsets	15	15
Billing and customer care	2	4
Cost of rental and power for MSC, BTS, etc.	30**	32
TOTAL	**100**	**201 (188)**

Notes:

* For WPC charge, MTNL had not indicated the number of carriers that they would use for providing service to 9,000 subscribers. This cost item for MTNL's submission has been determined on the basis of the number of carriers required;

** The cost estimate submitted by MTNL states that Rs. 30 lakhs is the capital expenditure required for BTS etc. Subsequently, MTNL clarified on phone that this was an annual recurring expenditure.

*** Network repair and maintenance cost has been calculated in the independent estimate by taking 5 per cent of capital cost. The lower estimate is the amount that would apply if the capital expenditure per line were the same as that applicable to the 9,000 lines added after the initial 1,000 lines, i.e. 5 per cent of Rs. 12 crores taking 90 per cent capacity utilization to determine the number of subscribers.

Table 5. Cost Based Rental and Call Charge for Cellular Mobile Estimated in the Second Consultation Paper on Tariffs (Rs.)

	Rental based on costs in 1999-2000	Rental based on costs in 2000-2001	Call charge based on costs in 1999-2000	Call charge based on costs in 2000-2001
Median with ARE of 30 Per Cent	644	598	6.30	6.36
Median with ARE of 25 Per Cent	579	539	6.30	6.36

Source: Table AIII.4B of the Consultation Paper on Telecom Pricing, Consultation Paper No. 98/3, dated September 9, 1998.

Table 6. Total cost To Be Covered Per Month For Cellular Mobile Service Using CDMA (Rs.)

Rental Costs	Other Costs	Total Costs
615	495	1,110
615	506	1,121
615	581	1,196

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